PROVINCIAL ADMINISTRATION OF KWAZULU-NATAL
DEPARTMENT OF HEALTH

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

BILLS OF QUANTITIES

with GCC for Construction Works - Second Edition 2010

RETURNABLE DOCUMENT

ONE VOLUME APPROACH

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Engineer/Principal Agent
TJ Architects South Coast (Pty) Ltd
1455 Lynne Avenue
Ramsgate
Ramsgate
4285
039 682 7911 - Tel Number
gdutoit@venturenet.co.za

Employer:
Head: Department of Health
KZN Department of Health
Private Bag X 9051
Pietermaritzburg
3200
Tel Number: 033 - 940 2400

Tender Number:	ZNB5526/2023-H	Document Date:	17 Novemebr 2023
CIDB Grading:	8GB	Contract Period:	24 Calendar Months

Contracting Party: _____

CIDB Registration number: _____

Central Suppliers Database Registration Number: _____

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

KWAZULU-NATAL PROVINCE
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THE TENDER

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IMPORTANT NOTICE TO TENDERERS

Any reference to words Tender or Tenderder herein and/or in any other documentation shall be construed to have the same meaning as the words Tender or Tenderer. These forms are for internal and external use for the KZN Department of Health, Provincial Administration of KwaZulu-Natal.

"Quality" shall mean totality of features and characteristics of a product or service that bears on the ability of the product or service to satisfy stated or implied needs.

No alternativeTenders will be accepted.

The Total (Including Value Added Tax) on the Final Summary of the Bill of Quantities must be carried to the "Offer" part only of the Form of Offer and Acceptance - T2.21

"Enterprise" shall mean the legal Tenderding Entity or Tenderder who, on acceptance of the Offer, would become the contractor"

All amendments issued for this tender must be downloaded from the website stated in the tender advertisment.

Tenderers are to ensure that all returnable documents as stated in T2.1, items 1 to 5, are submitted to avoid disqualification. Furthermore, tenderers are to ensure that all documents stated in T2.1, item 6, are submitted in order to be evaluated for functionality as per the requirements of T2.36.

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MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

The Tender

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PART T1. - TENDER PROCEDURES

KWAZULU-NATAL PROVINCE
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MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

T1.1 - TENDER NOTICE AND INVITATION TO TENDER

T1.1 TENDER NOTICE AND INVITATION TO TENDER

THE KZN DEPARTMENT OF HEALTH INVITES TENDERS FOR THE PROVISION OF:

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**
Advertisement date:	**17 November 2023**	**Closing date:**	**16 January 2024**
Closing time:	**11:00**	**Validity period:**	**84 Days**

It is estimated that tenderers must have a CIDB contractor grading designation of 8GB or higher. No alternative Class of work, as refered to in Clause 25(3)(a)(i) of the CIDB Regulations, as amended, is anticipated for this project.

X	All Tenderer's should have a CIDB Class of Construction Contractor Grading Designation as indicated above. No Tenderer with a PE status will be considered as the Department does not have an Official Mentorship Programme in place to assist a Potentially Emerging Enterprise.

Only Tenderder's who are responsive to the following responsiveness criteria are eligible to submit Tenders:

X	Only those tenderers who are registered with the CIDB, or are capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations for a : 8GB or higher, class of construction work, are eligible to have their Tenders evaluated.
X	Joint ventures are eligible to submit tenders provided that: 1 every member of the joint venture is registered with the CIDB; 2 the lead partner has a contractor grading designation in the 8GB or higher, class of construction work; or 3 the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a : **8GB** or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations.
X	Tender document must be properly received on or before the tender closing date and time specified on the invitation, fully completed and signed in ink (All as per Standard Conditions of Tender).
X	Submission of Compulsory Returnable Schedules documents as per List of returnable documents.
X	Tax Compliance Status (TCS) PIN number and Tenderder's or entity tax reference number.
X	Contractor's Safety, Health and Environmental Declaration.
X	Complete priced Bill of Quantities to be submitted.
X	Proof of good standing with the Compensation Commissioner - In terms of Section 84(1)(b) of the Compensation for Occupation Injuries and Disease Act, 1993, a Tenderder may not be awarded a contract if he/she is not registered and in good standing with the Compensation Commissioner.
☐	Proof of UIF Registration - Not Applicable (T2.24)
X	Compulsory Enterprise Questionnaire (T2.18)
X	**Tenderers must meet the minimum qualifying score for functionality criteria first before they can be considered for price and preference.**
X	Invitation to Tender - SBD 1

THE FOLLOWING PARTICULARS MUST BE FURNISHED (FAILURE TO DO SO MAY RESULT IN YOUR TENDER BEING DISQUALIFIED)

Name of Tenderer: _____

Postal Address: _____

Street Address: _____

Telephone Number CODE _____ NUMBER _____

Cellphone Number: _____

E-mail Address: _____

VAT Registration Number: _____

TAX COMPLIANCE STATUS (TCS) PIN TO VERIFY ON LINE COMPLIANCE SUPPLIER STATUS VIA SARS e-FILING (T2.19) YES ☐ or NO ☐

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS / SERVICES / WORKS OFFERED? [If yes, enclose proof] YES ☐ or NO ☐

THE TENDER SHALL BE EVALUATED IN THREE (3) STAGES. THE STAGES ARE AS FOLLOWS:

STAGE 1 - Administrative compliance: All mandatory returnable documents have been submitted and are compliant; the tender documentation has been fully completed and signed. This must include mandatory requirements as indicated below (T2.1), if applicable. The bidder who did not submit administrative and mandatory requirements will be treated as non-responsive and will not progress to the next evaluation stage

STAGE 2 - Evaluation of functionality criteria: As stated in T2.36 (if applicable). Tenderers are required to submit the stated documents and achieve the minimum stated score to proceed to the next Stage of evaluation. The bidder who did not submit administrative and mandatory requirements will be treated as non-responsive and will not progress to the next evaluation stage

STAGE 3 - Evaluation of price and preference points

Notes

T2.1: Returnable Documentation

List of returnable documents include the following:

- Returnable schedules required for tender evaluation purposes
- Documents required for the evaluation of mandatory technical criteria (if applicable)
- Documents required for the evaluation of functionality

This tender will be evaluated according to the preferential procurement model in the Preferential Procurement Policy Framework Act, 2000: Preferential Procurement Regulations, 2022:

☐ 80/20 Preference point scoring system ☒ 90/10 Preference point scoring system

NOTE	Refer to T2.36 - Functionality Criteria		
Functionality requirement:		60	Points
Price:		90	points
Preference point scoring system will be based on the following points:			
Preference points system: **Preferences are offered to Tenderder's who have attained the following in accordance with the table below:**			
1.	**Specific goals (according to the PPPFA):**		
(a)	In terms of Race, full, partial or combination of points may be allocated to companies who are at least 51% Owned by Black People	10	Points
Total must equal **10 or 20 points**		**10**	Points

Notes:

1 The successful Tenderder will be required to sign a contract.

2 Tenderders should ensure that Tenders are delivered timeously to the correct address. If the Tender is late, it will not be accepted for consideration.

3 The Tender box is generally open during official working hours.

4 All Tenders must be submitted on the official forms – (Not to be re-typed)

5 THIS TENDER IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS (GCC2010) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT

6 Where stated in the tender data that a two-envelope system has been followed, open only the non-financial proposal of valid tenders in the presence of tenderer's 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.

7 Evaluate that non-financial 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 are to be opened.

8 Open only the financial proposals of tenderers who, in the Functionality evaluation score, have more than the minimum number of points for Functionality stated in the tender data, and announce the score obtained for the non-financial proposals and the total price and any preferences claimed. Return unopened financial proposals to tenderers whose non-financial proposals failed to achieve the minimum number of points for Functionality.

THE PHYSICAL ADDRESS FOR COLLECTION OF TENDER DOCUMENTS:

Tender documents may be collected during working hours at the following address :

Department of Health Central Supply Chain 310 Jabu Ndlovu Street, Pietermaritzburg,3200

A non-refundable tender deposit of RTBC is payable as per the tender advertisement , on collection of the Tender documents.

COMPULSORY CLARIFICATION MEETING

It is vital that a technically qualified and knowledgeable member from the tenderer's firm attends the compulsory site clarification meeting.

A Compulsory clarification Meeting with representatives of the Employer will take place as follows:

Townhill Office Park, Boardroom 1 @11:00am, followed up by inspection of site @Mpolweni

on: **Tuesday, 05 December 2023**

QUERIES REGARDING THE TENDERING PROCEDURE OR TECHNICAL INFORMATION MAY BE DIRECTED TO:

DOH Project Manager:	Amile Ndlovu	**Telephone no:**	(033) 940 2400
Cell no:	0817175835		
E-mail:	Amile.Ndlovu@kznhealth.gov.za		

DEPOSIT / RETURN OF TENDER DOCUMENTS:

Telegraphic, telephonic, telex, facsimile, electronic, posted and / or late tenders will not be accepted.

Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the **Tender Data document.**

All tenders must be submitted on the official forms – (not to be re-typed)

TENDER DOCUMENTS MAY BE:

DEPOSITED IN THE TENDER BOX AT:
Tender Advisory Services Supply Chain Management, Head Office 310 Jabu Ndlovu Street Pietermaritzburg 3200

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MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

T1.2 - TENDER DATA

T1.2 TENDER DATA

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Project Code:	**N/A**		
Tender no:	**ZNB5526/2023-H**	**Closing date:**	**16 January 2024**
Closing time:	**11:00**	**Validity period:**	**84 Days**

Clause number:		
	The conditions of Tender are the Standard Conditions of Tender as contained in Annexure C of the CIDB Standard for Uniformity in Engineering and Construction Works Contracts as per Board Notice **423 of 2019** in Government Gazette **42622 of 8 August 2019** as amended from time to time (see www.cidb.org.za). Refer to Conditions of Tender as contained within this document. 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 marked "C" in the above mentioned Standard Conditions of Tender.	
C.1.1	For this contract the single volume approach is adopted. This procurement document has been formatted and compiled under the headings for a single volume approach as contained in table 5 of the CIDB's "Standard for Uniformity in Engineering and Construction Works Contracts." The list of Returnable Documents identifies which of the documents a Tenderder must complete when submitting a Tender. The Tenderder must submit his Tender by completing the Returnable Documents including the priced Final Summary of the Bills of Quantities, signing the "Offer" section in the "Form of Offer and Acceptance" and delivering the whole of the procurement document back to the Department bound up as it was when it was received.	
C.1.2	The single volume procurement document issued by the Employer comprises the following:	
	TENDER	
	Part T1: Tendering procedures	
	T1.1 -	Tender Notice and Invitation to Tender
	T1.2 -	Tender Data
	T1.3 -	Annexure C - Standard Conditions of Tender
	Part T2: Returnable documents	
	T2.1 -	List of returnable documents
	T2.2 -	Returnable schedules (See different forms listed in ***T2.1 - Returnable Schedule***)
	CONTRACT	
	Part C1: Agreements and Contract Data	
	C1.1 -	Form of Offer and Acceptance
	C1.2 -	Contract Data
	C1.3 -	Form of Guarantee
	Part C2: Pricing data	
	C2.1 -	Pricing Instructions
	C2.2 -	Bills of Quantities
	Part C3: Scope of works	
	C3.1 -	Scope of Works
	C3.2 -	Specification for HIV/AIDS awareness
	C3.3 -	HIV/STI Compliance report
	C3.4 -	Project Specific Construction Safety, Health and Environmental Specification
	C3.5 -	Supplementary Preambles

	Part C4: Site information	
	C4.1 -	Site Information
	C4.2 -	Builders Lien Agreement
	Part 5: List of Drawings/Annexure's	
	C5.1 -	List of Drawings
	C5.2 -	General Electrical Specifications
	C5.3 -	Lightning Protection Specifications
	C5.4 -	Map of Tender submission location
	C5.5 -	Joint Venture Agreement
	C5.6 -	Health and Safety Specification
	C5.7 -	Health and Safety Bill of Quantities
	C5.8 -	Builders Lien Agreement
	C5.9 -	Geotechnical Investigation Report (If applicable)
	C5.10 -	EPWP Employment Contract
	C5.11 -	Attendance Register - Infrastructure and Other projects
	C5.12 -	EPWP Data Collection tool for Phase 3 system

C.1.4	The Employer's agent (Engineer/Principal Agent) is:	
	Name:	**TJ Architects South Coast (Pty) Ltd**
	Capacity:	**Principal Agent/Engineer**
	Address:	**1455 Lynne Avenue , Ramsgate , Ramsgate , 4285**
	Tel:	**039 682 7911**
	E-mail:	**gdutoit@venturenet.co.za**
	Responsible person:	**Gerhard du Toit**

C.1.6	**PP2-Competitive Selection Procedure**	**Design by Employer**
	PP2B-Open Procedure	
	Tenderers must meet the minimum qualifying score for functionality criteria first before they can be considered for price and preference.	

C.2.1

For eligibility refer to **T1.1 Tender Notice and Invitation to Tender**

This project is an EPWP project and the tenderer is advised to price accordingly.

Only those tenderers who are registered with the CIDB, or are capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations for a :

8GB or higher class of construction work, are eligible to have their tenders evaluated.

Joint ventures are eligible to submit tenders provided that:

1 every member of the joint venture is registered with the CIDB;

2 the lead partner has a contractor grading designation in the 8GB or higher, class of construction work; or

not lower than one level below the required the required grading designation in the class of works construction works under considerations and possess the required recognition status

3 the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a :

8GB or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations.

See end of T2.3 AUTHORITY FOR CONSORTIA OR JOINT VENTURES TO SIGN TENDER for combinations of JV's arrangements.

C.2.7	For particulars regarding a pre-tender site inspection meeting (clarification meeting), see **T1.1 Tender Notice and Invitation to Tender.**
C.2.12	Alternative tender offer permitted: **Yes** ☐ **No** ☒
	If a tenderer wishes to submit an own alternative tender offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the Employer's standards and requirements. A tenderer may submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted. Provided that the tenderer's main tender offer is according to specification and would under normal circumstances be recommended for acceptance, his alternative tender offer may also be considered for the purpose of the award of the contract. 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 Employer's 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 Employer's 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 Employer's costs of confirming the acceptability of the detailed design before it is constructed.
C.2.13.2	Tenderers are to ensure that their company details appear on the entire relevant Tender documentation and must be legible.
C.2.13.4	The second sentence shall read as follows "The Employer will hold all authorised signatories jointly and severally liable on behalf of the tenderer". Tenderders proposing to contract as a Joint Venture shall submit a valid Joint Venture Agreement before the Joint Venture's offer could be accepted. Individuals, Partnerships and Companies proposing to contract as a party to a Joint Venture shall be jointly and severally liable on behalf of the Joint Venture.
C.2.13.5	The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are as per **T1.1 Tender Notice and Invitation to Tender.**
C.2.15	The closing time for submission of tender offers is as per **T1.1 Tender Notice and Invitation to Tender.**
C.2.16	The tender offer validity period is as per **T1.1 Tender Notice and Invitation to Tender.**
	The tenderer is to submit the Priced Bills of Quantities with the Returnable's at the closing of the tender.
C.2.19	Access shall be provided for inspections, tests and analysis as may be required by the Employer.
C.2.22	Tenderers **do not** have to return all retained tender documents within 28 days after expiry of the Tender validity period.
	Tenderers are to refer to **List of Returnable Schedules** and **Scope of Works** to establish what is required to be submitted with this tender.
C.3.4	The location for opening of the tender offers, immediately after the closing time thereof shall be at: **KZN Department of Health, 310 Jabu Ndlovu Street, Pietermaritzburg, 3200 at the time indicated on T1.1 Notice and Invitation to Bid**
C.3.8	The employer must determine, on opening and before detailed valuation, whether each Tender offer properly received: a) complies with the requirements of the 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: a) detrimentally affect the scope, quality, or performance of the Works, services or supply identified in the Scope of Work or b) significantly change the Employers or the Tenderers risks and responsibilities under the contract, or c) affect the competitive position of other Tenderers presenting responsive tenders, if it were to be rectified. Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

C.3.13	**Tender offers will only be accepted if:** (a) Tenderers must be registered on Government's Central Supplier Database (CSD) and include their master registration number (MAAA number) on the cover page of the tender document in order to enable the institution to verify the tenderers tax status on the CSD (b) the Tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation as is required for this tender and the Tenderder has submitted a CIDB certificate of registration which clearly indicates the status "Active" (c) the Tenderer has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the Tenderder's ability to perform to the contract in the best interests of the employer or potentially compromise the Tender process. (d) the Tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act, 2004 (Act No. 12 of 2004) as a person prohibited from doing business with the public sector; and (e) the Tenderer has not: i) abused the Employer's Supply Chain Management System; or ii) failed to perform on any previous contract and received a written warning/notice or has been terminated on any contract, in the past 5 years with the KZN Department of Health (f) the Tenderer is registered with: i) the Workmen's Compensation Fund (g) the Tenderer submitted Authority to Sign the tender. (h) the Tenderer submitted Financial Standing & other resources of Business Declaration. (i) the Tenderer signed the Form of Offer that is part of the Form of Offer and Acceptance. (j) the Tenderer submitted proof of Preference, if applicable. (k) the Tenderer submitted the fully completed Bill of Quantities including Final Summary at tender closing. (l) the Tenderer submitted a completed Bidder's Disclosure (SBD4). (m) the Tenderer submitted Site Inspection Certificate from the Compulsory Briefing Meeting. (n) the Tenderer submitted deliverables required to assess any stated mandatory criteria. (o) the Tenderer has incorporated all issued addenda (if applicable) into their submitted tender document and/or has complied with any instructions given through issued addenda. Providing the form of offer and acceptance does not contain any qualifying statements, it will constitute the formation of a contract between the employer and the successful Tenderer as described in the form of offer and acceptance.
C.3.15	Tenderders are informed that any formal dispute shall be resolved by being referred to Arbitration only.

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T1.3 - Annexure C - Standard Conditions of Tender

T1.3 - Annexure C - Standard Conditions of Tender

Note: Where this document refers to Bid or Bidder it shall be read as tender or tenderer

C.1 General

C.1.1 Actions

C.1.1.1 The employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently and comply with all legal obligations and not engage in anticompetitive practices.

C.1.1.2 The employer and the tenderer and all their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderer's shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process or as soon as they become aware of such conflict, and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.

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

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

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

C.1.2 Tender Documents

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

Interpretation

C.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.

C.1.3.2 These conditions of tender, the **tender data** and tender schedules which are required for tender evaluation purposes, shall form part of any contract arising from the invitation to tender.

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

a) **conflict of interest** means any situation in which:

i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfil his or her duties impartially;

ii) an individual or tenderer is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or

iii) incompatibility or contradictory interests exist between an employee and the tenderer who employs that employee.

comparative offer means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;

c) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process;

d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels.

C.1.4 Communication and employer's agent

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

C.1.5 Cancellation and Re-Invitation of Tenders

C.1.5.1 An employer may, prior to the award of the tender, cancel a tender if-

a) due to changed circumstances, there is no longer a need for the engineering and construction works specified in the inviteation;

b) funds are no longer available to cover the total envisaged expenditure; or

c) no acceptable tenders are received.

d) there is a material irregularity in the tender process.

C.1.5.2 The decision to cancel a tender invitation must be published in the same manner in which the original tender invitation was advertised.

C.1.5.3 An Employer may only with the prior approval of the relevant treasury cancel a tender invitation for the second time.

C.1.6 Procurement procedures

C.1.6.1 General

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

C.1.6.2 Competitive negotiation procedure

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

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

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

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

C.1.6.3 Proposal procedure using the two stage-system

C.1.6.3.1 Option 1

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

F.1.6.3.2 Option 2

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

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

C.2 Tenderer's obligations

C.2.1 Eligibility

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

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

C.2.2 Cost of tendering

C.2.2.1 Accept that, unless otherwise stated in the **tender data**, the employer will not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer complies with requirements.

C.2.2.2 The cost of the tender documents charged by the employer shall be limited to the actual cost incurred by the employer for printing the documents. Employers must attempt to make available the tender documents on its website so as not to incur any costs pertaining to the printing of the tender documents.

C.2.3 Check documents

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

C.2.4 Confidentiality and copyright of documents

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

C.2.5 Reference documents

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

C.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.

C.2.7 Clarification meeting

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

C.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five (5) working days before the closing time stated in the **tender data**.

C.2.9 Insurance

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

C.2.10 Pricing the tender offer

C.2.10.1 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT)), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the **tender data**.

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

C.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**.

C.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.

C.2.11 Alterations to documents

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

C.2.12 Alternative tender offers

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

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

C.2.12.3 An alternative tender offer must only be considered if the main tender offer is the winning tender.

C.2.13 Submitting a tender offer

C.2.13.1 Submit one tender offer only, either as single tendering entity or as a member in a joint venture to provide the whole of the works, services or supply identified in the **contract data** and described in the **scope of works**, unless stated otherwise in the **tender data**.

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

C.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.

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

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

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

C.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**.

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

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

C.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.

C.2.15 Closing time

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

C.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.

C.2.16 Tender offer validity

C.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**.

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

C.2.16.3 Accept that a tender submission that has been submitted to the employer may only be withdrawn or substitutes by giving the employer's agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted. If the validity period lapses before the employer evaluating the tender offer(s), the contractor reserves the right to review the price based on Consumer Price Index (CPI)

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

C.2.17 Clarification of tender offer after submission

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

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

C.2.18 Provide other material

C.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the employers request, the employer may regard the tender offer as non-responsive.

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

C.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**.

C.2.20 Submit securities, bonds and policies

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

C.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.

C.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**.

C.2.23 Certificates

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

C.3 The employer's undertakings

C.3.1 Respond to request from the tenderer

C.3.1.1 Unless otherwise stated in the **tender data**, respond to a request for clarification received up to five (5) working days before the tender closing time stated in the **tender data** and notify all tenderers who collected tender documents.

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

a) an individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;

b) the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or

c) in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

C.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until three (3) days before the tender closing time stated in the **tender data**. If, as a result a tenderer applies for an extension to the closing time stated in the **tender data**, the Employer may grant such extension and, shall then notify all tenderers who collected tender documents.

C.3.3 Return late tender offers

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

C.3.4 Opening of tender submissions

C.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.

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

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

C.3.5 Two-envelope system

C.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 tenderer's' 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.

C.3.5.2 Evaluate the functionality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the functionality evaluation more than the minimum number of points for functionality stated in the **tender data**, and announce the score obtained for the technical proposals and the total price and any points claimed on BBBEE status level. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for functionality.

C.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.

C.3.7 Grounds for rejection and disqualification

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

C.3.8 Test for responsiveness

C.3.8.1 Determine, after opening and before detailed evaluation, whether each tender offer properly received:

a) complies with the requirements of these Conditions of Tender,

b) has been properly and fully completed and signed, and

c) is responsive to the other requirements of the tender documents.

C.3.8.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would:

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

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

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

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

C.3.9 Arithmetical errors, omissions and discrepancies

C.3.9.1 Check Responsive tenders for discrepancies between amounts in words and amounts in figures.Where there is a discrepancy between the amounts in figures and the amount in words, the amount in words shall govern.

C.3.9.2 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with F.3.11 for:

a) the gross misplacement of the decimal point in any unit rate;

b) omissions made in completing the pricing schedule or bills of quantities; or

c) arithmetic errors in:

i) line items totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or

ii) the summation of the prices.

C.3.9.3 Notify the tenderer of all errors or omissions that are identified in the tender offer and either confirm the tender offer as tendered of accept the corrected total of prices

C.3.9.4 Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows:

a) If bills of quantities or pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected.

b) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the tenderer will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.

C.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.

C.3.11 Evaluation of tender offers

The Standard Conditions of Tender standardize the procurement processes, methods and procedures from the time that tenders are invited to the time that a contract is awarded. They are generic in nature and are made project specific through choices that are made in developing the Tender Data associated with a specific project.

Conditions of tender are by definition the document that establishes a tenderer's obligations in submitting a tender and the employer's undertakings in soliciting and evaluating tender offers. Such conditions establish the rules from the time a tender is advertised to the time that a contract is awarded and require employers to conduct the process of offer and acceptance in terms of a set of standard procedures

The CIDB Standard Conditions of Tender are based on a procurement system that satisfies the following system requirements:	
Requirement	**Qualitative interpretation of goal**
Fair	The process of offer and acceptance is conducted impartially without bias, providing simultaneous and timely access to participating parties to the same information.
Equitable	Terms and conditions for performing the work do not unfairly prejudice the interests of the parties.
Transparent	The only grounds for not awarding a contract to a tenderer who satisfies all requirements are restrictions from doing business with the employer, lack of capability or capacity, legal impediments and conflicts of interest.
Competitive	The system provides for appropriate levels of competition to ensure cost effective and best value outcomes.
Cost effective	The processes, procedures and methods are standardized with sufficient flexibility to attain best value outcomes in respect of quality, timing and price, and least resources to effectively manage and control procurement processes.

The activities associated with evaluating tender offers are as follows:

a) Open and record tender offers received
b) Determine whether or not tender offers are complete
c) Determine whether or not tender offers are responsive
d) Evaluate tender offers
e) Determine if there are any grounds for disqualification
f) Determine acceptability of preferred tenderer
g) Prepare a tender evaluation report
h) Confirm the recommendation contained in the tender evaluation report

C.3.11.1 General

The employer must appoint an evaluation panel of not less than three persons conversant with the proposed scope of works to evaluate each responsive tender offer using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

C.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.

C.3.13 Acceptance of tender offer

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

a) Is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement,

b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract,

c) has the legal capacity to enter into the contract,

d) is not; insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act No. 2008, bankrupt or being wound up, has his/her affairs administered by a court or a judicial officer, has suspended his/her business activities or is subject to legal proceedings in respect of any of the foregoing;

e) complies with the legal requirements, if any, stated in the **tender data**, and

f) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

C.3.14 Prepare contract documents

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

a) addenda issued during the tender period,

b) inclusion of some of the returnable documents, and

c) other revisions agreed between the employer and the successful tenderer.

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

C.3.15 Complete Adjudicator's Contract

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

C.3.16 Registration of the Award

An Employer must, within twenty-one (21) working days from the date on which a contractor's offer to perform a construction works contract is accepted in writing by the employer, register and publish the award on the cidb Register of Projects.

C.3.17 Provide copies of the contracts

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

C.3.18 Provide written reasons for actions taken

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

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

PART T2 - RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Project Manager:	**Amile Ndlovu**	**Tender no:**	**ZNB5526/2023-H**

STAGE 1 VERIFICATION: MINIMUM MANDATORY / COMPULSORY REQUIREMENTS FOR TENDER EVALUATION PURPOSES

(Tenderer to Insert a tick (√) in the "Returnable document" column to check which documents he/she returned with the tender)

Document name	Returnable document	
Invitation to Tender - SBD 1 (T2.37)	**Yes**	
Bidder's Disclosure - SBD 4 (T2.11)	**Yes**	
Authority to Sign Tender (T2.2)	**Yes**	
Authority for Consortia or Joint Venture's to Sign Tender (T2.3)	**Yes**	
Special Resolution of Consortia or Joint Venture's (If applicable) (T2.4)	**Yes**	
Joint Venture Involvement Declaration (If applicable) (T2.5)	**Yes**	
Financial Standing and other resources of Business Declaration (T2.8)	**Yes**	
Site Inspection Certificate as proof for attendance of compulsory briefing meeting (T2.10)	**Yes**	
Record of Addenda to Tender Documents (T2.12)	**Yes**	
Schedule of Imported Materials and Equipment (T2.14)	**Yes**	
Latest Audited Annual Financial Statement (T2.15a)	**No**	N/A
Contractor's Safety, Health and Environmental Declaration. (T2.17)	**Yes**	
Compulsory Enterprise Questionnaire (T2.18)	**Yes**	
Tax Compliance Status (TCS) PIN to verify on line Compliance Supplier Status via e-Filing (T2.19)	**Yes**	
Proof of Good Standing with the Compensation Commissioner (Attach) (T2.20)	**Yes**	
Form of Offer and Acceptance (Bound into Section 1 of 2) (T2.21)	**Yes**	
Proof of UIF Registration - Not Applicable (T2.24)	**No**	N/A
The National Industrial Participation Programme (T2.25)	**Yes**	
Proof of Registration Number on the Central Suppliers Database (T2.27)	**Yes**	
Complete Priced Bill of Quantities	**Yes**	

DOCUMENTS REQUIRED FOR THE EVALUATION OF MANDATORY TECHNICAL CRITERIA (IF APPLICABLE) - T2.29

(Tenderer to Insert a tick (√) in the "Returnable document" column to check which documents he/she returned with the Tender)

Tender document requirement	Returnable	
N/A		
N/A		
N/A		
N/A		

Note: >The documents, as stated in the above table if applicable, must be submitted with the tender by the closing date and time as determined by the KZN Department of Health. Should these documents not be submitted by the tenderer as required, then the tender will be declared as non-responsive and will be disqualified. Should the tenderer submit the required documentation but the evaluation committee requires further clarity/information to conduct their assessment, then the tenderer may be contacted to provide this additional information failing which the tenderer shall be eliminated from the evaluation process.

STAGE 2 DOCUMENTS REQUIRED FOR THE EVALUATION OF FUNCTIONALITY - T2.36

(Tenderer to Insert a tick (√) in the "Returnable document" column to check which documents he/she returned with the Tender)

Tender document requirement	Returnable	
Tenderer to demonstrate their technical competency, human resource capacity and relevant project experience. Letters of award to be attached and practical completion certificate for completed projects in the preceding 7 years	**Yes**	
Tenderer to submit curriculum vitae that demonstrates extensive experience	**Yes**	

STAGE 3 EVALUATION OF PRICE AND PREFERENCE - T2.9

The Department has identifed the following specific goal:

- full points(10 points) to companies who are at least 51% Owned by Black People

Ownership verification will be conducted through Central Suppliers Database by National Treasury, through the B-BBEE scorecard attributes or Companies and Intellectual Property Commission (CIPC), using Municipal Local Economic Development Database, Confirmation Letters from Municipality and councillors

(Tenderer to Insert a tick (√) in the "Returnable document" column to check which documents he/she returned with the tender)

Document name	Returnable document	
Proof of ownership in the form of printouts from CSD or CIPC clearly indicating ownership details	**Yes**	

T2.2 AUTHORITY TO SIGN TENDER

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

_____

_____

(Legally correct full name and registration number, if applicable, of the Enterprise)

held at *(town)* : _____ on *(date)* : _____

RESOLVED that:

1. The Enterprise submits a Tender to the KZN Department of Health in respect of the following project:

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Tender Number: **ZNB5526/2023-H**

2.
*Mr./Mrs./Ms: _____

in *his/her capacity as: _____ *(Position in the Enterprise)*

and who will sign as follows: _____ (Authorised Signatory)

be, and is hereby, authorised to sign the Tender, and any and all other documents and/or correspondence in connection with and relating to this Tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the Tender to the Enterprise mentioned above.

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			

Note:

*1. * Delete which is not applicable.*

2. NB. This resolution / Power of Attorney must be signed by all the Directors / Members / Partners of the Legal Tendering Enterprise authorising the Representative to make this Offer.

3. Should the number of Directors / Members/Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

*4. In the case of the tendering Enterprise being a Close Corporation, a **copy of the Founding Statement** of such corporation must be attached to this tender.*

ENTERPRISE STAMP (If Any)

T2.3 AUTHORITY FOR CONSORTIA OR JOINT VENTURES TO SIGN TENDER

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

_____

_____

(*Legally correct full name and registration number, if applicable, of the Enterprise)*

held at *(town)* : _____ on *(date)* : _____

RESOLVED that:

1. The Enterprise submits a Tender, in consortium/Joint Venture with the following Enterprises:

   _____

   _____

   (List all the legally correct full names and registration numbers, if applicable, of the Enterprises forming the Consortium/Joint Venture)

   to the KZN Department of Health in respect of the following project:

   MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

   Tender Number: **ZNB5526/2023-H**

2. * Mr. / Mrs. / Ms.: _____ in

   *his/her Capacity as: _____ *(Position in the Enterprise)*

   and who will sign as follows: _____
   be, and is hereby, authorised to sign a consortium/joint venture agreement with the parties listed under item 1 above, and any and all other documents and/or correspondence in connection with and relating to the consortium/joint venture, in respect of the project described under item 1 above.

3. The Enterprise accepts joint and several liability with the parties listed under item 1 above for the due fulfilment of the obligations of the joint venture deriving from, and in any way connected with, the Contract to be entered into with the Department in respect of the project described under item 1 above.
4. The Enterprise chooses as its *domicilium citandi et executandi* for all purposes arising from this joint venture agreement and the Contract with the Department in respect of the project under item 1 above:

   Physical address: _____

   _____

   _____

   _____ (Postal Code)

   Postal Address: _____

   _____

   _____

   _____ (Postal Code)

Telephone number: *(Dialling Code followed by number)* _____

Fax number: *(Dialling Code followed by number)* _____

Email Address : _____

***BOARD OF DIRECTORS / MEMBERS / PARTNERS in Consortium of Joint Venture**

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Note:

*1. * Delete which is not applicable.*

2. NB. This resolution / Power of Attorney must be signed by all the Directors / Members / Partners of the Tendering Enterprise.

3. Should the number of Directors / Members/Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

ENTERPRISE STAMP (If Any)

Deemed to satisfy joint venture arrangements	Designation
Grading 2 + Grading 2 + Grading 2	= 3
Grading 3 + Grading 3 + Grading 3	= 4
Grading 4 + Grading 4	= 5
Grading 4 + Grading 3 + Grading 3	= 5
Grading 5 + Grading 5	= 6
Grading 5 + Grading 4 + Grading 4	= 6
Grading 6 + Grading 6	= 7
Grading 6 + Grading 5 + Grading 5	= 7
Grading 7 + Grading 7 + Grading 7	= 8
Grading 8 + Grading 8 + Grading 8	= 9

Tenderers who envisage entering into a Joint Venture shall complete a submit a Joint Venture Agreement (see copy of CIDB's agreement elsewhere in this document) with this Tender.

T2.4 SPECIAL RESOLUTION OF CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the duly authorised representatives of the following legal entities who have entered into a consortium/joint venture to jointly tender for the project mentioned below: (*legally correct full names and registration numbers, of the Enterprises forming a Consortium/Joint Venture)*

_____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

6. _____

_____

7. _____

_____

8. _____

_____

held at: _____ *(place)* on _____ *(date)*

RESOLVED that:

A. The above-mentioned Enterprises submits a Tender in Consortium/Joint Venture to the KZN Department of Health in respect of the following project:

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Tender Number: **ZNB5526/2023-H**

Project Code: **N/A**

B. Mr/Mrs/Ms: _____ in

*his/her Capacity as: _____ *(Position in the Enterprise)*

and who will sign as follows: _____
be, and is hereby, authorised to sign the Tender, and any and all other documents and/or correspondence in connection with and relating to the Tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the Tender to the Enterprises in Consortium/Joint Venture mentioned above.

C. The Enterprises constituting the Consortium/Joint Venture, notwithstanding its composition, shall conduct all business under the name and style of:

_____

D. The Enterprises to the Consortium/Joint Venture accept joint and several liability for the due fulfilment of the obligations of the Consortium/Joint Venture deriving from, and in any way connected with, the Contract entered into with the Department in respect of the project described under item A above.

E. Any of the Enterprises to the Consortium/Joint Venture intending to terminate the consortium/joint venture agreement, for whatever reason, shall give the Department 30 days written notice of such intention. Notwithstanding such decision to terminate, the Enterprises shall remain jointly and severally liable to the Department for the due fulfilment of the obligations of the Consortium/Joint Venture as mentioned under item D above.

F. No Enterprise to the Consortium/Joint venture shall, without the prior written consent of the other Enterprises to the Consortium/Joint Venture and of the Department, cede any of its rights or assign any of its obligations under the consortium/joint Venture and of the Department, cede any of its rights or assign any of its obligations under the consortium/joint venture agreement in relation to the Contract with the Department referred to herein.

G. The Enterprises choose as the *domicilium citandi et executandi* of the consortium/joint venture for all purposes arising from the consortium/joint venture agreement and the Contract with the Department in respect of the project under item A above:

Physical address: _____

_____

_____

_____ (Postal Code)

Postal Address: _____

_____

_____

_____ (Postal Code)

Telephone number: *(Dialling Code followed by number)* _____

Fax number: *(Dialling Code followed by number)* _____

Email Address : _____

***BOARD OF DIRECTORS / MEMBERS / PARTNERS in Consortium of Joint Venture**

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Note:

1. ** Delete which is not applicable.*

2. ***NB.*** *This resolution / Power of Attorney must be signed by all the Duly Authorised Representatives of the Legal Entities to the Consortium/Joint Venture submitting this Tender.*
3. *Should the number of Duly Authorised Representatives of the Legal Entities joining forces in this Tender exceed the space available above, additional names and signatures must be supplied on a separate page.*
4. *Resolutions, duly completed and signed, from the separate Enterprises who participate in this Consortium/Joint Venture must be attached to the Special Resolution.*

T2.5 JOINT VENTURES INVOLVEMENT DECLARATION

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

DECLARATION RELATING TO A TENDER SUBMITTED BY A JOINT VENTURE :

I/We the undersigned parties do hereby declare that our respective involvement in the Works, of which I/we tender by Joint Venture, would be as follows :-

Party No. 1	
CENTRAL SUPPLIERS DATABASE REGISTRATION NO:	
TENDERERS CIDB REGISTRATION NUMBER:	
Name	
Address	
Percentage involvement	%

Party No. 2	
CENTRAL SUPPLIERS DATABASE REGISTRATION NO:	
TENDERERS CIDB REGISTRATION NUMBER:	
Name	
Address	
Percentage involvement	%

Party No. 3	
CENTRAL SUPPLIERS DATABASE REGISTRATION NO:	
TENDERERS CIDB REGISTRATION NUMBER:	
Name	
Address	
Percentage involvement	%

Signed - Party No. 1

I/We *(Full Name)* _____

duly authorised in my capacity as _____

of *(Enterprise name)* : _____

do jointly and severally accept responsibility for the due performance of the Works contained in the above project should such Tender submitted by the Joint Venture be accepted.

_____ _____

do jointly and severally accept responsibility for the due performance of the Works contained in the above project should such tender submitted by the Joint Venture be accepted.

_____ _____

Signed by Authorised Representative Date

Signed - Party No. 3

I/We *(Full Name)* _____

duly authorised in my capacity as _____

of *(Enterprise name)* : _____

do jointly and severally accept responsibility for the due performance of the Works contained in the above project should such tender submitted by the Joint Venture be accepted.

_____ _____

Signed by Authorised Representative Date

T2.8 FINANCIAL STANDING AND OTHER RESOURCES OF BUSINESS DECLARATION

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

(a) Based on the track record determined on the Minimum Average Annual Turnover coupled to the assessed Works Capabilities of Contracting Enterprises, the Construction Industry Development Board (CIDB) awards Grading Designations and accordingly registers it on the system.

This confirms that a Contractor has, at the time of registration, in the absence of any supply side interventions, sufficient working capital to commence the Works for a single contract and render due performance.

(b) However, it regularly occurs that a Contractor will at the same time submit tenders for a number of projects that are advertised during an overlapping period. Moreover, the Contractor may be busy with a Contract that is of the registered CIDB Grading Designation (value) or is even attending to a number of smaller valued Contracts.

(c) It therefore becomes the prerogative of a Tenderer in such instances to prove to the Department that the Enterprise has the capacity in every respect to attend to more than one (1) contract at a time.

(d) A Tenderer who wishes to be considered for this tender Contract award, over and above other tenders that they have submitted, shall submit if/when requested by the DoH the necessary proof that:

(i) he/she has access to additional finance (inclusive of a PERFORMANCE GUARANTEE BY A REGISTERED FINANCIAL INSTITUTION),
(ii) he/she has additional Human Resources available to successfully complete this project.
(iii) he/she has adequate Equipment, Plant and Machinery that all of the above can, undoubtedly, be sourced for this tender. (Please submit to the DoH the name and contact details of the supplier if the Tenderer is going to hire Equipment, Plant or Machinery, when requested.)

I, the undersigned, _____

(name of person authorized to sign on behalf of the Tenderer

understand that it is the responsibility of the Tenderer to prove and provide if/when requested by the DoH, evidence of the good Financial Standing of the Business to complete the Contract successfully.

Furthermore, it is understood that failure to provide if/when requested by DoH, at least the information as stated in paragraphs (d)(i)(ii) AND (iii) above will not enable the Evaluation Team to assess the CURRENT financial standing of the Business and the failure to provide said information when requested will, therefore, invalidate the Tender.

I accept and understand that the KZN Department of Health, as representative of the Provincial Administration of KwaZulu-Natal in this tender, may act against me and the Tenderer, jointly and severally, should this declaration and/or any information provided be found to be false.

Duly signed at……. on this the….. day of……. 20…..

Full Name of Signatory	Name of Enterprise
Capacity of Signatory	Signature of authorised representative

T2.9 PREFERENCE POINTS CLAIM - SBD 6.1			
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for Specific Goals.

BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022.

1. GENERAL CONDITIONS

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

- the 80/20 system for requirements with a Rand value of up to R 50 000 000 (all applicable taxes included); and

- the 90/10 system for requirements with a Rand value above R 50 000 000 (all applicable taxes included).

1.2 The applicable preference point system for this tender is the 90/10 preference point system.

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

(a)	Price points and	90
(b)	Specific Goals	10

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

	POINTS
PRICE	90
SPECIFIC GOALS	10
TOTAL POINTS FOR PRICE AND SPECIFIC GOALS	**100**

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

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

2 DEFINITIONS

(a) "tender" means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

(b) "price" means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;

(c) "rand value" means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

(d) "tender for income-generating contracts" means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and

(e) "the Act" means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3 FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1 POINTS AWARDED FOR PRICE

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

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

80/20

$$Ps = 80\left(1 - \frac{Pt - P\min}{P\min}\right)$$

or

90/10

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

Where:

P_s = Points scored for cooperative price of Tender under consideration
P_t = Comparative price of Tender under consideration
P_{min} = Comparative price of lowest acceptable Tender

3.2 FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

3.2.1 POINTS AWARDED FOR PRICE

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

80/20

$$Ps = 80\left(1 - \frac{Pt - P\min}{P\min}\right)$$

or

90/10

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

Where:

P_s = Points scored for cooperative price of Tender under consideration
P_t = Comparative price of Tender under consideration
P_{min} = Comparative price of lowest acceptable Tender

4 POINTS AWARDED FOR SPECIFIC GOALS

4.1 In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2 In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) 3any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

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

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

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

The specific goals allocated points in terms of this tender	Number of points allocated 90/10 system	Number of points claimed 90/10 system (To be completed by the tenderer)
Companies who are at least 51% Owned by Black People	10	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3 Name of company/firm: _____

4.4 Company registration number: _____

4.5 TYPE OF COMPANY/ FIRM

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

[Tick applicable box]

4.6 I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –

(a) disqualify the person from the tendering process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the audi alteram partem (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution, if deemed necessary.

.....

SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: .....

DATE: .....

ADDRESS: .....

.....

.....

.....

T2.10 SITE INSPECTION MEETING CERTIFICATE			
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**
Site Inspection Date:		**05 December 2023**	

This is to certify that I, _____
(Name of authorised Representative)

representing _____
(Name of Enterprise)

visited the site on: _____ *(Date)*

I have made myself familiar with all local conditions likely to influence the work and the cost thereof. I further certify that I am satisfied with the description of the work and explanations given at the site inspection meeting and that I understand the work to be done, as specified and implied, in the execution of this contract.

I declare that my representative is technically capable and knowledgeable to represent my company in the meeting. I further confirm that my representative's attendance at this site meeting, shall be deemed conclusive proof that my Enterprise is fully aware of what was said and discussed at this meeting.

Name of Tenderer	Signature	Date

Name of DOH Representative	Signature	Date

This form is only to be completed when applicable to the tender and if a Compulsory Briefing meeting has been called.

Departmental Stamp:

T2.11 BIDDER'S DISCLOSURE - SBD 4			
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. Bidder's declaration

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having controlling interest[1] in the enterprise, employed by the state? **YES / NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution?

YES / NO

2.2.1 If so, furnish particulars:

_____

_____

[1] the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

2.3. Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract? **YES / NO**

2.3.1 If so, furnish particulars:

_____

_____

3. DECLARATION

I, the undersigned, (name)…… in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

3.1 I have read and I understand the contents of this disclosure;
3.2I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;
3.3 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[2] will not be construed as collusive bidding.
3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.
3.4The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

[2] 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.

3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

3.6I 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.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.
I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

Signature	**Date**
Position	**Name of Bidder**

T2.12 RECORD OF ADDENDA TO TENDER DOCUMENTS

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

The undersigned 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	No. of Pages
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

Attach Additional Pages if more space is required

If it is found that the Tenderer has failed to incorporate any addendum into their tender document, the tender will be deemed non-responsive

Signed		**Date**	
Name		**Position**	
Tenderer			

T2.14 SCHEDULE FOR IMPORTED MATERIALS AND EQUIPMENT

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

This schedule should be completed by the tenderer. *(Attach additional page(s) if more space is required)*

Item	Material / Equipment	Quotation (Excluding VAT)
1		R
2		R
3		R
4		R
5		R
6		R

The Contractor shall list imported items, materials and/or equipment which shall be excluded from the Contract Price Adjustment Provisions (if applicable) and shall be adjusted in terms of currency fluctuations only. Copies of the supplier's quotations for the items, materials or equipment (provided that such costs shall not be higher than the relevant contract rate as listed above) should be lodged with the Principal Agent / Engineer of the Department of Health within 60 (sixty) days from the date of acceptance of the tender. No adjustment of the local VAT amount, nor the contractor's profit, discount, mark-up, handling costs, etc. shall be allowed. (See P&G E16)

These net amounts will be adjusted as follows:

FORMULA:

The net amount to be added to or deducted from the contract sum:

$$A = V\left(\frac{Z}{Y} - 1\right)$$

A = the amount (R) of adjustment

V = the net amount (supplier's quotation) (R) of the imported item

Y = exchange rate 14 days prior to closing date of tender submission

Z = exchange rate on the date of the Bill of Lading* of exporters invoice.

** A bill of lading (sometimes abbreviated as B/L or BoL) is a document issued by a carrier which details a shipment of merchandise and gives title of that shipment to a specified party. Bills of lading are one of three important documents used in international trade to help guarantee that exporters receive payment and importers receive merchandise. A straight bill of lading, which is referred to above, is used when payment has been made in advance of shipment and requires a carrier to deliver the merchandise to the appropriate party. It is therefore the date of the paid up invoice when the shipment leaves the exporter's location. [http://en.wikipedia.org/wiki/Bill_of_lading]*

Name of authorised representative	Signature	Date

T2.17 CONTRACTOR'S SAFETY, HEALTH AND ENVIRONMENTAL DECLARATION

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

In terms of Regulation 5(1)(h) of the Construction Regulations of February 2014 a Contractor may only be appointed to perform construction work if the Client is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of February 2014. In line with this requirement the Contractor is required to read through this document carefully, sign it and submit it with his/her Tender.

DECLARATION

1. I, the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specifications attached to this document.
2. I hereby declare that my company and its employees has the necessary competency and resources to safely carry out the construction works under this contract in compliance with the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specifications.
3. I hereby confirm that adequate provisions has been made in my Tender to cover the cost of all Safety, Health and Environmental duties and responsibilities imposed on me by the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specifications.
4. I hereby undertake that if my Tender is accepted, to provide before commencement of the Works under the contract or as required by the Conditions of the Contract, a suitable and sufficiently documented Construction Safety, Health and Environmental Management Plan in accordance with Regulation 7(1)(a) of the Construction Regulations of February 2014, which shall be subject for approval by the Client.
5. I confirm that I may not commence with any part of construction work under the contract until my Construction Safety Health and Environmental Management Plan has been approved in writing by the Client.
6. I hereby confirm that copies of the following documentation will be kept on site for viewing and inspection purposes for the duration of the construction work:
   a) Client's Construction Safety, Health and Environmental Specification.
   b) Approved Construction Safety, Health and Environmental Plan.
   c) Occupational Health and Safety Act, Act 85 of 1993.
   d) Construction Regulations of February 2014.
7. I agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of February 2014, and accept that my Tender will be rejected.

Duly signed at……. on this the….. day of……. 20…..

Full Name of Signatory	Name of Enterprise
Capacity of Signatory	Signature of authorised representative of Tenderer

T2.18 Compulsory Enterprise Questionnaire

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

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: CSD Number:	

Section 5: 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 6 partners*

Section 6: Particulars of companies and close corporations

Company registration number	
Close corporation number	
Tax reference number	

Section 7: SBD4 issued by National Treasury must be completed for each tender and be attached as a tender requirement
Section 8: SBD6 issued by National Treasury must be completed for each tender and be attached as a tender requirement
Section 9: -
Section 10: -

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

i) authorizes the Employer to verify the tenderers tax clearance status from the South African Revenue Services that it is in order;

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

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

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

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			
Enterprise name			

T2.19 TAX COMPLIANCE STATUS (TCS) PIN TO VERIFY ON LINE COMPLIANCE SUPPLIER STATUS VIA SARS e-FILING

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

TAX CLEARANCE REQUIREMENTS

It is a condition of Tender that the taxes of the successful tenderer must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the tenderer's tax obligations. It is a condition of this Offer of Commission that your practice remains in good standing with SARS (South African Revenue Services) in terms of its tax clearance.

1. In order to meet this requirement Tenderders are required to apply via e-filing at any SARS branch office nationally. The Tax Complance Status (TCS) requirements are also applicable to foreign Tenderders / individuals who wish to submit tenders.
2. SARS will then furnish the tenderer with a Tax Compliance Status (TCS) **PIN** that will be valid for a period of 1 (one) year from the date of approval.
3. In tenders where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Compliance Status (TCS) PIN.
4. Application for Tax Compliance Status (TCS) PIN can be done via e-filing at any SARS branch office nationally or on the website www.sars.gov.za.
5. Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.

IMPORTANT NOTICE

1. The South African Revinue Services (SARS) has phased out the issuing of paper Tax Clearance Certificates.
2. From 18 April 2016 SARS introduced an enhanced Tax Compliance (TCS) system.
3. The new system allows taxpayers to obtain a Tax Compliance Status (PIN), which can be utilised by authorised third parties to varify taxpayers compliance status online via SARS e-filing.
4. Tenderers are required to fill in clearly, legibly, in bold print and black ink the SARS (TCS) PIN number and Tax Reference number in the space hereunder:

Tax Compliance Status(TCS) PIN Number	
Company / Tendering Entity Tax Reference Number	

Name of Tenderer: .....

Signature of tenderer: .....

Date: .....

T2.20 PROOF OF GOOD STANDING WITH THE COMPENSATION COMMISSIONER

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

ATTACH A COPY OF PROOF, THAT THE TENDERER IS IN GOOD STANDING WITH THE COMPENSATION COMMISSIONER, TO THIS PAGE FOR ADJUDICATION PURPOSES

NOTE

In the case of a Tender by a Joint Venture, copies of proof of Good Standing with the Compensation Commissioner in respect of each party to the Joint Venture must be attached to this page

T2.21 - FORM OF OFFER AND ACCEPTANCE

Tender no: ZNB5526/2023-H

OFFER

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

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

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.

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

Amount (in words):	
Amount in figures:	**R**

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 (s)				
Name (s)				
Capacity				
For the tenderer				
	(Name and address of tenderer)			
Name and signature of witness			**Date**	

ACCEPTANCE

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

The terms of the contract, are contained in:

Part C1	Agreement and Contract Data, (which includes this agreement)
Part C2	Pricing data
Part C3	Scope of work.
Part C4	Site information and drawings and documents or parts thereof, which may be incorporated by reference into the above listed Parts.

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

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

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the schedule of deviations (if any). Unless the tenderer (now contractor) within five (5) working days of the date of such receipt notifies the employer in writing of any reason why he/she cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties.

Signature (s)			
Name (s)			
Capacity			
For the employer			
	(Name and address of employer)		
Name and signature of witness			

Schedule of Deviations

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

1.1.1.	**Subject:**
Details:	

1.1.2.	**Subject:**
Details:	

1.1.3.	**Subject:**
Details:	

1.1.4.	**Subject:**
Details:	

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

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

T2.22 - FINAL BILL OF QUANTITY SUMMARY

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

ATTACH SUMMARY PAGE OF THE BILL OF QUANTITIES

FINAL SUMMARY

Section No		Page No		Amount
1	SECTION NO. 1: PRELIMINARIES	29		
	SUB TOTAL		R	
2	SECTION NO. 2: BUILDING WORKS	98		
3	SECTION NO. 3: ELECTRICAL INSTALLATION (PROVISIONAL)	121		
4	SECTION NO. 4: SECURITY INSTALLATION (PROVISIONAL)	135		
5	SECTION NO. 5: ICT INSTALLATION (PROVISIONAL)	143		
6	SECTION NO. 6: MECHANICAL INSTALLATION	144		
7	SECTION NO. 7: EXTERNAL WORKS (PROVISIONAL)	191		
	SUB TOTAL		R	
8	SECTION NO. 8: PROVISIONAL SUM ALLOWANCES, ETC.	195		
	SUB TOTAL		R	

MONETARY PROVISIONS

Note:
The following monetary provisions have been made in the contract and must be omitted from the contract sum at the start of the contract and used as directed below.

These are monetary provisions only and the use, value and payment thereof are subject to adjustment based on actual costs through contractually approved variation orders and escalation costs calculated in terms of the prescribed contractual escalation calculations directives respectively.

ESCALATION

Provide the amount of R 3,800,000.00 (Three Million Eight Hundred Thousand Rand) for statutory increases (CPAP), to be adjusted, used and paid as instructed by the Client for and based on contractually calculated escalation per item 6.8.1 of the contract data of the Preliminaries Bill.	Item		3,800,000.00
Carried Forward		R	

FINAL SUMMARY

Section No		Page No		Amount
	Brought Forward		R	
	SUB TOTAL		R	
	ADD: VAT 15%		R	
	Carried to Form of Tender		R	

T2.24 - PROOF OF VALID UIF REGISTRATION

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

CURRENTLY NOT APPLICABLE

T2.25 THE NATIONAL INDUSTRIAL PARTICIPATION PROGRAMME

INTRODUCTION

The National Industrial Participation (NIP) Programme, which is applicable to all government procurement contracts that have an imported content, became effective on the 1 September 1996. The NIP policy and guidelines were fully endorsed by Cabinet on 30 April 1997. In terms of the Cabinet decision, all state and parastatal purchases / lease contracts (for goods, works and services) entered into after this date, are subject to the NIP requirements. NIP is obligatory and therefore must be complied with. The Industrial Participation Secretariat (IPS) of the Department of Trade and Industry (DTI) is charged with the responsibility of administering the programme.

1 PILLARS OF THE PROGRAMME

1.1 The NIP obligation is benchmarked on the imported content of the contract. Any contract having an imported content equal to or exceeding US$ 10 million or other currency equivalent to US$ 10 million will have a NIP obligation. This threshold of US$ 10 million can be reached as follows:

(a) Any single contract with imported content exceeding US$10 million.

or

(b) Multiple contracts for the same goods, works or services each with imported content exceeding US$3 million awarded to one seller over a 2 year period which in total exceeds US$10 million.

or

(c) A contract with a renewable option clause, where should the option be exercised the total value of the imported content will exceed US$10 million.

or

(d) Multiple suppliers of the same goods, works or services under the same contract, where the value of the imported content of each allocation is equal to or exceeds US$ 3 million worth of goods, works or services to the same government institution, which in total over a two (2) year period exceeds US$10 million.

1.2 The NIP obligation applicable to suppliers in respect of sub-paragraphs 1.1 (a) to 1.1 (c) above will amount to 30 % of the imported content whilst suppliers in respect of paragraph 1.1 (d) shall incur 30% of the total NIP obligation on a pro-rata basis.

1.3 To satisfy the NIP obligation, the DTI would negotiate and conclude agreements such as investments, joint ventures, sub-contracting, licensee production, export promotion, sourcing arrangements and research and development (R&D) with partners or suppliers.

1.4 A period of seven years has been identified as the time frame within which to discharge the obligation.

2 REQUIREMENTS OF THE DEPARTMENT OF TRADE AND INDUSTRY

2.1 In order to ensure effective implementation of the programme, successful tenderers (contractors) are required to, immediately after the award of a contract that is in excess of R10 million (ten million Rands), submit details of such a contract to the DTI for reporting purposes.

2.2 The purpose for reporting details of contracts in excess of the amount of R10 million (ten million Rands) is to cater for multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as provided for in paragraphs 1.1.(b) to 1.1. (d) above.

3 Tender SUBMISSION AND CONTRACT REPORTING REQUIREMENTS OF TenderDERS AND SUCCESSFUL TenderDERS (CONTRACTORS)

3.1 Tenderders are required to sign and submit this Standard Tenderding Document (SBD 5) together with the Tender on the closing date and time.

3.2 In order to accommodate multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as indicated in sub-paragraphs 1.1 (b) to 1.1 (d) above and to enable the DTI in determining the NIP obligation, successful Tenderders (contractors) are required, immediately after being officially notified about any successful Tender with a value in excess of R10 million (ten million Rands), to contact and furnish the DTI with the following information:

- Tender / contract number.
- Description of the goods, works or services.
- Date on which the contract was accepted.
- Name, address and contact details of the government institution.
- Value of the contract.
- Imported content of the contract, if possible.

3.3 The information required in paragraph 3.2 above must be sent to the Department of Trade and Industry, Private Bag X 84, Pretoria, 0001 for the attention of Mr. Elias Malapane within five (5) working days after award of the contract. Mr. Malapane may be contacted on telephone (012) 394 1401, facsimile (012) 394 2401 or e-mail at Elias@thedti.gov.za for further details about the programme.

4 PROCESS TO SATISFY THE NIP OBLIGATION

4.1 Once the successful Tenderder (contractor) has made contact with and furnished the DTI with the information required, the following steps will be followed:

a. the contractor and the DTI will determine the NIP obligation;
b. the contractor and the DTI will sign the NIP obligation agreement;
c. the contractor will submit a performance guarantee to the DTI;
d. the contractor will submit a business concept for consideration and approval by the DTI;
e. upon approval of the business concept by the DTI, the contractor will submit detailed business plans outlining the business concepts;
f. the contractor will implement the business plans; and
g. the contractor will submit bi-annual progress reports on approved plans to the DTI.

4.2 The NIP obligation agreement is between the DTI and the successful Tenderder (contractor) and, therefore, does not involve the purchasing institution.

Tender number: _____ Closing date: _____

Name of tenderer: _____

Postal address: _____

_____

Signature: _____ Name (in print): _____

Date: _____

T2.27 - PROOF OF REGISTRATION ON CENTRAL SUPPLIERS DATABASE

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Bid no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

ATTACH A COPY OF PROOF, THAT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIERS DATABASE TO THIS PAGE FOR ADJUDICATION PURPOSES

NOTE

In the case of a Tender by a Joint Venture, copies of proof of registration on the Central Suppliers Data Base in respect of each party to the Joint Venture must be attached to this page

T2.28 - PROOF OF CIDB REGISTRATION NUMBER

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

ATTACH A COPY OF PROOF, THAT THE TENDERER IS REGISTERED WITH THE CONSTRUCTION INDUSTRY DEVELOPMENT BOARD (CIDB) TO THIS PAGE FOR ADJUDICATION PURPOSES

NOTE

In the case of a Tender by a Joint Venture, copies of proof of registration with the CIDB in respect of each party to the Joint Venture must be attached to this page

T2.29 MANDATORY TECHNICAL CRITERIA

The following section contains the Mandatory Technical requirements for this bid and may include but is not limited to equipment/plant requirements, personnel requirements, minimum level of experience, professionals required, certifications required, minimum financial requirements, etc. Should the tenderer fail any of the criteria in T2.29, the tender will be deemed non-responsive and will be excluded from further evaluation. This evaluation forms part of Stage 1.

T2.29 Mandatory Technical Criteria

Successful tenderers must pass all technical criteria as set out below. If below table is blank then Mandatory Technical Criteria is not applicable on this tender.

	Criteria	Deliverable Required	Deliverable meets Criteria (YES / NO) (FOR USE BY EVALUATION COMMITTEE)	Comments (FOR USE BY EVALUATION COMMITTEE)
			N/A	
			N/A	

T2.30 CONTRACT FORM - PURCHASE OF GOODS/WORKS-Part 1

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

PART 1 (TO BE FILLED IN BY THE TENDERER)

1. I hereby undertake to supply all or any of the goods and/or works described in the attached tendering documents to Head: Health (Department of Health: Province of KwaZulu-Natal) in accordance with the requirements and specifications stipulated in tender number ZNB5526/2023-H at the price/s quoted.
2. The following documents shall be deemed to form and be read and construed as part of this agreement:
   (i) Tendering documents, viz
   - Invitation to tender;
   - Tax Compliance Status (TCS) **PIN**;
   - Pricing schedule(s);
   - Technical Specification(s);
   - Preference claims for Specific Goals in terms of the Preferential Procurement Regulations 2022;
   - Declaration of interest;
   - Declaration of Tenderder's past SCM practices;
   - Certificate of Independent Tender Determination
   - Special Conditions of Contract;

   (ii) General Conditions of Contract for construction works Edition 2 - GCC2010; and
   (iii) Other (specify)
3. I confirm that I have satisfied myself as to the correctness and validity of my Tender; that the price(s) and rate(s) quoted cover all the goods and/or works specified in the Tenderding documents; that the price(s) and rate(s) cover all my obligations and I accept that any mistakes regarding price(s) and rate(s) and calculations will be at my own risk.
4. I accept full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on me under this agreement as the principal liable for the due fulfilment of this contract.
5. I declare that I have no participation in any collusive practices with any Tenderder or any other person regarding this or any other Tender.
6. I confirm that I am duly authorised to sign this contract.

NAME (PRINT): _____

CAPACITY: _____

SIGNATURE: _____

NAME OF FIRM: _____

DATE: _____

Witnesses:

1. _____

2. _____

Date: _____

T2.31 CONTRACT FORM - PURCHASE OF GOODS/WORKS-Part 2

PART 2 (TO BE FILLED IN BY THE PURCHASER)

1. I _____ in my capacity as

_____

accepts your tender under reference ZNB5526/2023-H dated _____for the supply of goods/works indicated hereunder and/or further specified in the annexure(s).

2. An official order indicating delivery instructions is forthcoming.
3.

ITEM NO.	PRICE (ALL APPLICABLE TAXES INCLUDED)	BRAND	DELIVERY PERIOD

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

SIGNED AT _____ON_____
[Place] *[Date]*

NAME (PRINT): _____

SIGNATURE: _____

OFFICIAL STAMP:

Witnesses:

1. _____

2. _____

Date: _____

T2.32 - OHSE PLAN STRUCTURE

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

A detailed OHSE Plan is to be submitted by the successful tenderer as per Construction Regulation 7(1)(a). The following are the minimum standard legal documentation that must form part of the OHSE Plan based on the risks attached in executing this project titled;

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Tenderer to refer to Annexure 5 for project specific baseline risk assessment and specifications.

T2.33 - OHSE CLIENT SPECIFIC REQUIREMENTS	
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**
Tender no:	**ZNB5526/2023-H**
Project Code:	**N/A**

Tenderer to refer to Annexure 5 for project specific baseline risk assessment and specifications.

T2.34 - BASELINE RISK ASSESSMENT	
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**
Tender no:	**ZNB5526/2023-H**
Project Code:	**N/A**

Tenderer to refer to Annexure 5 for project specific baseline risk assessment and specifications.

T2.36 - Functionality Criteria

The threshold score, below which tenderers are eliminated from further consideration is 60 points

TENDER EVALUATION CRITERIA AND SCORING

The weighting for Functionality is as follows:

	Evaluation Criteria	Deliverables	Points	Sub-Points		Sub-Criteria
1.	Competency, Experience and Resource Capacity	Tenderer to demonstrate their technical competency, human resource capacity and relevant project experience. Letters of award to be attached and practical completion certificate for completed projects in the preceding 7 years	60 Points	60	Sub-points	Schedule of experience on 4 or more general building/health projects (CIDB grading values of 6GB and over) – letters of award and practical completion certificates to be attached for projects completed in the preceding 7 years
				40	Sub-points	Schedule of experience on 3 or more general building/health projects of similar value (CIDB grading values of 6GB and over) – letters of award and practical completion certificates to be attached for projects completed in the preceding 7 years
				0	Sub-points	No relevant experience in building/health projects of similar value in the preceding 7 years or requested documents not provided
			15 Points	15	Sub-points	Schedule of experience on 2 or more general building/health projects of similar value in the Health Sector (CIDB grading values of 8GB and over) – letters of award and practical completion certificates to be attached for projects completed in the preceding 7 years
				10	Sub-points	Schedule of experience on 1 or more general building/health projects of similar value in the Health Sector (CIDB grading values of 8GB and over) – letters of award and practical completion certificates to be attached for projects completed in the preceding 7 years
				0	Sub-points	No relevant experience in building/health projects of similar value in the preceding 7 years or requested documents not provided
2.	Tenderer's Project Management Structure and Experience of Resources Proposed for the Project	Tenderer to submit curriculum vitae that demonstrates extensive experience	25 Points	25	Sub-points	All key project resources have more than (8) years' experience in the construction industry. Resources are to include but not limited to Contracts Manager/Site Agent, Site Foreman including an individual with a Quantity Surveying background
				20	Sub-points	All key project resources have more than (6) years' experience in the construction industry. Resources are to include but not limited to Contracts Manager/Site Agent, Site Foreman including an individual with a Quantity Surveying background
				0	Sub-points	No submission provided or submission does not comply with conditions stated

TENDER EVALUATION CRITERIA AND SCORING PRICE AND SPECIFIC GOALS

Evaluation Criteria	Deliverables	Points	
Price	The lowest responsive and responsible priced offer shall be allocated 90 points. All other responsive and responsible offers shall be allocated a prorated point value based on the lowest responsive and responsible priced offer.	90	Points
Specific Goals	The points allocated to each tenderer for Specific Goals. In this regard, the points score for this criteria for each tenderer, shall be determined as follows: - full points(10 points) to companies who are at least 51% Owned by Black People	10	Points

PART A
INVITATION TO TENDER - SBD 1

ZNB5526/2023-H					
TENDER NUMBER:	ZNB5526/2023-H	**CLOSING DATE:**	16-Jan-24	**CLOSING TIME:**	11:00
DESCRIPTION	MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION				
THE SUCCESSFUL TENDERER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT					
TENDER RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE TENDER BOX SITUATED AT *(STREET ADDRESS)*					
Tender Advisory Services Supply Chain Management, Head Office 310 Jabu Ndlovu Street Pietermaritzburg					

SUPPLIER INFORMATION				
NAME OF TENDERER				
POSTAL ADDRESS				
STREET ADDRESS				
TELEPHONE NUMBER	CODE		NUMBER	
CELLPHONE NUMBER				
FACSIMILE NUMBER	CODE		NUMBER	
E-MAIL ADDRESS				
VAT REGISTRATION NUMBER				
	TCS PIN:		**CSD No:**	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE (Tick YES or NO)	Yes		B-BBEE STATUS LEVEL SWORN AFFIDAVIT (Tick YES or NO)	Yes
	No			No
If YES, State the name of the verification agency accredited by SANAS				

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/SWORN AFFIDAVIT(FOR EMEs& QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	Yes		NO		ARE YOU A FOREIGN BASED SUPPLIER FOR **THE GOODS /SERVICES**	YES		NO	
	[IF YES ENCLOSE PROOF]				**(IF YES ANSWER PART B:3 BELOW)**				
SIGNATURE OF TENDERER					**DATE**				
CAPACITY UNDER WHICH THIS TENDER IS SIGNED (Attach proof of authority to sign this tender; e.g. resolution of directors, etc.)									
TOTAL NUMBER OF ITEMS OFFERED					**TOTAL TENDER PRICE (ALL INCLUSIVE)**				

TENDERING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		**TECHNICAL INFORMATION MAY BE DIRECTED TO:**	
DEPARTMENT/ PUBLIC ENTITY	KZN Department of Health	CONTACT PERSON	
CONTACT PERSON	Junitha Sookraj	TELEPHONE NUMBER	
TELEPHONE NUMBER	033 815 8369	FACSIMILE NUMBER	
FACSIMILE NUMBER		E-MAIL ADDRESS	
E-MAIL ADDRESS	Junitha.sookraj @kznhealth.gov.za		

PART B

TERMS AND CONDITIONS FOR TENDERER - SBD 1

1.5. THIS TENDER IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT 2000 AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER LEGISLATION OR SPECIAL CONDITIONS OF CONTRACT.

2. TAX COMPLIANCE REQUIREMENTS

2.1 TENDERERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.

2.2 TENDERERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.

2.3 APPLICATION FOR TAX COMPLIANCE STATUS (TCS) OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.

2.4 TENDERERS MAY ALSO SUBMIT A PRINTED TCS TOGETHER WITH THE Tender.

2.5 IN TENDERS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE PROOF OF TCS / PIN / CSD NUMBER.

2.6 WHERE NO TCS IS AVAILABLE BUT THE TenderDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.

3. QUESTIONNAIRE TO TenderDING FOREIGN SUPPLIERS

3.1. IS THE TENDERER A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	YES		NO	
3.2. DOES THE TENDERER HAVE A BRANCH IN THE RSA?	YES		NO	
3.3. DOES THE TENDERER HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	YES		NO	
3.4. DOES THE TENDERER HAVE ANY SOURCE OF INCOME IN THE RSA?	YES		NO	

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

NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE TENDER INVALID.

KWAZULU-NATAL PROVINCE
HEALTH
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MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

THE CONTRACT

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

C1 - AGREEMENT AND CONTRACT DATA

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

FORM OF OFFER AND ACCEPTANCE

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

C.1.1 - FORM OF OFFER AND ACCEPTANCE

THE OFFER AND ACCEPTANCE FORM IS BOUND INTO **SECTION 1** (See end of Returnable Documents) OF THIS DOCUMENT AS PART OF THE RETURNABLE DOCUMENTS. ONCE A CONTRACT IS CONCLUDED WITH A SUCCESSFUL TENDERER, THIS PAGE WILL BE REPLACED WITH THE FILLED AND SIGNED OFFER AND SIGN ACCEPTANCE BY THE EMPLOYER AND IT WILL BECOME PART OF THE CONTRACT.

PLEASE SUBMIT THE OFFER AND ACCEPTANCE FORM WITH THE OTHER RETURNABLE DOCUMENTS.

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

C1.2 - CONTRACT DATA

C 1.2 CONTRACT DATA:

CONTRACT DATA FOR:

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Tender no: **ZNB5526/2023-H**

The General Conditions of Contract are the clauses contained in the General Conditions of Contract (2010) (Second Edition) published by the South African Institution of Civil Engineering. Copies of these conditions of contract may be obtained through most regional offices of the South African Institution of Civil Engineering, telephone number 011 805 5947 or by visiting their website at www.saice.org.za.

CONTRACT SPECIFIC DATA
The following contract specific data are applicable to this contract:

CONTRACT VARIABLES

This schedule contains all variables specific to this document and is divided into pre-tender and post-tender categories. The pre-tender category must be completed in full and included in the tender documents. Both the pre-tender and post-tender categories form part of this **agreement.**

Spaces requiring information must be filled in, shown as 'not applicable' or deleted but not left blank. Where choices are offered, the non-applicable items are to be deleted. Where insufficient space is provided the information should be annexed hereto and cross referenced to the applicable clause of the schedule. Key cross reference clauses are italicised in *[ ]* brackets.
The Engineer/Principal Agent, in accordance with Clause 1.1.1.16, shall obtain the specific approval from the Employer before executing any of his functions according to the "Conditions under which Consultants are appointed", or in the event where an employee of the Employer represents the Employer, the relevant General Delegations applicable at the time of executing his/her duties as described in Clause 3.1.2.

PRE-TENDER INFORMATION

CONTRACTING AND OTHER PARTIES

[1.1.1.15] **Employer:**

Head: Department of Health (KZN Department of Health: Province of KwaZulu-Natal)

Postal address:

Pietermaritzburg
3200

Tel: ***Not Applicable*** Fax: ***033 - 940 2400***

[1.2.1.2] Physical address:
310 Jabu Ndlovu Street
Pietermaritzburg
3200

Tender no: **ZNB5526/2023-H**

PART 1: DATA PROVIDED BY THE EMPLOYER

[1.1.1.13] **Defects Liability Period**

The defects liability period is: **12 months**
Defects Liability Period is Applicable for the whole of the Works

Latent Defect Period

[5.16.3] The latent defect period is: 5 years after the Final Approval Certificate

Documentation required before Commencement of the Works:

[5.3.1] The documentation required before commencement with the Works execution are;

[4.3]	Health and Safety Plan	The Contractor shall deliver his Health and Safety Plan of the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[5.6]	Initial Programme	The Contractor shall deliver his programme of work within 10 calendar days after notice from the Employer, prior to the Commencement Date.
[6.2]	Guarantee	The Contractor shall deliver his chosen Guarantee (security) for this Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[8.6]	Insurance	The Contractor shall deliver his insurance for the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Cash flow by contractor	The Contractor shall deliver his Cash flow for the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Priced Bill of Quantity	The Contractor shall deliver his Priced Bill of Quantity within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Programme	The Contractor is required to submit his Programme of Works in terms of Clause 5.6.1 and 5.3.1 and the Principal Agent is required to approve this within 7 days in terms of Clause 5.6.3
	Other requirements	

[5.3.2] The time to submit the documentation required before commencement with Works execution is: 14 calendar days

Non-Working days

[5.8.1] Non-Working days: **Sundays**
Special non- working days: **All Nationally Recognized Public Holidays and the year end break**

[5.8.1]

First Year end break - commences	***16-Dec-24***
ends on	***13-Jan-25***
Second Year end break - commences	***16-Dec-25***
ends on	***12-Jan-26***
Third Year end break - commences	***16-Dec-26***
ends on	***11-Jan-27***
Fourth Year end break - commences	***16-Dec-27***
ends on	***10-Jan-28***

Engineer/Principal Agent to consult with Employer

[3.1.3] The Engineer shall obtain the specific approval from the Employer before executing any of his functions according to the "Conditions under which Consultants are appointed", or in the event where an employee of the Employer represents the Employer, the relevant General Delegations applicable at the time of executing his/her duties.

Security

[6.2.1] The time to deliver the deed of guarantee is Prior to site hand over in terms of clause 5.3.1 and 5.3.2.

[6.2.1] Please see CONTRACT DATA - below to select Guarantee Option

Commencement Date

Commencement date means the date of Site Hand over that should not occur prior to the tenderer receiving one fully signed copy of the Offer and Acceptance in terms of the Form of Offer and Acceptance.

*The **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)

The agreement ("this document") consists of;
1. Agreement and Conditions of Contract.
2. Form of Offer and Acceptance.
3. Contract Data.
4. Scope of Works.
5. Site Information.
6. Drawings & documents referred to in the 1 to 4 above.

(See Form of Offer and Acceptance)

[5.3.1] The contractor shall commence executing the Works within 7 calendar days from the Commencement Date.

[5.4.1] ***Possession of the site*** will be given within 10 calendar days after the **contractor** has fulfilled the conditions (4.3, 5.6, 6.2, 8.6) and received the notification from the Employer of Site Hand Over where the contractor will receive one fully signed copy of the Form of Offer and Acceptance from the **employer.**

[5.6.1] The Contractor shall deliver his programme of work within 10 calendar days after notice from the Employer, prior to the Commencement Date.

CONTRACT DETAILS

[1.1.1.33] ***Works*** description: Refer to document C3 – Scope of Work.

[1.1.1.30] ***Site*** description: Refer to document C4 – Site Information.

Specific options that are applicable to a **State** organ only
Where so :

[6.10.6.2]

1) Interest rate legislation:

(a) in respect of interest owed by the **employer**, the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975), will apply; and

(b) in respect of interest owed to the **employer**, the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply

2)	Lateral support insurance to be effected by the contractor:	***Yes***	***No X***
3)	Payment will be made for materials and goods	***Yes X***	***No***
4)	Dispute resolution by litigation	***Yes***	***No X***
5)	Extended **defects** liability period applicable to the following elements:	***Electrical, Mechanical and Civil work***	

[8.6.1.1.2] The Value of material, supplied by the Employer, and not included in the Contract Price, is: ***R0.00***

[8.6.1.1.3] The amount to cover Professional Fees, not included in the Contract Price, for repairing damage and loss to be included in the insurance:
30% of the Contract Price

[8.6.1.1] The value of Works Insurance, including SASRIA cover, taken by the contractor on this contract shall be: ***Contract sum + 30%***

[8.6.1.3] The limit for indemnity for liable insurance is: ***Contract Sum + 30%***

The value of Public Liability Insurance cover, taken by the contractor on this contract shall be: ***R10 million***

[6.5.1.2.3] The percentage allowance to cover overhead charges for contractor and subcontractors, is: ***33.00%***

[1.1.1.14] **Practical Completion Date**

The Practical Completion date is: **A time measured from the Commencement date.**

For the **works** as a whole:
The whole of the works shall be completed within: ***24*** *Months (which shall be deemed to include all Non – Working Days, Special Non – Working Days and the year-end Builders Annual Industry Holiday Periods).*

[5.5.1] The date for **practical completion** shall be ***To be determined***
[5.13.1] The penalty per calendar day shall be : ***0.04% of the Contract Price, rounded to the nearest R10***

	***For the* works** in **sections:**
	***The date for* practical completion** from the **commencement date** and the **penalty** per **calendar day:**
	Portion 1:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 2:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 3:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 4:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 5:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 6:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
[1.3.2]	***The* law** applicable to this **agreement** shall be that of the: **Republic of South Africa**
[6.10.1.5]	The percentage advance on materials not yet built into the Permanent Works is: ***80.00%***
[6.10.3]	Percentage retention on amounts due to contractor is: ***The Percentage retention is nil. The only security required by the Employer will be such as selected by the Contractor on the Form of Offer and Acceptance and Part 2: CONTRACT DATA PROVIDED BY THE CONTRACTOR, point 2 - Documents, of the Contract Data.***
	Maximum retention is: ***0.00%*** *of the Contract Price*
[6.8.1]	Contract Price Adjustment Provisions (CPAP) Indices Application Manual for use with P0151 indices (Revised 1 January 2013)" as published by Statistics South Africa. The Contract Price Adjustment Provision (CPAP) will be subject to the most recently released indices by Statistic South Africa. Bidders are advised that with reference to Clause 3.4.6 of the Contract Price Adjustment Provisions (CPAP) Indices Applications Manual, the Head: Department of Health (KZN Department of Health: Province of Kwa-Zulu Natal) will not accept the submission by Bidders of lists of additional items."
[6.8.2]	
[6.8.3]	
[6.8.2]	
[6.8.3]	
[5.14.5]	***The following clause must be added to clause 5.14.5:***
	[5.14.5.6] The employers agent shall submit the **final account** within 3 calendar months to the principal agent.
[10.5]	The determinations of disputes shall be by ARBITRATION ONLY.
[10.5.3]	The number of Adjudication Board Members to be appointed is: **One**
	Replace the last part of the clause with the following: *"..on the application of either party, by the Chairman, or his nominee of the Association of Arbitrators."*
[10.9.1]	
	Clause
[1.1]	*[1.1.1.5]* **COMMENCEMENT DATE** – means the actual date of Site Hand over that should not occur prior to the Tenderer receiving one fully signed copy of the Offer and Acceptance in terms of the Form of Offer and Acceptance.
	[5.12.2.2] **ABNORMAL CLIMATIC CONDITIONS** - means conditions over and above what could reasonably be expected for the specific locality where the Works are being executed and include inter alia exessive rain, heat, cold, wind and any other climatic condition that would not normally be experienced during the season that the Works are executed in that area. The South African Weather Service's (http://www.weathersa.co.za) 10 year average climatic conditions statistics would be what could be reasonably expected for the specific locality where the Works are executed.
	[6.2.1] **CONSTRUCTION GUARANTEE** – means an on demand guarantee at call obtained by the **contractor** from an institution approved by the **employer** in terms of the **employer's** construction guarantee form as selected in the Offer and Acceptance Form and the **contract data.**
	CONSTRUCTION PERIOD – means the period commencing on the **commencement date** and ending on the date of **due completion date.** This period will be deemed to commence on actual site hand over date to the contractor and end on the date of practical completion and shall include all annual industrial holiday periods, Sundays and public holidays.
	CORRUPT PRACTICE – means the offer, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution.
	FINAL ACCOUNT - The document prepared by the principal agent, which reflects the contract value of the works at final approval or termination.
	FRAUDULENT PRACTICE – means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any tenderer and includes collusive practise among tenderers (prior to or after the tender submission) designed to establish tender prices at artificial non-competitive levels and to deprive the tenderer of the benefits of free and open competition.

		INTEREST – the interest rates applicable on this contract, whether specifically indicated in the relevant clauses or not, will be in terms of the legislation of the Republic of South Africa, and in particular: (a) in respect of interest owed by the **employer,** the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975), will apply; and (b) in respect of interest owed to the employer, the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply
	[1.1.1.16]	**ENGINEER/PRINCIPAL AGENT –** means the person or entity appointed by the **Employer** and named in the **Contract Data** as the **Engineer /Principal Agent** to act as agent of the **Employer**. In the event of an Engineer/**Principal Agent** not being appointed, then all the duties and obligations of an Engineer/**Principal Agent** as detailed in the **Contract** shall be fulfilled by a representative of the **Employer** as named in the **Contract Data. (Hereafter referred to as Engineer)**
	[1.1.1.21]	**GENERAL ITEMS -** or preliminaries means items stipulated in the Pricing Data relating to general obligations, site services, facilities and/or items that cover elements of the cost of the work which are not considered as proportional to the quantities of the Permanent Works.
	[4.4.1]	Add the following to the clause 4.4.1: *"The Contract shall only use subcontractors who are duly registered with the CIDB and who has an ACTIVE status at the time of submitting the tender"*
	[6.2.1]	Refer to Offer and Acceptance form for the various options that the contractor may choose from in providing a form of **Guarantee** under "GUARATEE OPTIONS".
	[6.10.6.2]	Replace *"at the prime overdraft rate, as charged by the Contractor's Bank,"* with *"..at the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975).* " Omit *",on all overdue payments from the date on which the same should have been paid..." and replace with " only after 30 calendar days from receiving written notice from the Contractor that the amount is overdue,.."*
		SPECIAL CONDITIONS OF CONTRACT
[5.12.3]		Omit clause 5.12.3 and add the following: *"5.12.3. If an extension of time is granted, the Contractor shall be paid such additional time-related General Items, including for special non-working days, if applicable as are appropriate regarding to any other compensation which may already have been granted in respect of the circumstances concerned.The reasons for extension of time that would invoke payment of time related General Items are inter alia;* *5.12.3.1 Failure to give possession of the site to the contractor.* *5.12.3.2 Making good physical loss and repairing damage to the works where the contractor is not at risk.* *5.12.3.3 Contract instructions not occasioned by default by the contractor.* *5.12.3.4 Failure to issue construction information timeously or the late issue of a contract instruction following a request from the contractor.* *5.12.3.5 Late acceptance by the principal agent of a design undertaken by a selected subcontractor where the contractor's obligations have been met.* *5.12.3.6 Suspension or cancellation termination invoked by a nominated or selected n/s subcontractor due to default by the employer or the principal agent.* *5.12.3.7 Insolvency of a nominated subcontractor.* *5.12.3.8 A direct contractor.* *5.12.3.9 Opening up and testing of work and materials and goods where such work is according to in accordance with the contract documents.* *5.12.3.10 The execution of additional work for which the quantity included in the bills of quantities is not sufficiently accurate.* *5.12.3.11 Late or failure to supply materials and goods for which the employer is responsible.* *5.12.3.12 Suspension of the works."*
[5.14.5.1]		Omit entire clause 5.14.5.1
[5.16.4]		Add the following new clause *"5.16.4. Upon the issue of a Final Approval Certificate, unless otherwise provided in the Contract:* *5.16.4.1. The performance Guarantee (if any) shall be returned within 14 days to the guarantor in terms of Clause 7."*
[6.2.3]		Add to clause 6.2.3 the following "*The Contractor shall provide proof of paid-up premium payments to accompany his payment certificate as proof that his performance guarantee has not expired yet. The Contractor will not receive payment without proof of the validity of their performance guarantee.*
[9.3.2.2]		Omit *"without prejudice to the exercise of any lien the Contractor may have acquired over the Employer's property."*
		Duties and functions of the **Engineer** requiring the specific approval of the **Employer** BEFORE execution of any part of these duties are as follows: (a) Determinations of contractors claims for extension of time (revision of the contract completion date). All claims for extension of time shall be submitted by the **Engineer,** together with the **Engineer's** recommendations, to the **Employer** for determination. Omit "Engineer" in clause 42.2 and replace with (b) Drawings, instructions or communications of any kind requiring variations of the works and involving EXTRA's shall NOT be given effect by the **Contractor** UNTIL Official Variation Order submission including the Financial Request for Additional Funds, has been approved and signed by the **Head of Department: Health** (c) Insurance policies to be approved by the **Employer** within 21 days of the date of the **Commencement** of the Works. (d) Any notice of disagreement raised by the **Contractor** or written Dispute Notice given by the **Contractor** to the **Engineer** shall be submitted by the **Engineer**, together with the **Engineer's** recommendations, to the **Employer** for determination. (e) The issue of the certificate of practical completion, certificate of completion and the final approval certificate shall be signed and submitted by the **Engineer**, to the **Employer** for final approval and signature. The certificates shall not be considered as officially issued until signed by the **Employer**.
		MANAGING PROJECT DURATION (a) The Contractor shall co-ordinate his programme with all other contractors whose work may precede or be executed simultaneously to his own. The Contractor will be called upon to plan and control the project using the Project Evaluation and Review Technique (PERT) or other approved Critical Path Method (CPM) network analysis of his events and activities and those of the sub-contractors in his employ and must co-ordinate his planning with any other contractor employed on the project. A fortnightly project control report will be expected from the Contractor in writing, evaluating any gains or delays against the critical path and he should allow for all costs involved in planning reviewing and updating the programme to the satisfaction of the Principal Agent against this item. (b) Activity-and total float shall belong to the Employer. (c) The Contractor shall deliver his programme of work within 10 calendar days after notice from the Employer, prior to the Commencement Date. It is a condition of this contact that, the contracter submit to the Engineer/principal agent a detailed CPM Programme which shall be to the approval of the Engineer/principal agent. In this regard tenderers are advised to consult with the Engineer/Principal Agent as to the format and requirements of the programme as no claim whatsoever will entertained should the programme fail to meet the requirements of the Engineer/Principal Agent. Failure to submit the programme within the stipulated time may result in the contractor being held in breach of contract. The approved programme will form the basis of time management of the project and extension of time will not be guaranteed unless the Contractor has strictly complied with this provision. The programme shall make allowance for inclement weather at 3 workings days per month.

INCLEMENT WEATHER AND CLAIMS FOR DELAYS IN PERFORMANCE

(a) The Contract Sum includes a monthly allowance of 3 working days inclement weather during which rainfall exceeds 10mm per day for months as indicated in the Scope of Works. These days shall be reflected on the critical path of the Contractor's programme as specified in MANAGING PROJECT DURATION above.

(b) Claims for delays in performance due to inclement weather shall be calculated separately for each calendar month and for the project as a whole. Delays or gains to the critical path shall be reflected in all revisions of the programme. An extension of time will only be granted where the following conditions are met:

(i) The criteria to be used for WORK stoppages shall be for safety hazards or poor quality of work.

(ii) The Employer's site representative or the Employer's Principal Agent, if the site representative is not available shall be notified when the Contractor stops the work and intends to claim performance delays. The Employer representative shall inspect the situation together with the Contractor and give an immediate decision.

1. The stoppage claimed must cause a delay in the Completion Date of work. If the critical activities can proceed and a non-critical activity is delayed due to inclement weather no claims for delay shall be granted.
2. No claims for stoppages less than 2(two) hours per day shall be considered.
3. Claims granted for more than 2 (two) hours, but less than 10 (ten) hour (lunch included) day, shall be added together and expressed as full days.
4. All claims shall be submitted in writing to the Principal Agent within one working day of the actual stoppage.
5. The total delay in performance granted to the Contractor expressed in days shall be added to the contractual Completion Date of each section of the Works. The contractual penalty clause shall only come into effect after this newly arrived date.
6. Total delays (in hours) will be rounded up or down to the nearest integer for the calculation of Working Days. The total hours (including lunch) per Working Day shall be 10 unless otherwise indicated on the Contractor's programme.
7. Where the programmed delays for inclement weather exceed the actual delays incurred the Completion Date(s) will not be adjusted.
8. Where the project includes builder's holidays the programmed durations for inclement weather shall be adjusted pro-rate to the actual Working Days.
9. The total of all monthly delays due to inclement weather shall be calculated in accordance with the example given below:

Description		Months					Total
		Sept	Oct	Nov	Dec	Jan	
		Hours	Hours	Hours	Hours	Hours	Hours
Programmed	Rain days	0	30	30	15	15	90
Actual	Rain days	16	22	35	15	18	106
Difference		-16	8	-5	0	-3	-16
8 hrs/day*						Estimated Extension of time - in working days	2

See point 5.2 in the Scope of Works for the specific days the tenderer must allow for in this contract.

Tender no:	ZNB5526/2023-H	Part 2: CONTRACT DATA PROVIDED BY THE CONTRACTOR:

POST-TENDER INFORMATION

Note: All information for this section requires consultation with the **Contractor**. The **Engineer/Principal Agent** shall not pre-select any of the alternatives available to the **Contractor.**

1 CONTRACT DETAILS

[1.1.1.9] **Contractor Name:** .....

[1.2.1.2] Postal address:

.....

.....

.....

Tel no ..... Fax no .....

Tax / VAT Registration No: ..... e-mail .....

Physical address:

.....

.....

.....

[1.1.1.10] The accepted **contract price** inclusive of **tax** is R :

.....

[Amount in words]

Payment Of Preliminaries (Clause 6.7, 6.8, 6.10 and 6.11)

The preliminaries amounts shall be paid in terms of:

***Alternative A**	**Yes**
****Alternative B**	**N/A**

** Assessed by the Engineer/Principal Agent as an amount prorated to the value of the Work duly executed in the same ratio as the Preliminaries bears to the Contract Price excluding VAT, Preliminary amount, Contingencies and any CPAP.*

*** Calculated from the priced Bill of Quantity/Lump Sum document. The Contractor and the Engineer/Principal Agent shall agree on a division of the priced Preliminaries items into: initial establishment charge, monthly charge and final disestablishment charge.*

If the Contractor and the Engineer/Principal Agent can not agree, within 10 Working Days from the Commencement Date, on such a division then the Engineer/Principal Agent shall make a division of the Preliminaries to be incorporated in the valuations for each monthly payment certificate as follows;

10% of the General Items/Preliminaries amount shall not be varied

15% of the General Items/Preliminaries shall only be varied in proportion of the Contract Price to the Contract Sum

75% of the General Items/Preliminaries shall be varied in proportion to the revised Construction Period compared with the initial Construction Period.

Alternative A

Adjustment of Preliminaries (Clause 6.7, 6.8, 6.10 and 6.11)

For the adjustment of Preliminaries both the Contract Sum and the Contract Value (including tax) shall exclude the amount of Preliminaries, all Contingency Sum(s) and any provision for Cost Price Adjustment Provisions:-

- An amount which shall not be varied.

- An amount varied in proportion to the contract value as compared to the Contract Sum.

- An amount varied in proportion to the Construction Period as compared to the initial Construction Period (excluding revisions to the Construction Period to which the Contractor is not entitled) to adjustment of the Contract Value in terms of the agreement.

The Contractor shall provide a breakdown of charges (including tax) within 15 working days of the date of acceptance of tender and, where applicable, an apportionment of Preliminaries per section

If the Contractor and the Principal Agent cannot agree, within ten (10) Working Days from the Commencement Date, on such a division then the Principal Agent shall make a division of the Preliminaries to be incorporated in the valuations for each monthly payment certificate as follows;

0% of the amount shall not be varied

10% of the amount shall not be varied

15% varied in proportion of the Contract Value to the Contract Sum

75% varied in proportion to the revised Construction period compared with the initial Construction Period

Sectional Completion : Subdivision of Preliminaries Costs

For the adjustment of preliminaries for sections of the work the value of fixed, value, and time related amounts of the preliminaries for each section is required. The contractor is to provide such information within fifteen (15) working days of taking possession of the site, failing which the categorised preliminaries amounts shall be prorated to the value of each section.

The above shall apply equally for projects where sectional completion was not contemplated at tender stage but subsequently occurred on an adhoc basis during construction of the works as agreed between the client and the employer. The original priced categorised amounts for fixed, value, and time related amounts shall be prorated to the value of each section.

When an extension of time has been granted in terms of the GCC and the preliminaries require to be adjusted accordingly, the pertinent sectional (subdivided) categorised preliminaries amounts shall be utilised, where applicable and not the overall preliminary amounts.

Where sectional completion is required in terms of the agreement, the Contractor shall provide the Principal Agent with the division of the above categorized amounts into sections. Should the Contractor fail to provide such information within the period stipulated the categorized amounts shall be prorated to the value of each section.

YES *yes / no*

or

Alternative B

The Contractor shall within 15 working days of the date of possession of the site provide the Principal Agent with a detailed breakdown of Preliminaries amounts for the works as a whole, or per section where applicable, including administrative and supervisory staff charges and for the use of construction equipment in terms of the programme.

NO *yes / no*

The contractor is informed that only option 'A' shall apply

	Waiver of the Contractors lien or right of continuing possession is required.	**YES**	
	GUARANTEE OPTIONS		
	The Tenderer agrees to provide a bank or insurance guarantee in accordance with clause 6.2.3 of the Conditions of the GCC2010 Contract within the period stated in the Contract Data. This guarantee shall be for a sum equal to an amount stated in the Contract Data.		
	Guarantees submitted must be issued by either an insurance company duly registered in terms of the Insurance Act (Long Term Insurance Act No 52 of 1998 or Short Term Insurance Act No 53 of 1998) or by a bank duly registered in terms of the Banks Act No 94 of 1990, on the pro-forma referred to above. No alterations or amendments of the wording of the pro-forma will be accepted.		
	(a) the tenderer accepts that in respect of contracts up to R1 million, a payment reduction of 5% of the contact value will be applicable and will be reduced by the Employer in terms of the applicable conditions of contract.		
	(b) in respect of contracts above R1 million, the Tenderer offers to provide security as indicated below: select one option		
	(i) payment reduction of 10% of the value certified in the payment certificate (excluding VAT)		
	(ii) bank or insurance Performance Guarantee of 10 % of the Contract Price		
	(iii) bank or insurance guarantee of 5% of the Contract Price and a payment reduction of 5% of the value certified in the payment certificate (excluding VAT)		
3	**SIGNATURES OF THE CONTRACTING PARTIES**		
	Thus done and signed at……on ……..of……20…..		
	Name of signatory	for and behalf of the **Employer** who by signature hereof	
	Capacity of signatory	as Witness.	
	Thus done and signed at……on ……..of……20…..		
	Name of signatory	for and behalf of the **Contractor** who by signature hereof	
	Capacity of signatory	as Witness.	

KWAZULU-NATAL PROVINCE
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REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

C1.3 - FORM OF GUARANTEE

C1.3 PERFORMANCE GUARANTEE - GCC FOR CONSTRUCTION WORKS (2nd Edition - 2010)

Head: Department of Health
KZN Department of Health:
Private Bag X 9051
Pietermaritzburg
3200

Sir,

ON DEMAND PERFORMANCE GUARANTEE

Tender Number ZNB5526/2023-H	Project Code N/A

For use with the General Conditions of Contract for Construction Works, Second Edition, 2010.

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: _____

Physical Address: _____

"Employer" means: The Provincial Administration of KwaZulu-Natal in its Department of Health

"Contractor" means: _____

"Engineer" means: _____

"Works" means: **MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**

"Site" means: _____

"Contract" means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

"Contract Sum" means: The accepted amount inclusive of tax of: _____

Amount in Words:

"Guaranteed Sum" means: The maximum aggregate amount of: 10% _____
Of Contract Sum

Amount in Words: _____

"Expiry Date" means: _____

CONTRACT DETAILS

Engineer Issues: Interim Payment Certificates, Final Payment Certificates and the Certificate Completion of the Works as defined in the Contract.

PERFORMANCE GUARANTEE

1 The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2 The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of issue by the Engineer of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.

3 The Guarantor hereby acknowledges that:

3.1 any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;

3.2 its obligation under the Performance Guarantee is restricted to the payment of money.

4 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum Certified in 4.

5 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

6 It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7 Where the Guarantor has made payments in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Payment Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

8 Payment by the Guarantor in terms of 4 or 5 shall be made with seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9 Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.

10 The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

11 The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.

12 This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

13 This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

14 Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Court Act No 32 of 1944, as amended, to this jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at _____

Date _____

Guarantor's signatory (1) _____

Capacity _____

Guarantor's signatory (2) _____

Capacity _____

Witness signatory (1) _____

Witness signatory (2) _____

KWAZULU-NATAL PROVINCE
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MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

PART C2 - PRICING DATA

C2.1 PRICING INSTRUCTIONS GCC FOR CONSTRUCTION WORKS (Second Edition 2010)			
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

C2.1 Pricing Instructions

	Where any item is not relevant to this specific contract, such item is marked N/A (signifying "not applicable") The adjustment of the preliminaries each item priced is to be allocated to one or more of the three categories by insertion of "F", "V", "T" as the case may be against the price in the "rate" column immediately preceding the "amount" column, where "F" denotes a fixed amount (amount not varied), "V" denotes an amount variable in proportion to value and "T" denotes an amount variable in proportion to time. **MASSES AND MEASURING UNITS** These shall be in accordance with the Measuring Units and National Measuring Standards Act No. 76 of 1973 and amendments thereto. The pages of each of these documents are numbered consecutively and before the Tenderer submits his tender he should check the number of pages, and if any are found missing or duplicated, or the figures or writing indistinct, or the documents contain any obvious error, he should apply to the Head : Health AT ONCE and have same rectified as no liability whatsoever will be admitted by the Administration in respect of errors in Tender due to the foregoing.
2	**PRICES FOR VARIATIONS** Where prices or quotations for variations are submitted by the Contractor during the currency of the Contract, it is to be clearly understood that these are for the purpose of consideration by the Head : Health and that there is no assumption of acceptance. The Contractor will be notified of acceptance of prices or quotations either by insertion of the amount on the variation order or by written intimation.
3	The scale to which the Drawings are made is only to be made use of when no figured dimensions are given either on the Drawings or in the tender documents and the figured dimensions are always to be followed though they may not coincide with the scale of the Drawings, but dimensions where possible are to be taken from the buildings.
4	**PROVISIONAL ITEMS** All items described as "Provisional" shall be used as directed by the Employer and measured and valued or paid for. No work for which "Provisional" items are allowed shall be commenced without written instructions from the Head : Health.

5 TIMELY ORDERING OF MATERIALS

The Contractor is warned to place all orders for materials or special articles as early as possible, as he will be held solely responsible for any delay in the delivery of such goods.
Nevertheless this tender is conditional upon no liability being attached to the Contractor if delivery of materials is rendered impossible by reason of any act of the Government.

6 ELECTRICAL LIGHTING, POWER AND WATER

The Contractor shall provide any artificial lighting which may be necessary or required for the proper execution of the works, and provide electric power and water required by all Sub-Contractors, Nominated Sub-Contractors and Sub-Contractors appointed directly by the Employer.

The Contractor shall give all notices and pay all fees in connection with temporary electrical and water connections and shall connect temporary Electrical and Water meters for and pay for all current and water consumed.

Tenderers are advised that the permanent light fittings and water points of any kind installed in the Works are not to be used to provide temporary lighting and supplement water requirements for construction purposes.

7 IMPORT PERMITS, DUTIES AND SURCHARGES.

All tenders by means of which imported products are being called for, must use the rate of exchange 14 days prior to the closing date indicated in the tender documents. If this day falls on a weekend or public holiday, the next working day must be used.

Furthermore, Tenderers must submit documentary proof (in the form of a certified copy) from their bank or legally recognised financial institution, clearly indicating what the rate of exchange was 14 days prior to the closing date, as mentioned above.

Together with this, the Tenderer must confirm that the tender price relating to an imported product, was based on the rate of exchange 14 days prior to the closing date as mentioned above.

8 STANDARD SYSTEM OF MEASUREMENT WHERE BILLS OF QUANTITIES FORM PART OF THE TENDER DOCUMENTS

The work executed under this Contract has been measured in accordance with the;

Standard System of Measuring Builders Work (7th Edition)

including all amendments unless descriptions of items indicate a deviation and it shall be understood that the system of measurement which is herein adopted is the only system of measurement which will be recognised in connection with this contract. Any contradictions to this system of measurement contained in the “Model Preambles for Trades 2008” shall be disregarded (unless same have been accommodated in the system of measurement) but applicable rates shall be included for all requirements stated and not measured separately in compliance with this system.

9 PRICING OF ROCK EXCAVATIONS

It is a condition of this tender that should the tenderer elect to price the Rock Excavation included in this tender, the rates must be market related and should be identically priced for the same classification of excavations and not vary for similar billed items in the different sections.

10 REGISTRATION ON THE CENTRAL SUPPLIERS DATABASE

1. In terms of the Public Finance Management Act (PFMA), 1999 (Act No 1 of 1999) Section 38 (1) (a) (iii) and 51 (1) (iii) and Section 76 (4) of PFMA National Treasury developed a single platform, The Central Supplier Database (CSD) for the registration of prospective suppliers including the varification functionality of key supplier information.
2. Prospective suppliers will be able to self - register on the CSD website: www.csd.gov.za
3. Once the supplier information has been varified with external data sources by National Treasury a unique supplier number and security code will be allocated and communicated to the supplier. Suppliers will be required to keep their data updated regularly and should confirm at least once a year that their data is still current and updated.
4. Suppliers can provide their CSD supplier number and unique security code to organs of state to view their varified CSD information.

5 Tenderers are required to fill in clearly, legibly, in bold print and black ink their CSD supplier number in the space hereunder:

Name of Supplier	
Central Supplier Database (CSD) Supplier Number:	

12 TAX CLEARANCE REQUIREMENTS

It is a condition of tender that the taxes of the successful tenderer must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the Tenderder's tax obligations. It is a condition of this Offer of Commission that your practice remains in good standing with SARS (South African Revenue Services) in terms of its tax clearance, during the project, which is required to process your payment certificates.

1 In order to meet this requirement tenderers are required to apply via e-filing at any SARS branch office nationally. The Tax Complance Status (TCS) requirements are also applicable to foreign Tenderders / individuals who wish to submit Tenders.

2 SARS will then furnish the Tenderder with a Tax Compliance Status (TCS) PIN that will be valid for a period of 1 (one) year from the date of approval.

3 In tenders where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Compliance Status (TCS) PIN.

4 Application for Tax Compliance Status (TCS) PIN can be done via e-filing at any SARS branch office nationally or on the website www.sars.gov.za.

5 Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.

6 Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.

Security PIN Number	
Company / Entity Tax Reference Number	

13 BILLS OF QUANTITIES/LUMP SUM DOCUMENT

The Bills of Quantities document forms part of and must be read and priced in conjunction with all the other documents forming part of the contract documents, the Standard Conditions of Tender, Conditions of Contract, Standard Preambles to all Trades, Specifications, Drawings and all other relevant documentation.

14 VALUE ADDED TAX

The tender price must include for Value Added Tax (VAT). All rates, provisional sums, etc. in the Bills of Quantities must however be net (exclusive of VAT) with VAT calculated and added to the Total Value thereof in the Final Summary.

15	**FIXED PRICE CONTRACT** Should the Bills of Quantities/Lump Sum Document be a fixed price contract, the following clause must be inserted in the Pricing Instructions: Tenderders are to take note that the contract price adjustments are not applicable to this contract. Tenderders should therefore make provision in the Contract Sum, schedule of rates, etc. for possible price increases during the contract period, as no claims in this regard shall be entertained.

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C2.2 - Preliminaries for GCC for Construction works - 2nd Edition 2010

Item No		Quantity	Rate	Amount

SECTION NO. 1
PRELIMINARIES & GENERAL
BILL NO. 1
PRELIMINARIES

i) The agreement is to be the General Conditions of Contract for Works of Civil Engineering Construction (2010) (Second Edition), published by the S.A. Institution Of Civil Engineering.

ii) and The Preliminaries are to be the Construction management requirements for works contracts - Part 1: General engineering and construction works (SANS 1921-1: 2004 Edition 1) prepared by Standards South Africa and shall be deemed to be incorporated herein.

iii) Tenderers are referred to the above mentioned documents for the full intent and meaning of each clause thereof (hereinafter referred to by heading and clause number only) for which such allowance must be made as may be considered necessary.

iv) Where standard clauses or alternatives are not entirely applicable to this contract such modifications, corrections or supplements as will apply are given under each relevant clause heading.

v) Where any item is not relevant to this specific contract such item is marked N/A (signifying "not applicable").

vi) Adjustment of the preliminaries: each item priced, is to be allocated to one or more of the three categories, where "F" denotes a fixed amount (amount not to be varied), "V" denotes an amount variable in proportion to value and "T" denotes an amount in proportion to time.

vii) Time (T) related Preliminaries will only be adjusted for omissions or additions, issued by the Employer, or delays caused by the Employer, for which variation and extension of time has been granted. See Contract Data.

Carried Forward R

		Brought Forward			R
	SECTION A: GENERAL CONDITIONS OF CONTRACT				
1	A1	General (clause 1)			
		F:..... V:..... T:.....		Item	
2	A2	Basis of Contract (clause 2)			
		F:..... V:..... T:.....		Item	
3	A3	Engineer (clause 3)			
		F:..... V:..... T:.....		Item	
4	A4	Contractor's General Obligation (clause 4)			
		F:..... V:..... T:.....		Item	
5	A5	Time and Related Matters (clause 5) - As referred to in the Contract Data under Special Condition of Contract.			
		F:..... V:..... T:.....		Item	
6	A6	Payment and Related Matters (clause 6)			
		F:..... V:..... T:.....		Item	
7	A7	Quality and Related Matters (clause 7)			
		F:..... V:..... T:.....		Item	
8	A8	Risk and Related Matters (clause 8)			
		F:..... V:..... T:.....		Item	
9	A9	Termination of Contract (clause 9)			
		F:..... V:..... T:.....		Item	
		Carried Forward			R

		Brought Forward			R
10	A10	Claims and Disputes (clause 10)			
		F:..... V:..... T:.....		Item	
		SECTION B: SANS 1921-1:2004 (Edition 1): CONSTRUCTION AND MANAGEMENT REQUIREMENTS FOR WORKS CONTRACTS: PART 1			
		Refer to the SCOPE OF WORK for detail requirements:			
11	B1	Scope			
		F:..... V:..... T:.....		Item	
12	B2	Normative references			
		F:..... V:..... T:.....		Item	
13	B3	Definitions			
		F:..... V:..... T:.....		Item	
14	B4	Requirements for construction and management			
		F:..... V:..... T:.....		Item	
15	B4.1	General			
		F:..... V:..... T:.....		Item	
16	B4.2	Responsibilities for design and construction			
		F:..... V:..... T:.....		Item	
17	B4.3	Planning, programme and method statements			
		F:..... V:..... T:.....		Item	
		Carried Forward			R

	Brought Forward			R
18	B4.4 Quality assurance F:..... V:..... T:.....		Item	
19	B4.5 Setting out F:..... V:..... T:.....		Item	
20	B4.6 Management and disposal of water F:..... V:..... T:.....		Item	
21	B4.7 Blasting F:..... V:..... T:.....		Item	
22	B4.8 Works adjacent to services and structures F:..... V:..... T:.....		Item	
23	B4.9 Management of the Works and site F:..... V:..... T:.....		Item	
24	B4.10 Earthworks F:..... V:..... T:.....		Item	
25	B4.11 Testing F:..... V:..... T:.....		Item	
26	B4.12 Materials, samples and fabrication drawings F:..... V:..... T:.....		Item	
27	B4.13 Equipment F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
28	B4.14 Site establishment F:..... V:..... T:.....		Item	
29	B4.15 Survey control F:..... V:..... T:.....		Item	
30	B4.16 Temporary works F:..... V:..... T:.....		Item	
31	B4.17 Existing services F:..... V:..... T:.....		Item	
32	B4.18 Health and safety F:..... V:..... T:.....		Item	
33	B4.19 Environmental requirements F:..... V:..... T:.....		Item	
34	B4.20 Alterations, additions, extensions and modifications to existing works F:..... V:..... T:.....		Item	
35	B4.21 Inspection of adjoining structures, services, buildings and property F:..... V:..... T:.....		Item	
36	B4.22 Attendance on nominated and selected subcontractors F:..... V:..... T:.....		Item	
	Carried Forward			R

Section No. 1
Bill No. 1
PRELIMINARIES

		Brought Forward			R
		SECTION C: SCOPE OF WORK in accordance with SANS 10403			
		(The reference to Clauses refer to Table B.1 of SANS 1921-1:2004)			
37	C1	Certification by recognised bodies - CLAUSE 4.4			
		F:..... V:..... T:.....		Item	
38	C2	Agrément certificates - CLAUSE 4.5			
		F:..... V:..... T:.....		N/A	
39	C3	Other services and facilities - CLAUSE 4.8			
		F:..... V:..... T:.....		Item	
40	C4	Recording of weather - CLAUSE 5.2			
		F:..... V:..... T:.....		Item	
41	C5	Management meetings - CLAUSE 5.3			
		F:..... V:..... T:.....		Item	
42	C6	Daily records CLAUSE 5.6			
		F:..... V:..... T:.....		Item	
43	C7	Bond and guarantees - CLAUSE 5.7			
		F:..... V:..... T:.....		Item	
44	C8	Permits - CLAUSE 5.9			
		F:..... V:..... T:.....		Item	
		Carried Forward			R

		Brought Forward		R	
45	C9	Proof of compliance with the law - CLAUSE 5.10			
		F:..... V:..... T:.....	Item		
		SECTION D: SPECIFICATION DATA ASSOCIATED WITH SANS 1921-1:2004 (Table A.1)			
46	D1	Requirements for drawings, information and calculations for which the contractor is responsible CLAUSE 4.1.7			
		F:..... V:..... T:.....	Item		
47	D2	The responsibility strategy assigned to the contractor for the works CLAUSE 4.2.1			
		F:..... V:..... T:.....	Item		
48	D3	The planning, programme and method statements - CLAUSE 4.3			
		F:..... V:..... T:.....	Item		
49	D4	Samples of materials, workmanship and finishes - CLAUSE 4.12.1			
		F:..... V:..... T:.....	Item		
50	D5	Fabrication drawings that the contractor is to provide and deliver to the employer - CLAUSE 4.12.2			
		F:..... V:..... T:.....	Item		
51	D6	Office for the foreman CLAUSE 4.14.3			
		F:..... V:..... T:.....	Item		
52	D7	Telephone - CLAUSE 4.14.3			
		F:..... V:..... T:.....	Item		
		Carried Forward		R	

		Brought Forward		R	
53	D8	Office for inspector of works - CLAUSE 4.14.3 F:..... V:..... T:.....	Item		
54	D9	Telephone in office for inspector of works - CLAUSE 4.14.3 F:..... V:..... T:.....	Item		
55	D10	Sheds - CLAUSE 4.14.3 F:..... V:..... T:.....	Item		
56	D11	Provision and erection of signboards - CLAUSE 4.14.6 F:..... V:..... T:.....	Item		
57	D12	Termination, diversion or maintenance of existing services - CLAUSE4.17.1 F:..... V:..... T:.....	Item		
58	D13	Services which are known to exist - CLAUSE 4.17.3 F:..... V:..... T:.....	Item		
59	D14	Detection apparatus - CLAUSE 4.17.4 F:..... V:..... T:.....	Item		
60	D15	Additional health and safety requirements - CLAUSE 4.18 F:..... V:..... T:.....	Item		
		SECTION E: SPECIFIC PRELIMINARIES *Section E contains Specific Preliminary items which apply to this contract except where "N/A" (Not Applicable) appears against the item.*			
		Carried Forward		R	

	Brought Forward			R
	E1 PROPRIETARY BRANDED PRODUCTS			
61	The contractor shall take delivery of, handle, store, use apply and/or fix all proprietary branded products in strict accordance with the manufacturers' instruction after consultation with the manufacturer's authorised representative.			
	F:..... V:..... T:.....		Item	
	E2 OVERTIME			
62	Should overtime be required to be worked for any reason whatsoever, the costs of such overtime are to be borne by the Contractor unless the Engineer/Principal Agent has specifically authorised in writing, prior to the execution thereof, that costs for such overtime are to be borne by the Employer.			
	F:..... V:..... T:.....		Item	
	E3 AS BUILT DRAWINGS			
63	The position of construction breaks and the extent of individual concrete pours are to be recorded by the Contractor on the Structural Engineer's drawings and are to be submitted to the Engineer/Principal Agent and the Structural Engineer for their records.			
	F:..... V:..... T:.....		Item	
	E4 SITE INSTRUCTIONS			
64	Site Instructions issued on site are to be recorded in triplicate in a Site Instruction book which is to be maintained on site by the Contractor.			
	F:..... V:..... T:.....		Item	
	Carried Forward			R

E5 LABOUR RECORD

65 At the end of each week the Contractor shall provide the Engineer/Principal Agent with a written record, in schedule form, reflecting the number and description of tradesmen and labourers employed by him and all sub-contractors on the works each day.

F:..... V:.....
T:..... Item

Note:
In the event that the contractor fails to satisfy the requirements of this specification, the Employer (Head: Health) may apply any of the sanctions provided in the contract. Sanctions may include the application of a financial penalty of 0.04% of the Contract Sum per calendar day of which the required report has not been submitted.

E6 PLANT RECORD

At the end of each week the Contractor shall provide the Engineer/Principal Agent with a written record, in schedule form, reflecting the number, type and capacity of all plant, excluding hand tools, currently used on the works.

F:..... V:.....
T:.....

E7 NON CESSION OF MONIES

66 The Contractor shall not cede nor assign his rights or claims to any monies due or to become due under this contract.

F:..... V:.....
T:..... Item

E8 SECTIONAL COMPLETION

67 When it is required that the contract be executed in sections or portions, the tenderer shall allow for all costs in this regard as no claim for additional costs will be entertained.

F:..... V:.....
T:..... Item

	Brought Forward			R
	E9 LOCAL LABOUR			
68	It is a general requirement of this contract that persons normally resident in the locality of the works (Local Labour) be given preference for employment on the contract. Provided, however, that should adequate and appropriate Labour not be available within the locality, others may be employed subject to satisfactory proof being provided that every reasonable endeavour has been made to employ Local Labour. The Contractor shall identify the local community leaders with the purpose of negotiating with them regarding the utilization of Local Labour in the construction process. In this regard, the Contractor shall furthermore give preference, wherever possible to the employment of single heads of households, women and youth. The Contractor shall, in general, maximize the involvement of the local community.			
	F:..... V:..... T:.....		Item	
	E10 IMPORT PERMITS AND DUTIES			
69	The responsibility for obtaining the necessary import permits shall rest with the successful Tenderer. No foreign exchange will be arranged or provided by the Administration. Tenderers are to allow in their tenders and pay the ordinary levy imposed on imported items in terms of item 196.10 of Part 8 of Schedule No. 1 of the Customs and Excise Act, 1964 with effect from 1 October 1989.			
	F:..... V:..... T:.....		Item	
	E11 CONTRACT PRICE ADJUSTMENT PROVISIONS (CPAP)			
	Contract Price Adjustment Provisions (CPAP) Indices Application Manual for use with P0151 indices (Revised 1 January 2013)" as published by Statistics South Africa. The Contract Price Adjustment Provision (CPAP) will be subject to the most recently released indices by Statistic South Africa. Bidders are advised that with reference to Clause 3.4.6 of the Contract Price Adjustment Provisions (CPAP) Indices Applications Manual, the Head: Department of Health (KZN Department of Health: Province of Kwa-Zulu Natal) will not accept the submission by Bidders of lists of additional items."			
	Carried Forward			R

	Brought Forward			R
	E12 EPWP CONDITIONS AND SPECIFICATIONS			
	12.1 EMPLOYMENT TARGETS			
	E12.1a Employment Targets The contractor needs to provide a realistic estimate on the number of jobs that the project has the potential to create throughout the project duration as the project will be implemented using labour intensive construction methods on elements where it is economical and feasible for this construction method.			
70	No of jobs to be created = ……. [*Contractor to fill in an estimated number*]			
	F:..... V:..... T:.....		Item	
	E12.1b Employment requirements Tenderers are advised that this contract will be subject to the Expanded Public Works Program (EPWP) aimed at alleviating and reducing unemployment.			
71	Tenderers must allow for any costs for the employment of unskilled labour as per the requirements of the EPWP program; 1. 55% of unskilled labour to be women 2. 55% of unskilled labour to be youth aged between 18 and 35 years 3. 2% of unskilled labour to be people living with disability 4. 100% Unskilled labour utilised must reside within the boundaries of the Municipality Ward where this contract is executed, with preference to the local community closest or at the walking distance to the contract site. Wherever possible local skilled tradesmen are to be employed on this contract with the view to maximize utilization of local resources.			
	F:..... V:..... T:.....		Item	
	Carried Forward			R

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72	E12.1c Labour rate and payment intervals The contractor should ensure that labour rate paid to unskilled local labour is commensurate to the daily task. When determining the rate, consideration should be given to that EPWP beneficiaries are mostly bread winners in their families, as the program intends alleviating poverty. There should also be consideration that the labour rate promotes creation of expanded number of jobs created and person days of work. Contractors should make endeavours to ensure that labourers, particularly unskilled are remunerated on fortnight basis and prior notification be made should there be a shortfall on their wages. The labour rate for local unskilled shall also be determined in consideration of the location of the project, i.e. for projects implemented in urbanized municipalities will not be the same as that for rural municipalities. F:..... V:..... T:.....		Item	
	12.2 LABOUR INTENSIVE CONSTRUCTION METHOD			
73	E12.2a Labour Intensive Construction (LIC) method On site there must a person(s) having competency in managing and implementing LIC methods. *Foreman @ NQF Level 4 the Unit Standard on Implementing LIC methods on site. *Site Agent/ Managers @ NQF level 5 the Unit Standard on Manage Labour-Intensive Skills Programme both must be CETA accredited. F:..... V:..... T:.....		Item	
	Carried Forward			R

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E12.2b Labour Intensive Construction Method
Those parts of the contract to be constructed using Labour Intensive methods will be marked in the BoQ with letter LI (indicating Labour Intensive) against every item so designated. Such works will only be constructed using method so indicated.

Reference to be made to Guidelines for the implementation of Labour Intensive Infrastructure projects under EPWP. "Scope of Work in Respect of Work Relating to the Expanded Public Works Programme (EPWP)"

F:..... V:.....
T:.....

E12.3 RECORD KEEPING

12.3.1 Every employer must keep in the project site office the following minutes of site progress minutes; contractors' monthly site progress reports; accurately recorded attendance register; proof of payment as means to verify authenticity of data in the EPWP Beneficiary form submitted with payment certificates. Copies of submitted EPWP beneficiary data forms should also be kept in the site office.

F:..... V:.....
T:.....

12.3.2 The employer must keep this record for a period of at least three (3) years after the completion of the project in his/her office as the project site office would have been relocated.

This should be safely kept for job creation data verifications and periodical audits on projects conducted by National and Provincial Department of Public Works after one (1) or two (2) quarters of submitting captured EPWP Data to the National EPWP coordinating Department.

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	E12.4 EPWP REPORTING as per EPWP DATA FORM			
74	At the end of each month as part of site progress report and to be attached to every contractors' progress payment certificate; the contractor shall provide the principal agent & Public Works with a written records, as per EPWP data form; which will be reflecting, beneficiaries full name & surname; ID No and job description of labour employed by main contractor and sub-contractors on site. At the end of each month the contractor must submit the following documents to be attached to the Progress payment certificate: 1. EPWP monthly data collection form 2. Worker monthly payment upload 3. Worker monthly proof of payment i.e 3.1 Acknowledgement of receipt of payment or 3.2 Payslips 3.3 Bank statement highlighted the workers paid 4. Worker monthly training form 5. Monthly attendance register 6. Certified copies of ID's (once off) 7. ID size photos (once off) 8. Proof of UIF 9. Proof of COIDA F:..... V:..... T:.....	Item		
	Carried Forward		R	

	Brought Forward			R
	E12.5 EPWP PROMOTION			
75	12.5.1 EPWP signage board EPWP Program at the project level shall always be promoted through have the projects signage board that embrace EPWP logo at the bottom, correct measurement for this signage board will be provided by the project leader during the site handing over meeting. the standard "HELVETIVA MEDUIM " letters are to be used . Professional title to be 10 mm above line . Line thickness to be 8 mm thick . Space between bottom of the line and bottom of the lettering below the line has to be 100 mm. Letter sizes are as follows : Helvetica medium 100 mm black upper case to be for project name and owner . Helvetica medium 75mm black upper case only to be used for professional titles.Project name and owner shall be black lettering on white background.board sizes are as follows : Board to be minimum 2000mm from ground level and to be constructed from reinforced formed chromadek panels minimum 0,6mm thick chromadek. The contractor is responsible for ensuring that the project board remains neatly and safely erected for the full duration including maintenance period, after which the project board and post are to be dismantled and handed to the client in good order. F:..... V:..... T:.....	Item		
76	12.5.2 Branding of labour apparel Contractor & Sub-contractors' labourers shall be provided with EPWP branded Personal Protective Equipment (PPE), reflector vest with EPWP wording at the back is an ideal and cost effective means of promoting program on site. The contractor is then advised to price for both item 17.5.1 and 17.5.2 F:..... V:..... T:.....	Item		
	Carried Forward			R

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E12.6 COMMUNITY LIAISON OFFICER (CLO)

UTILISATION OF A COMMUNITY LIAISON OFFICER
In addition to the requirements of Clause E9, contained in this document;

The Contractor shall allow for and pay any and all costs necessary for the engagement of the services of a Community Liaison Officer (CLO) for the full duration of this contract.

In the interest of providing a sound service to both the community and the Contractor, a CLO may only manage one project at a given time.

A CLO will be identified by the local structures of the ward areas and appointed following fair and transparent interviewing process, to be conducted in the presence of local structures and the contractor representative, in order to assist the Contractor in the procurement of any local labour, etc. required for this project. The Contractor is to liaise with the CLO and afford him any assistance needed in ensuring sound working relations with the local community.

77 **Key Responsibilities of the CLO are envisaged to include and not necessary be limited to:**

1. Assisting local leadership in conducting skills and resources audit which facilitates sourcing labour from within the ward or targeted areas for employment, as required by contractor.

2. Assisting in sourcing labour-only domestic sub-contractors and the procurement of materials from local resources, as required by the contractor.

3. Assisting the contractor by identifying areas of potential conflict and or threats to the project or to stakeholders in the project and recommend appropriate action to the contractor.

4. Assisting contractor and stakeholders in the project in the resolution of any conflict which may arise.

5. Establishing and ensuring that sufficient and open communication channels between the contractor and the work force are maintained.

6. Establish and ensuring that efficient and open communication channels between the contractor and the community are maintained.

7. Identifying and reporting to the Contractor regarding

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Brought Forward			R
issues where communication between stakeholder is necessary, recommend courses of action and facilitate such communications.			
8. Assisting the Contractor and the work force in the establishment of grievance procedures and necessary recommendation to the Contractor regarding the grievances and solution thereto.			
9. Attending to site meetings and project implementation meetings as required by the Contractor and prepare periodic reports as may be required by the Contractor from time to time.			
10. Attending to such other duties which are consistent with the functions of a CLO, as may be required by the Contractor from time to time.			
Tenderers are to price twice the rate of unskilled local labour rate against this item for any and all costs arising out of compliance with the foregoing and in the event of a Tenderer failing to price against this item or making inadequate financial provision against this item for compliance as aforesaid, then no claim for costs or additional cost incurred will be entertained by the Head: Works			
F:..... V:..... T:.....		Item	
Carried Forward			R

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	E12.7 SKILLS DEVELOPMENT ON SITE			
78	Contractor in conforming to the object of EPWP that its beneficiaries need to be capacitated with skills that will render them employable in the future. It is then the responsibility of the Contractor that mandatory life skills are provided to 100% of workforce on site and on the job training to labourers from whom the potential for further development has been identified. The latter is not mandatory to all as it covers technical skills. Contractor should also make provision for the possibility that there might be local youth that will need to be placed on the project with an intention to be provided support towards improving their level of competency and productivity. Contractor shall also provide all necessary on-the-job training to targeted labour to enable such labour to master and advance on techniques required to undertake the work in accordance with requirements of the contract in a manner that does not compromise workers health and safety. F:..... V:..... T:.....	Item		
	E12.8 LABOUR ONLY Sub Contracting for local emerging enterprises Tenderer's are advised that this contract is subject to the Expanded Public Works Programme (EPWP) and the following criteria will apply:			
	Carried Forward			R

	Brought Forward			R
79	<u>African Equity Ownership</u> a) The Tenderer is to allow for 5% of the total value of works to be undertaken by a Priority Population Group. This percentage excludes the costs of employing local unskilled labour. The allocation of this percentage from the Project, the screening of people, the selection of skills, will be for the Contractor to adjudicate. b) The Priority Population Group consists of women, youth and disabled people. c) The Contractor is to give first option for prospective PPG's from the surrounding areas of the Project. Should there be insufficient suitable people fitting the criteria of PPG's, the Contractor may hire people from further afield. This is to be done only after consultation with the Department of Works EPWP Co-ordinator and the Community Liaison Officer (CLO). d) A Mentor is to be employed by the Contractor, in consultation with the Department of Works for the purposes of quality control and liaison between the Contractor and the selected PPG's on site. The mentor will be responsible for ensuring an acceptable level of quality workmanship and that such work carried out by the PPG's is executed within the time frames stipulated. In so far as possible, the Contractor is encouraged to expand the PPG's skills, knowledge and performance levels. F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
	TENDERER'S TO NOTE CONDITIONS a) The contract to be entered into between the Contractor and the PPG's will be a LABOUR ONLY sub-contract. b) The Contractor will be responsible for ensuring that all materials for use by the PPG's in the works are to be on site timeously. The Contractor shall liaise with The Mentor and PPG to determine the nature and extent of materials required and the lead time necessary. c) The Contractor shall be responsible for the overall programming of the Works and he is to allow for monitoring the PPG's programme and progress. d) In conjunction with the Mentor, he is to allow for the supervision and mentoring (where necessary) of the PPG to ensure quality and adherence to standard building practice. e) The Contractor is to allow for extra storage facilities on site for the PPG's tools and equipment. f) Basic tools shall be provided by the PPG's and where these are not available; the Contractor will supply him with the necessary tools and equipment and deduct the costs thereof from the interim claims made by the PPG. g) Work requiring specialized tools will be provided free of charge by the Contractor with the provision that these be returned upon completion of the Work.			
80	CO-ORDINATION The Contractor is to co-ordinate the work of all the PPG's, Sub-Contractors and Nominated Sub-Contractors appointed direct by the Employer in such a manner and at all times as will suit the building programme and he is to allow adequate access, for the PPG's, where required, to carry out their work in an efficient manner as no claims for extras in this connection will be entertained. F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
81	ATTENDANCE The Contractor may allow for attendance upon the PPG's concerned to execute the work. The Contractor is to allow the PPG's the use of any scaffolding belonging to him while it remains so erected on the site. Where scaffolding is necessary for the use by any PPG and the Contractor has not erected any for his own use or has removed same after his own use, the Contractor shall supply sufficient scaffolding to the PPG to be erected and dismantled by the PPG and returned to the Contractor. This attendance upon PPG's to execute the work is to include for the scaffolding provisions as aforesaid and, in addition, is to include for co-operating to the fullest extent with all the parties, attending on off-loading materials, providing suitable storage for tools and materials used by the PPG's, use of general facilities such as latrines, etc., supply and cost of power, lighting, water and the like. F:..... V:..... T:.....		Item	
	E12.9 EPWP CONTRACT FOR LABOUR			
82	It is compulsory that shortly after the contractor and or sub contractor has appointed local labour, the employment contract should be signed by both parties, prior to commencement with works on site. The employment contract forms part of the Ministerial Determination or from the regional EPWP officials. Each contract will lapse at the end of each financial year therefore requiring the Contractor to do a renewal of each contract should the need of employment still exist for that particular labourer. F:..... V:..... T:.....		Item	
	E12.10 EPWP SCOPE of WORK **Note:** Contractors are to price any item on the Bill of Quantities having below, bearing in mind that they are regarded as main sources of job creation, whether sub contracted or undertaken by the main contractor.			
	Carried Forward			R

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83	Elements on the scope of work where application of Labour Intensive Construction methods as will indicated with letters (LI) are regarded feasible are as follows; i) Excavating trenches for foundations and any other civil works with the depth not more than 1.5m. ii) All masonry works which include concrete mixing on site; brickwork; plastering; screed works; jointing; etc. iii) Painting, Plumbing, Ironmongery; roof cladding; glazing; tilling; carpentry; flooring; waterproofing; etc. F:..... V:..... T:.....	Item		
	Note: It is a general requirement of this contract that persons normally resident in the ward of the works (local labour) be given preference for employment on the contract. Provided, however, that should adequate and appropriate labour not be available within the ward, others may be employed subject to satisfactory proof being provided that every reasonable endeavour has been made to employ local labour (Local Sub-contractor(s); Skilled; Semi-Skilled and Unskilled). The contractor shall in consultation with the local community leaders with the purpose of negotiating with them regarding the utilization of local resources in the construction process. In this regard, the contractor shall furthermore give preference, wherever possible to the employment of single heads of households, women and youth as well as families declared as most indigent by War on Poverty/ Sukuma Sakhe program profiling process. The contractor should aim, in general, to maximise the involvement of the local community, however workers from other communities should not exceed 20% of all persons working on the project, where local employees possess skills at level of competency that meet contractors 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.			
	Carried Forward			R

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	Brought Forward			R
	Linkage of payment for labour-intensive component of works to submission of project data The Contractor's payment invoices shall be accompanied by labour information for the corresponding period in a format specified by the employer. If the contractor chooses to delay submitting payment invoices, labour returns shall still be submitted as per frequency and time frame stipulated by the Employer. The contractor's invoices shall not be paid until all pending labour information has been submitted.			
84	Applicable labour laws The current Ministerial Determination (also downloadable at www.epwp.gov.za) Expanded Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice , shall apply to works described in the scope of work as being labour-intensive and which are undertaken by unskilled or semi-skilled workers. F:..... V:..... T:.....		Item	
	E13 HIV/AIDS AWARENESS Tenderers are to price against the following items for compliance with the SPECIFICATION FOR HIV/AIDS AWARENESS bound into this document *(The clauses referred to are those of the Specification for HIV/AIDS)*			
85	E13.1 Provide and maintain a condom dispenser in terms of Clause 5.1a) F:..... V:..... T:.....		Item	
86	E13.2 Provide and maintain HIV/AIDS awareness posters terms of Clause 5.1b) F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
87	E13.3 HIV /Aids Awareness Programme on Site for not less than 90% of workers inclusive of all direct and indirect costs; Engage a qualified service provider as described in the scope of works to conduct an HIV Awareness Programme in terms of Clause 5.2.1a) F:..... V:..... T:.....	Item		
88	E13.4 Arrange for workers to attend the HIV Awareness Programme in terms of Clause 5.2.1b) F:..... V:..... T:.....	Item		
	E13.5 Reporting			
89	Prepare and attach to claims for payment a brief report in terms of Clause 5.3 (see also HIV/STI Compliance Report included with this document). F:..... V:..... T:.....	Item		
	Note: *In the event that the contractor fails to satisfy the requirements of this specification, the employer (Head: Health) may apply any of the sanctions provided for in the contract. Sanctions may include the application of a financial penalty of 0.04% of the Contract Sum per calendar day of which the required reports has not been submitted.*			
	E14 OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 OF 1993			
90	Tenderers are to allow for costs in providing a project specific ' Construction Phase Safety, Health and Environmental Plan' in accordance with "Section 2 - Specification Data associated with SANS 1921-1:2004" clause C4.18 in "Part C3 - Scope of Work" F:..... V:..... T:.....	Item		
	Carried Forward			R

	Brought Forward			R
	E15 NOTICE BOARD, SITE OFFICE, ETC.			
91	Bidders are to allow for the provision and removal of a project notice board and a site office in accordance with the Principal Agent's requirements. F:..... V:..... T:.....		Item	
	E16 IMPORTED MATERIALS AND EQUIPMENT			
92	Where imported items are listed in the tender documents, the tenderer shall provide all information called for, failing which the price of any such item, material or equipment shall be excluded from currency fluctuations. (Refer to T2.14 - Schedule of Imported Materials and Equipment. F:..... V:..... T:.....		Item	
	E17 CONTRACT DOCUMENTS			
93	The drawings issues with these Bid documents do not comprise the complete set but serves as a guide only for Bidding purposes and for indicating the scope of works to enable the Bidder to acquaint him with the nature and extent of the works and the manner in which they are to be executed. Should any part of the drawings not be clearly legible to the Bidder he shall, before submitting his Bid, obtain clarification in writing from the principal agent. F:..... V:..... T:.....		Item	
	E18 GENERAL PREAMBLES			
94	The Document Preambles will be the DOH Supplementary Preambles January 2009 Rev.3 and shall be read in conjunction with the Bills of Quantities and be referred to for the full descriptions of work to be done and materials to be used. F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
	E19 TRADE NAMES			
95	Wherever a Trade Name for any product has been described in the Bills of Quantities the Bidder's attention is drawn to the fact that any other product of equal quality may be used subject to the written approval of the Principal Agent being obtained prior to the closing date for submission of Bids.			
	F:..... V:..... T:.....		Item	
	E20 EXISTING PREMISES OCCUPIED			
96	Refer to Scope of Works Part C3 of this Bid Document for information on the occupation of existing buildings.			
	F:..... V:..... T:.....		Item	
	E21 INACCURATE AND DEFECTIVE WORK EXECUTED UNDER PREVIOUS CONTRACT			
97	The contractor shall, after taking possession of the site and before commencing the work, check all levels, liners, profiles and the like and satisfy himself as to the dimensional accuracy of all work executed under the previous contract which may affect his work. Should any inaccurate or defective work be found, the contractor shall immediately notify the principal agent in writing requesting his instructions with regard thereto and afford every facility to those rectifying such inaccurate or defective work.			
	F:..... V:..... T:.....		Item	
	E22 VIEWING THE SITE IN SECURITY AREAS			
98	If the site is situated in a security area and the Bidder must arrange with the Authorities to obtain permission to enter the site for Bidding purposes.			
	F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
	E23 COMMENCEMENT OF WORKS IN SECURITY AREAS			
99	If the works falls within a security area, the contractor must arrange with the Authorities and give the necessary notices before commencement of the works. Should the contractor fail to make such arrangements, admission to the site may be refused and any additional costs will be for the contractor's account. F:..... V:..... T:.....		Item	
	E24 ENTRANCE PERMITS TO SECURITY AREAS			
100	If the works fall within a security area, the contractor shall obtain entrance permits for his personnel and workmen entering the area and shall comply with all regulations and instructions which may be issued from time to time regarding the protection of persons and property under control of the Authority. F:..... V:..... T:.....		Item	
	E25 SECURITY CHECK OF PERSONNEL			
101	The principal agent may require the contractor to have his personnel and workmen, or a certain number of them, security classified. In the event of the principal agent requesting the removal of a person or persons from the works for security reasons, the contractor shall do so forthwith and shall thereafter ensure that such person or persons are denied access to the works and the site and/or to any document or information relating to the works. F:..... V:..... T:.....		Item	
	Carried Forward			R

	Brought Forward			R
	E26 PROHIBITION ON TAKING PHOTOGRAPHS			
102	In terms of article 119 of the Defence Act, 44 of 1957, it is prohibited to sketch or to take photographs of any military site or installation or any building or civil works thereon or to be in possession of a camera or other apparatus used for taking photographs, except when authorised thereto by or on behalf of the Minister. The same prohibition is also applicable to all Correctional Institutions in terms of article 44.1(e) of the Correctional Services Act 8 of 1959. F:..... V:..... T:.....	Item		
	E27 MANAGEMENT OF WATER			
103	Water for Construction purposes must be obtained from alternative water sources (i.e. supply other than water that is produced and distributed by a regulated water service authority from a licensed water treatment works for human consumption), e.g. dams, rivers, boreholes, springs, rainwater harvesting, recycled sewerage water, etc. The alternative water source shall not be of an inferior quality / standard than that required for construction purposes. The client reserves the right through his agents to test such supplies or request certificates confirming the grade and nature of the water supply. Relevant knowledge of the respective area will be an advantage. F:..... V:..... T:.....	Item		
	Carried to Final Summary			R

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

PART C2.3 BILL OF QUANTITIES

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 1
EARTHWORKS (PROVISIONAL)

(CPAP Work Group No.104, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Nature of material to be excavated:
The material to be excavated is assumed to be predominantly of a composition that will allow excavation in "earth" as specified, but including a percentage of excavation in "soft rock" and "hard rock".

Carting away of excavated material:
Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations, or alternatively, from stock piles situated on the building site.

Carried Forward R

	Brought Forward			R	
	De-watering of excavations: The Contractor shall allow for removing seepage and other water from subterranean sources from the excavations by pumping, baling or otherwise accurate records of all such de-watering shall be kept to determine the total volume of water so removed and a clear distinction shall be made between water from subterranean sources and other water.				
	Density testing on filling: Rates for filling, etc. shall include for all density and soil type testing to prove that the specified compaction is achieved. When additional testing is done on instruction of the principal agent and these tests are successful, they will be paid for additionally.				
	Imported fill: Filling and bedding to trenches, etc. to be in compliance with SABS 1200 DB and LB respectively.				
	SITE CLEARANCE				
	Site clearance:				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth.	m2	3,267		
	REMOVAL OF TREES, ETC.				
	Taking out and removing, grubbing up roots and filling in holes:				
2	Tree stump not exceeding 1m high, exceeding 500mm and not exceeding 1,000mm girth.	No	1		
3	Tree stump not exceeding 1m high, exceeding 4,000mm and not exceeding 4,500mm girth	No	1		
	Cutting down and removing, grubbing up roots and filling in holes:				
4	Tree exceeding 2,500mm and not exceeding 3,000mm girth.	No	1		
	EXCAVATIONS, ETC.				
	Carried Forward			R	

				R	
	Brought Forward				
	Digging up topsoil:				
5	Digging up topsoil to an average depth of 150mm and preserving for use as filling.	m2	3,267		
	Excavation in earth not exceeding 2m deep:				
6	Trenches.	m3	1,012		
7	Holes.	m3	48		
8	Reduced levels under floors.	m3	707		
9	Thickening under surface beds, etc.	m3	22		
	Extra over all excavations in earth for excavation in:				
10	Soft rock.	m3	179		
11	Hard rock.	m3	90		
	Extra over all excavations for carting away:				
12	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor.	m3	1,290		
	Risk of collapse of excavations:				
13	Sides of trench and hole excavations not exceeding 1.5m deep.	m2	3,143		
	Keeping excavations free of water:				
14	Keeping excavations free of all water other than subterranean water.		Item		
	FILLING. ETC.				
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 95% Mod AASHTO density:				
15	Backfilling to trenches, holes, etc.	m3	500		
	Imported earth filling (G2) supplied by the contractor, compacted to 98% Mod AASHTO density:				
16	Under floors, steps, pavings, etc.	m3	364		
	Carried Forward			R	

	Brought Forward				R
	Imported earth filling (G5) supplied by the contractor, compacted to 98% Mod AASHTO density in layers not exceeding 150mm thick:				
17	Under floors, steps, pavings, etc.	m3	364		
	Filling of coarse river sand supplied by the contractor, filtered, consolidated and compacted:				
18	Under floors, etc.	m3	101		
	Compaction of surfaces:				
19	Compaction of ground surface under floors, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density.	m2	2,019		
	WEED KILLERS, INSECTICIDES, ETC.				
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
20	To sides of trenches, holes, etc.	m2	3,143		
21	To bottoms of trenches, holes, etc.	m2	948		
22	Under floors etc., including forming and poisoning shallow furrows against foundation walls etc., filling in furrows and ramming.	m2	2,019		
	TESTS				
	Prescribed tests to determine degree of compaction or other properties of ground or filling to be used at the sole discretion of the Client and/or Principal Agent:				
23	"Modified AASHTO Density" test.	No	10		
24	"Field Density" test including "Optimum Moisture Content" test (four readings per test).	No	10		
	Carried Forward to Summary of Section No. 2				R

Section No. 2
Bill No. 1
EARTHWORKS (PROVISIONAL)

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 2
CONCRETE, FORMWORK & REINFORCEMENT (PROVISIONAL)

(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Cost of tests:
The costs of making, storing and testing of concrete test cubes as required under clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests for approval.

The testing shall be undertaken by an approved independent firm or institution nominated by the contractor (test cubes are measured separately).

	Carried Forward			R	

	Brought Forward			R	
	Formwork: Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use. Formwork to soffits of solid slabs, etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described. Formwork to soffits of slabs, beams, etc. shall be deemed to be propped up exceeding 1,5m and not exceeding 3,5m high unless otherwise described. Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the engineer for design reasons. Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".				
	CONCRETE *(CPAP Work Group No.110, Unless Otherwise Stated)* **UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES** 10MPa/19mm concrete:				
1	Surface blinding under footings and bases.	m3	44		
	REINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES 30MPa/19mm concrete:				
2	Strip footings.	m3	215		
3	Bases.	m3	12		
4	Surface beds on waterproofing.	m3	263		
5	Thickening to surface beds, slabs, etc..	m3	22		
	Carried Forward			R	

	Brought Forward			R	
	REINFORCED CONCRETE				
	30MPa/19mm concrete:				
6	Brick wall cavity infill.	m3	48		
	REINFORCED CONCRETE CAST ON/IN FORMWORK				
	30MPa/19mm concrete:				
7	Columns in foundations.	m3	4		
8	Columns.	m3	3		
9	Slabs, beams and inverted beams.	m3	93		
	TEST CUBES				
	Making and testing of (sets of three):				
10	150 x 150 x 150mm concrete strength test cube.	No	111		
	CONCRETE SUNDRIES				
	Finishing top surfaces of concrete smooth with a wood float:				
11	Tops of beams, walls, slabs, etc.	m2	222		
12	Tops of columns, etc. to falls.	m2	4		
	Finishing top surfaces of concrete smooth with a power float:				
13	Surface beds, slabs etc.	m2	2,019		
	40MPa non-shrink grout:				
14	Bedding approximately 10mm thick under 250 x 250mm base plate (elsewhere).	No	57		
15	Bedding approximately 10mm thick under 250 x 450mm base plate (elsewhere).	No	6		
	MOVEMENT JOINTS, ETC.				
	Carried Forward			R	

	Brought Forward			R	
	"Jointex" or similar approved 10mm wide closed cell polyurethane with 10 x 10mm tear-off strip in isolation joints between vertical concrete and brick surfaces:				
16	Not exceeding 300mm wide in foundations.	m	1,753		
	"Jointex" or similar approved expanded polyethylene in slip joints between horizontal concrete and brick surfaces including cement mortar bed:				
17	Not exceeding 300mm wide.	m	1,774		
	Expansion joints with 10mm bitumen impregnated softboard between vertical concrete surfaces:				
18	Not exceeding 300mm high to edges of surface beds, aprons, etc.	m	351		
	Keyed construction joint between vertical concrete surfaces:				
19	Bitumous coating to sides of surface beds not exceeding 300mm high.	m	140		
20	Keyed construction joint, size 13 x 25mm to face of surface beds complete.	m	140		
	Saw cut joints:				
21	3 x 30mm Saw cut joints in top of concrete, reamed out to 8mm.	m	443		
	Vertical construction joints through concrete including thick cement slurry to one face:				
22	Surface beds not exceeding 300mmm thick.	m	340		
	FORMWORK				
	(CPAP Work Group No.111, Unless Otherwise Stated)				
	ROUGH FORMWORK (DEGREE OF ACCURACY II)				
	Rough formwork to soffits:				
23	Slabs propped up exceeding 1.5m and not exceeding 3.5m high.	m2	19		
24	Beams propped up exceeding 1.5m and not exceeding 3.5m high.	m2	67		
	Carried Forward			R	

	Brought Forward			R	
	Rough formwork to sides:				
25	Edges, risers, ends and reveals not exceeding 300mm high or wide.	m	658		
26	Beams propped up exceeding 1.5m and not exceeding 3.5m high.	m2	777		
27	Rectangular columns in foundations.	m2	7		
28	Rectangular columns.	m2	10		
29	Columns in foundations.	m2	49		
30	Columns.	m2	34		
	REINFORCEMENT				
	(CPAP Work Group No.114, Unless Otherwise Stated)				
	REINFORCEMENT				
	Mild tensile steel reinforcement to structural concrete work:				
31	Various diameters.	t	2.49		
	High tensile steel reinforcement to structural concrete work:				
32	Various diameters.	t	37.99		
	Fabric reinforcement:				
33	Type 193 fabric reinforcement in concrete surface beds, etc.	m2	2,019		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 2
CONCRETE, FORMWORK & REINFORCEMENT (PROV

Item No		Unit	Quantity	Rate	Amount
	SECTION NO. 2 **BUILDING WORKS** **BILL NO. 3** **PRECAST CONCRETE** *(CPAP Work Group No.112, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. **Sizes:** Blocks, sills, etc. measured linear shall be made in suitable lengths. Large size setting out drawings shall be prepared where necessary and submitted to the principal agent for approval before moulds are made. Window surrounds shall be built into brick walls and pointed all round on both sides with 10 x 10mm square recessed joints. Prices shall include for building in as single units or combinations in patterns of two or more window units and for bedding solid all round in mortar and pointing. Aluminium infill windows, glazing and pointing with sealing compound are measured elsewhere. **PRECAST CONCRETE WINDOW SURROUNDS**				
	Carried Forward			R	

	Brought Forward				R
	<u>"Wintec" or similar approved modular precast concrete window surrounds, etc. finished smooth on exposed surfaces, including bedding, jointing and pointing:</u>				
1	"WS03" 800 x 400mm Type "Winblok" window surround installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	12		
2	"W07" 800 x 400mm Type "Winblok" window surround installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	70		
3	"WS03" 800 x 400 x 4mm thick, Type "Winvent Fixed Direct Glass" flush toughened safety glass infill panel fixed in precast window surrounds (elsewhere) with "Neutral-Cure" silicone sealant with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	12		
4	"W07" 800 x 400 x 4mm thick, Type "Winvent Fixed Direct Glass" flush toughened safety glass infill panel fixed in precast window surrounds (elsewhere) with "Neutral-Cure" silicone sealant with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	70		
	Carried Forward to Summary of Section No. 2				R

Section No. 2
Bill No. 3
PRECAST CONCRETE

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 4
MASONRY

(CPAP Work Group No.118, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Sizes in descriptions:
Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick.

Hollow walls:
Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole.

Bagged and sealed walls:
Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats bitumen emulsion waterproofing coating.

Carried Forward R

	Brought Forward			R	
	Samples, etc.: Rates for brickwork, faced brickwork, etc. shall include for all required samples.				
	BRICKWORK				
	FOUNDATIONS (PROVISIONAL)				
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar:				
1	Half brick walls.	m2	35		
2	One brick walls.	m2	751		
3	L-shaped piers.	m3	3		
4	340mm Hollow walls of two half brick skins.	m2	399		
5	Piers.	m3	5		
6	Mass brickwork.	m3	3		
	SUPERSTRUCTURE				
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar:				
7	Half brick walls.	m2	914		
8	Half brick walls in fire walls, etc.	m2	136		
9	One brick walls.	m2	2,606		
10	One brick walls in beamfilling.	m2	80		
11	L-shaped piers.	m3	9		
12	Piers.	m3	4		
13	Mass brickwork.	m3	5		
	BRICKWORK SUNDRIES				
	Mortar testing to SANS:				
14	Compressive strength test (Provisional).	No	50		
	Carried Forward			R	

				R	
	Brought Forward				
	2.5mm Galvanised brick reinforcement in foundation brickwork, etc.:				
15	75mm Wide reinforcement built in horizontally (Provisional).	m	9,729		
16	150mm Wide reinforcement built in horizontally (Provisional).	m	8,797		
	2.5mm Galvanised brick reinforcement in superstructure brickwork, etc.:				
17	75mm Wide reinforcement built in horizontally.	m	4,842		
18	150mm Wide reinforcement built in horizontally.	m	12,852		
	Pre-stressed fabricated concrete lintels including necessary temporary supports:				
19	110 x 75mm Lintels in lengths not exceeding 3m.	m	476		
20	110 x 75mm Lintels in lengths exceeding 3m and not exceeding 4.5m.	m	12		
	Air bricks, etc.:				
21	229 x 76mm Clay vermin proof air brick (Provisional).	No	58		
	Bag down outer face of inner skin of brick wall with 4:1 cement slurry and apply two coats bituminous emulsion including working around ties:				
22	On brick walls, piers, etc. in foundations (Provisional).	m2	858		
23	On brick walls, piers, etc.	m2	2,936		
	Cement wash of liquid cement and sand mixture (2:1) applied with a brush:				
24	On concrete walls, columns, beams, etc. including removing ridges, irregularities, etc. (Provisional).	m2	840		
25	On concrete ceilings, beams, etc. including removing ridges, irregularities, etc. (Provisional).	m2	67		
	Joint forming material in movement joints:				
26	10mm "Jointex" or similar approved expanded polyurethane, built in vertically through half brick walls in foundations (Provisional).	m	5		
	Carried Forward			R	

	Brought Forward				R
27	10mm "Jointex" or similar approved expanded polyurethane, built in vertically through one brick walls in foundations (Provisional).	m	15		
28	10mm "Jointex" or similar approved expanded polyurethane, built in vertically through half brick walls (Provisional).	m	15		
29	10mm "Jointex" or similar approved expanded polyurethane, built in vertically through one brick walls (Provisional).	m	45		
	Hoop iron, etc.:				
30	30 x 1,000mm Galvanised hoop iron straps, built into brick walls every fourth course in foundations (Provisional).	No	100		
31	30 x 1,000mm Galvanised hoop iron straps, built into brick walls every fourth course (Provisional).	No	309		
	FACE BRICKWORK				
	FOUNDATIONS (PROVISIONAL)				
	"Corobrik Firelight Satin FBX" or similar approved face bricks in stretcher bond pointed with recessed horizontal and vertical joints:				
32	Extra over brickwork for face brickwork.	m2	145		
	SUPERSTRUCTURE (PROVISIONAL)				
	"Corobrik Firelight Satin FBX" or similar approved face bricks in stretcher bond pointed with recessed horizontal and vertical joints:				
33	Extra over brickwork for face brickwork.	m2	1,775		
	FACE BRICK COPINGS, SILLS, ETC.				
	Brick-on-edge header course copings, sills, etc. of face bricks, pointed with flush recessed joints on all exposed faces:				
34	110mm Wide sills set sloping and slightly projecting.	m	179		
	Carried Forward to Summary of Section No. 2				R

Section No. 2
Bill No. 4
MASONRY

Item No		Unit	Quantity	Rate	Amount
	SECTION NO. 2 **BUILDING WORKS** **BILL NO. 5** **WATERPROOFING**				
	(CPAP Work Group No.120, Unless Otherwise Stated)				
	SUPPLEMENTARY PREAMBLES				
	The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs. **Proprietary products in descriptions:** Proprietary products shall be used as specified. Substitute products of similar quality and specification may only be used with prior tender closing written approval by the principal agent.				
	DAMPPROOFING OF WALLS AND FLOORS				
	One layer 375 micron embossed polyethylene dampproof course "Consol Plastics Brickgrip DPC" or similar approved:				
1	In walls vertically at reveals.	m2	122		
	Carried Forward			R	

	Brought Forward			R	
2	In walls horizontally at reveals, under sills, etc..	m2	137		
	<u>One layer 250 micron green polyethylene waterproof sheeting (SANS 952-1985 type C) sealed at laps with PVC self-adhesive tape:</u>				
3	Under surface beds including turn-ups, etc.	m2	2,228		
	<u>"Mapelastic Smart" or similar approved two-component, cementitious mortar applied to screed (surface preparation and application as per supplier's recommendation):</u>				
4	On shower floors (Provisional).	m2	1		
	<u>SEALING STRIPS, JOINT SEALANTS, ETC.</u>				
	<u>"Bostik" or similar approved silicone sealant:</u>				
5	In joint sealing and pointing all round external window and door frames (Provisional).	m	2,349		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 5
WATERPROOFING

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 6
ROOF COVERINGS, CLADDINGS, ETC.

(CPAP Work Group No.122, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

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Proprietary products in descriptions:
Proprietary products shall be used as specified. Substitute products of similar quality and specification may only be used with prior tender closing written approval by the principal agent.

Fixing:
Fixing shall be done according to SABS 1200HB with minimum 225mm end laps.

Guarantee:
The contractor will be required to provide a written guarantee, stating that:

1. The roof sheeting is of the specified thickness.

2. The client is indemnified against any defects, including colour deterioration for a minimum period of 15 years.

Carried Forward R

	Brought Forward			R	
	Pricing: Prices for roof covering and cladding are to include for all necessary drive screws, hook bolts, clips, sheet bolts, nuts, washers, etc., for drilling holes for screws and bolts including removing all swarf from the sheeting and all right angle cutting and waste (measured net).				
	PROFILED METAL SHEETING AND ACCESSORIES				
	0.80mm "Saflok 700" or similar approved aluminium-zinc coated steel (AZ150) interlocking roof sheeting with a "COLORPLUS" (Seaspray), fixed with approved fixings to timber purlins (elsewhere) at 1,900mm centres and end-span purlins at 1,700mm centres fixed with "Saflok 700" clips and "Fixtite" or similar approved wafer head self-tapping fasteners complete and in strict accordance with the manufacturer's recommendations:				
1	Roof covering with pitches not exceeding 25 degrees	m2	346		
2	Apex flashings, 75 degrees x 660mm girth, bent and notched on site to suit roof profile complete.	m	31		
3	Barge flashing, 660mm girth bent and notched on site to suit roof profile complete.	m	87		
4	Headwall flashing, 97.5 degrees x 462mm girth including 185mm girth counter flashing with broadflute closure, bent and notched on site to suit roof profile complete.	m	30		
	0.80mm "Saflok 700" or similar approved aluminium-zinc coated steel (AZ150) interlocking roof sheeting with a "COLORPLUS" (Seaspray), fixed with approved fixings to steel purlins (elsewhere) at 1,900mm centres and end-span purlins at 1,700mm centres fixed with "Saflok 700" clips and "Fixtite" or similar approved wafer head self-tapping fasteners complete and in strict accordance with the manufacturer's recommendations:				
5	Roof covering with pitches not exceeding 25 degrees	m2	2,403		
6	Apex flashings, 75 degrees x 660mm girth, bent and notched on site to suit roof profile complete.	m	222		
7	Barge flashing, 660mm girth bent and notched on site to suit roof profile complete.	m	172		
	Carried Forward			R	

	Brought Forward			R	
8	Headwall flashing, 97.5 degrees x 462mm girth including 185mm girth counter flashing with broadflute closure, bent and notched on site to suit roof profile complete.	m	161		
9	Sidewall flashing, 462mm girth including 185mm girth counter flashing, bent and notched on site to suit roof profile complete.	m	111		
10	Valley gutters/flashing, size 150 degrees x 462mm girth complete.	m	39		
	ROOF AND WALL INSULATION				
	ROOF INSULATION				
	"Isover - Saint-Gobain" or similar approved insulation:				
11	"Factorylite" or similar approved 135mm Thick non-combustible light weight fibreglass insulation with reinforced foil facing (one side), fixed concurrently with roof coverings (elsewhere) including galvanised steel straining wires at 300mm centres and tied down at both top and bottom and tensioned with galvanised hoop iron ties complete (overlaps to be stapled):	m2	2,749		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 6
ROOF COVERINGS, CLADDINGS, ETC.

Item No		Unit	Quantity	Rate	Amount
	SECTION NO. 2 **BUILDING WORKS** **BILL NO. 7** **CARPENTRY & JOINERY** *(CPAP Work Group No.126, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. The following fittings have been given as complete units i.e. the components of the units have not been given separately. Descriptions of such units shall, therefore, be deemed to include all components, assembling, housing, notching, glueing, blocking, planting-on and screwing with countersunk screws, edge strips, thermosetting plastic laminate, glass, ironmongery, metalwork, bolting, welding, paint or varnish finishes, etc. **EAVES, VERGES, ETC.**				
	Carried Forward			R	

	Brought Forward			R	
	"Everite Nutec" or similar approved medium density plain fibre-cement fascias and barge boards:				
1	15 x 225mm Fibre-cement ungrooved fascia board including aluminium H-profile jointing plates tied with and including hot dipped galvanised screws and washers with H-profile fascia corner joiners at board ends.	m	402		
	TIMBER DOORS, WINDOWS, ETC.				
	DOORS, ETC.				
	"Bison Dura" or similar approved moisture resistant V313 particle board doors with melamine finish and 2mm high impact edging (colour to Architect's approval), hung to brick walls (elsewhere):				
2	"DS04" - 950 x 2,091 x 18mm Double door complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	8		
3	"DS05" - 550 x 2,091 x 18mm Single door complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	2		
	Solid laminated external quality flush panel doors with rebated meeting stiles and 19mm edge strips, hung to steel frames (elsewhere):				
4	"D07" - 813 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	21		
5	"D08" - 813 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	13		
6	"D09" - 813 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	7		
7	"D10" - 900 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	1		
8	"D06" - 1,000 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	20		
9	"D11" - 1,000 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	4		
10	"D15" - 900 x 2,032 x 40mm Double door complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	4		
11	"D17" - 1,250 x 2,032 x 40mm Double door complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	4		
	Carried Forward			R	

	Brought Forward			R	
12	"D18" - 1,250 x 2,032 x 40mm Double door complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	1		
13	"D04" - 1,350 x 2,032 x 40mm Double door (900 x 2,032mm & 450 x 2,032mm) with opening for 300 x 300mm viewing panel (glazing elsewhere) complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	4		
14	"D05" - 1,350 x 2,032 x 40mm Double door (450 x 2,032mm & 900 x 2,032mm) with opening for 300 x 300mm viewing panel (glazing elsewhere) complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	4		
15	"DS03" - 813 x 2,032 x 40mm Single door complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	9		
	Fire doors and frames, etc.:				
16	"D21" Class B fire double door 1,800 x 2,459mm high, each leaf with 161 x 550mm opening with clear fire rated "Pyroceram" fire resistant glass, including approved 1.6mm thick double rebated pressed steel frame for 220mm brick wall and preparing frame for door closers (elsewhere) complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	1		
	JOINERY SUNDRIES				
17	"F18" Varnished laminated hard wood protection bumper rails, size 1,000 x 300 x 30mm secured to walls with brass screws and silicon sealant between wall and rail for the entire length of both bottom and tops complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	11		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 7
CARPENTRY & JOINERY

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 8
CEILINGS, PARTITIONS & ACCESS FLOORING

(CPAP Work Group No.129, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

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Fixing:
Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete.

Ceilings:
Unless otherwise described ceilings shall be deemed to be horizontal.

Steel components:
All steel components for ceilings, partitions, etc. are to be galvanised in accordance with SANS 121.

Proprietary suspended ceilings:
Hangers, suspension grids, "lay-in" panels, etc. are to be in accordance with the manufacturers' recommendations.

Carried Forward R

	Brought Forward			R	
	Hangers, suspension grids, "lay-in" panels, etc. are to be in accordance with the manufacturers' recommendations.				
	The following preambles to be included in the bills of quantities after confirmation of the basic design of the ceilings, lighting, air conditioning, etc.:				
	1) Electrical light fittings, diffusers, panels, etc. are generally "lay-in" units of the same dimensions as the suspension grid described and allowance must be made in the rates accordingly for their support inclusive of any flexibility in setting out that may be required (ceiling panels have not been deducted and pricing is to take cognisance thereof).				
	2) The grid shall be suspended by means of galvanised steel L-section hangers at suitable centres, securely shot-pinned or screwed to concrete/steel/timber.				
	CEILING TIMBERS, BEADS, INSULATION, ETC.				
	CORNICES, ETC.				
	Wrought softwood:				
1	"F" - 76 x 19mm Double rebated cornices, nailed.	m	981		
	NAILED-UP CEILINGS				
	6mm "SHERA" or similar approved fibre-cement with 7mm PVC "H" profile jointing strips secured to and including brandering fixed to rafters/trusses at 762mm centre and fibre-cement boarding fixed to brandering at 300mm centres including priming all nail heads with "Birla White" plaster to smooth finish:				
2	"C2" - Ceilings, including "SAP H2-CCA" brandering, size 38 x 38mm (500mm c/c) in one direction, including all necessary cross brandering at ends and to all perimeter edges.	m2	202		
3	"C1" - Sloped ceilings, including "SAP H2-CCA" brandering, size 38 x 38mm (500mm c/c) in one direction, including all necessary cross brandering at ends and to all perimeter edges.	m2	887		
	Carried Forward			R	

	Brought Forward			R	
4	"E" - Extra over ceilings for "CAPCO" or similar approved aluminium trap door, size 1,200 x 600mm, with access panel fitted to ceiling brandering (elsewhere), boarded and flush plastered complete.	No	10		
	SUSPENDED CEILINGS				
	Ceilings shall comprise of “CAPCO” or similar approved 9mm gypsum tapered edge boards screwed to and including “CAPCO - T38/35G” or similar approved galvanised concealed tee grid system consisting of main tees at 1,200mm centres and cross tees at 400mm centres and hung with 25 x 25 x 0.6mm GMS angle hangers, with 50mm wide self-adhesive glass fibre to all joints and finish with "CAPCO" or similar approved jointing compound and boards finished with "RhinoLite" skimming plaster to a smooth surface (3-4mm thick), including approved screws/nails (all nail heads to receive jointing compound) and installed with strict accordance as per the manufacturer's specifications:				
5	"B1" - Sloped ceilings suspended not exceeding 1m below timber roof trusses	m2	79		
6	"B2" - Ceilings suspended not exceeding 1m below timber roof trusses.	m2	105		
7	"B1" - Sloped ceilings suspended not exceeding 1m below steel roof trusses	m2	327		
8	"B2" - Ceilings suspended not exceeding 1m below steel roof trusses.	m2	10		
	Ceilings shall comprise of “Pyroceil” or similar approved fire-retardant surface painted (colour: white) calcium silicate sealed backed tiles (rating A/A1/1) laid in "CAPCO - CKM T38/24W" pre-painted (colour: white) exposed tee grid system, main tees suspended at 1,200mm centres and hung with 19 x 0.5mnm GMS strap hangers with 32mm grabber screws to bottom chord of trusses and installed with strict accordance as per the manufacturer's specifications:				
9	"D" - Ceilings suspended not exceeding 1m below steel roof trusses.	m2	612		
10	"D" - Ceilings suspended exceeding 1m not exceeding 2m below steel roof trusses.	m2	220		
	Carried Forward			R	

	Brought Forward			R	
	<u>Cornices to suspended ceilings:</u>				
11	30 x 30mm "SIGMA - Shadow Mould 30" or similar approved epoxy coated (colour: satin white) aluminium shadowline trim with 5/6/36 wall anchors at 450mm centres including alignment with 75 x 2..8mm alignment pins complete.	m	1,034		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 8
CEILINGS, PARTITIONS & ACCESS FLOORING

Item No		Unit	Quantity	Rate	Amount
	SECTION NO. 2 **BUILDING WORKS** **BILL NO. 9** **FLOOR COVERINGS, WALL LININGS, ETC.** *(CPAP Work Group No.130, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. **Fixing:** Floor coverings, wall linings, etc. shall, where applicable, be fixed with adhesive as recommended by the manufacturers of the flooring, linings, etc. **Cleaning:** Rates for floor covering shall include for proper cleaning on completion. **FLOOR COVERINGS** 2.0mm "Polysafe Hydro" or similar approved flexible seamless pvc sheet flooring with welded joints fully bonded with adhesive installed complete with strict adherence to manufacturer's installation guidelines on well prepared screeded floors (elsewhere):				
1	Vinyl Sheeting on floors.	m2	785		
	Carried Forward			R	

	Brought Forward			R	
	"Belgotex Grass" or similar approved artificial lawn on well prepared granolithic screeded floors (elsewhere):				
2	"Short Plus" Artificial lawn on floors including approved artificial grass adhesive complete (Provisional).	m2	57		
	SKIRTINGS, NOSINGS, ETC.				
	"Polysafe Hydro" or similar approved coved vinyl skirting (colour to match vinyl flooring) formed from vinyl sheeting up-turned to walls to form skirting:				
3	70mm Vinyl coved skirting.	m	740		
	POLISH, SEALERS, ETC				
4	Thoroughly clean down and wash, strip with an ammonia based stripping agent and apply three coats of approved polyurethane sealer in strict accordance with the manufacturer's instructions.	m2	785		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 9
FLOOR COVERINGS, WALL LININGS, ETC.

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 10
IRONMONGERY

(CPAP Work Group No.132, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Proprietary items:
Where applicable the manufacturers' names or product catalogue titles are given in sub-headings preceding the items.

Prices are to be based on the specific products/articles specified.

If tenderer's wish to offer alternative products/articles for certain items, these items are to be clearly marked and the alternative specification given with supporting brochures, etc. clarifying the features of the products/articles offered.

On request returnable samples are to be provided to the principal agent for consideration.

Carried Forward R

	Brought Forward			R	
	Finishes to Ironmongery: Where applicable finishes to ironmongery are indicated by suffixes in accordance with the following list: BS Satin Bronze lacquered CP Chromium plated SC Satin chromium plated SE Silver enamelled GE Grey enamelled AS Anodised silver AB Anodised bronze AG Anodised gold ABL Anodised black PB Polished brass PL Polished and lacquered PT Epoxy coated SD Sanded Fixing Descriptions of wall mounted and floor standing ironmongery items shall be deemed to include for fixing in position and all fixing accessories. Descriptions of proprietary items shall be deemed to include fixing in position and all fixing accessories. **Keys:** Unless otherwise described locks shall have two keys each. **HINGES, BOLTS, ETC.** Manufactured by "Dormakaba" or similar approved:				
1	Satin chrome 150 x 32mm heavy duty barrel bolt (Code: BHD 150), complete.	No	6		
2	Satin Chrome 153mm manual flush bolt with heel (Code: DFB-SC-180), complete.	No	8		
3	Satin Chrome 305mm manual flush bolt with heel (Code: DFB-SC-181), complete.	No	8		
4	Satin Chrome 150x32mm heavy duty necked bolt (Code: NBHD 150), complete.	No	6		
5	Stainless steel adjustable roller bolt (Code: DBC-SS-022), complete.	No	8		
	LOCKS				
	Carried Forward			R	

	Brought Forward			R	
	Manufactured by "Dormakaba" or similar approved:				
6	Stainless steel narrow stile sash lock operating with European profile cylinder (Code: D02635 SS), case dimensions (mm) 174H x 52D, forend dimensions (mm) 238H x 22W, backset 35mm, 20mm throw, complete.	No	3		
7	Stainless steel narrow stile dead lock operating with European profile cylinder (Code: D02735 SS), case dimensions (mm) 174H x 52D, forend dimensions (mm) 238H x 22W, backset 35mm, 20mm throw, complete.	No	1		
8	Stainless steel narrow stile roller dead lock operating with European profile cylinder (Code: D02835 SS), case dimensions (mm) 174H x 52D, forend dimensions (mm) 238H x 22W, backset 35mm, 20mm throw, complete.	No	20		
9	Stainless steel bathroom deadlock (Code: D032D SS), case dimensions (mm) 102H x 78D, forend dimensions (mm) 155H x 22W, backset 57mm, complete.	No	12		
10	Stainless steel cylinder sash lock (Code: D036S SS), case dimensions (mm) 116.5H x 78D, forend dimensions (mm) 168H x 22W, backset 57mm, at 61mm centres, complete.	No	58		
11	Stainless steel cylinder dead lock (Code: D037D SS), case dimensions (mm) 116.5H x 78D, forend dimensions (mm) 168H x 22W, backset 57mm, complete.	No	8		
12	Satin nickel 65mm Euro-profile bathroom / privacy cylinder (Code: DBC006501), complete.	No	4		
13	Satin nickel 63mm Euro-profile nickel plated E-SP 5 pin double cylinder, grand master keyed (Code: DDC206301 GMK), complete.	No	61		
14	Satin nickel 63mm Euro-profile nickel plated E-SP 5 pin knob cylinder, grand master keyed (Code: DKC206301 GMK), complete.	No	18		
15	Satin nickel 40.5mm Euro-profile nickel plated E-SP 5 pin single cylinder, grand master keyed (Code: DSC204101 GMK), complete.	No	7		
16	Stainless steel bathroom WC indicator (Red & White) and turnknob (Code: DWC-005), complete.	Sets	7.0		
	Carried Forward			R	

Section No. 2
Bill No. 10
IRONMONGERY

	Brought Forward			R	
17	Stainless steel disabled WC indicator (Red & White) and turnknob for physically impaired (Code: DWC-006), complete.	Sets	5.0		
18	Nickel plated rebate conversion kit for Euro profile locks D036S, D037D (Code: D038R NP), complete.	No	13		
	ESCUTCHEONS				
	Manufactured by "Dormakaba" or similar approved:				
19	Stainless Steel round cylinder escutcheon (Code: DCE-002 S.S), complete.	Pairs	2.5		
20	Stainless Steel narrow stile cylinder escutcheon (Code: DCE-105 S.S), complete.	Pairs	21.0		
	HANDLES				
	Manufactured by "Dormakaba" or similar approved:				
21	62 x 44mm Stainless steel ring flush pull handle (Code: DRP-SS-023), complete.	No	18		
22	325 x 25mm Stainless steel straight tubular pull handle flange fixing (Code: DPH301B), complete.	No	10		
23	382 x 32mm Stainless steel D shaped offset tubular pull handle BTB (BTB fixing sets included) - (Code: DPH215 BTB), complete.	Pairs	26.0		
24	Brushed stainless steel DPH301C pull handle BT fixed on a 75 x 170 x 1.2mm think Grade 304 stainless steel plate with no cylinder cut-out (Code: DPH-304-BL-SF 75x170). Stainless steel plate to have 4 countersunk holes for screw fixing, complete.	No	7		
25	Brushed stainless steel DPH301C pull handle BT fixed on a 150 x 300 x 1.2mm think Grade 304 stainless steel plate with no cylinder cut-out (Code: DPH-304-BL-SF 150x300). Stainless steel plate to have 6 countersunk holes for screw fixing, complete.	No	5		
26	Brushed stainless steel DPH301C pull handle BT fixed on a 150 x 300 x 1.2mm think Grade 304 stainless steel plate with cylinder cut-out to the left (Code: DPH-304-CL-SF 150x300). Stainless steel plate to have 6 countersunk holes for screw fixing, complete.	No	1		
	Carried Forward			R	

	Brought Forward			R	
27	Stainless steel lever handle on 170x170mm plate with cylinder cut-out (Code: TH120 BP Cyl S.S), complete.	Sets	58.0		
28	Stainless steel lever handle on narrow style rose with narrow style cylinder escutcheons (Code: TH120 NS Cyl S.S), complete.	Sets	3.0		
	PUSH PLATES AND KICK PLATES				
	1.2mm Thick stainless steel (grade 304) linings to timber doors (elsewhere), etc.:				
29	"D04/D05" 900 x 1,200mm High stainless steel lining to timber doors (elsewhere) with countersunk holes at edges (150mm c/c) for screw fixing with stainless steel screws complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	16		
30	"D04/D05" 450 x 1,200mm High stainless steel lining to timber doors (elsewhere) with countersunk holes at edges (150mm c/c) for screw fixing with stainless steel screws complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	16		
31	"D06" 1,000 x 1,200mm High stainless steel lining to timber doors (elsewhere) with countersunk holes at edges (150mm c/c) for screw fixing with stainless steel screws complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	40		
32	"D08" 813 x 1,200mm High stainless steel lining to timber doors (elsewhere) with countersunk holes at edges (150mm c/c) for screw fixing with stainless steel screws complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	26		
33	"D11" 1,000 x 1,200mm High stainless steel lining to timber doors (elsewhere) with countersunk holes at edges (150mm c/c) for screw fixing with stainless steel screws complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	8		
34	"D21" 861 x 1,500mm High stainless steel lining to timber doors (elsewhere) glued with approved fastening agent complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	4		
	Carried Forward			R	

	Brought Forward			R	
	Manufactured by "Dormakaba" or similar approved:				
35	75 x 170 x 1.2mm Thick Grade 304 stainless steel plate (Code: DPP-304-BL-SF 75X170) with 4 countersunk holes for screw fixing, complete (Provisional).	No	7		
36	150 x 300 x 1.2mm Thick Grade 304 stainless steel plate (Code: DPP-304-BL-SF 150X300) with 6 countersunk holes for screw fixing, complete (Provisional).	No	3		
37	150 x 300 x 1.2mm Thick Grade 304 stainless steel plate with cylinder cut-out on the left (Code: DPP-304-CL-SF 150X300) with 6 countersunk holes for screw fixing, complete (Provisional).	No	1		
38	150 x 300 x 1.2mm Thick Grade 304 stainless steel plate with cylinder cut-out on the right (Code: DPP-304-CR-SF 150X300) with 6 countersunk holes for screw fixing, complete (Provisional).	No	2		
39	Grade 430 stainless steel door width kick plate 200 x width of door x 1.2mm thick (Code: DKP-304-SF 200) with 10 countersunk holes for screw fixing, complete (Provisional).	No	22		
	DOOR CLOSERS				
	Manufactured by "Dormakaba" or similar approved:				
40	Silver EN 2-4 Parallel arm delayed action door closer (Code: TS73V PA DC-PAB-SL). Push side fixing (parallel arm bracket included) EN2 750-850, EN3 850-950, EN4 950-1100, complete.	Sets	5.0		
41	Silver EN 3-4 Cam action slide channel non hold open door closer - hydraulic speed control (Code: TS90-SL). Pull side - leaf or transom fixing, push side - leaf or transom fixing, EN3 850-950, EN4 950-1100, complete.	No	5		
42	Silver Non hold open co-ordinated door closer system (Code: TS91B G-SR) for rebated doors between 1350 - 1900mm. Max door width 950mm per leaf. Pull-side fixing. Door closer compliant with EN 1154. Door co-ordinators tested to EN 1158. Door closer is "Certi Fire" approved (Certificate No. CF 119) for door types ITT 120, MM/IMM 240. Certified manufacturer to ISO 9001, complete.	Sets	1.0		
	LETTERS, NAMEPLATES, ETC.				
	Carried Forward			R	

	Brought Forward			R	
	Manufactured by "Dormakaba" or similar approved:				
43	150 x 150mm High male sign (Code: DSS-130 M) fixed to doors, etc. including stainless steel countersunk screws (No.4) complete.	No	4		
44	150 x 150mm High female sign (Code: DSS-131 F) fixed to doors, etc. including stainless steel countersunk screws (No.4) complete.	No	2		
45	150 x 150mm High male/female sign (Code: DSS-132 MF) fixed to doors, etc. including stainless steel countersunk screws (No.4) complete.	No	3		
46	150 x 150mm High disabled persons sign (Code: DSS-133 P) fixed to doors, etc. including stainless steel countersunk screws (No.4) complete.	No	5		
47	150 x 150mm High fire hose reel sign (Code: DSS-145 FHR) fixed to doors, etc. including stainless steel countersunk screws (No.4) complete.	No	4		
48	150 x 150mm High fire extinguisher sign (Code: DSS-146 FE) fixed to doors, etc. including stainless steel countersunk screws (No.4) complete.	No	4		
	SUNDRIES				
	Brass:				
49	3 x 25mm Dividing strip between different floor finishes complete.	m	50		
	Manufactured by "Dormakaba" or similar approved:				
50	Stainless steel dust proof strike (Code: DPS-SS-032),complete.	No	26		
51	Stainless steel floor mounted door stop plugged to concrete floor (Code: DDS-SS-017), complete.	No	115		
52	Stainless steel hat and coat hook (Code: DHC-SS-030A), complete.	No	2		
53	Stainless steel hat and coat hook with rubber buffer (Code: DHC-SS-031B), complete.	No	9		
54	Satin chrome 150mm cabin hook and eye (Code: CH 150) with 100 x 100 x 75mm Chamfered wrot meranti block, or similar approved.	No	36		
	Carried Forward			R	

	Brought Forward			R	
	Manufactured by "Coastal Manufacturing" or similar approved:				
55	"F16" Grade 316 stainless steel wall mounted broom hook, size 1,450 x 250 x 100mm, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	6		
	Manufactured by "Greenfield" or similar approved:				
56	"F30" Galvanised powder coated two-door locker (code: GB002) (colour: grey), size 1,800 x 300 x 450mm complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	8		
	Manufactured by "Medicare" or similar approved:				
57	"F32" PPE Dispenser (code: MHE-PL006), size 605 x 130 x 395mm high, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	6		
	BATHROOM FITTINGS (PROVISIONAL)				
	Manufactured by "Hygiene Systems" or similar approved:				
58	"F31" Infant changing station with horizontal integral moulded bag hooks and safety belt including built-in liner dispenser and liner storage drawer, size 560 x 112 x 900mm high, bolted to walls complete as per Architect's Drawing (PS2023-07-WD-531-00)..	No	3		
	Manufactured by "Versitrack" or similar approved:				
59	"F09" 10mm natural anodised hospital extruded curtain rail, suspended with hangers, finished with sand hospital curtains complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	8		
60	"F19" Powder coated double wall mounted glide curtain rail complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	3		
	Manufactured by "Meditek-Hemco" or similar approved:				
61	"F37" "M31A" Single door drug cabinet, size 610 x 460 x 305mm plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
	Carried Forward			R	

	Brought Forward			R	
	Manufactured by "Franke" or similar approved:				
62	"F01" "Stratos - STRX672" 1.5mm thick stainless steel (18-10) double roll toilet roll holder, size 156 x 141 x 303mm including keyed cylinder lock and mounting hardware, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	15		
63	"F02" "Stratos - STRX600" 1.5mm thick stainless steel (18-10) paper towel dispenser, size 300 x 134 x 305mm including keyed cylinder lock and mounting hardware, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	48		
64	"F03" "Stratos - STRX605" 1.5mm thick stainless steel (18-10) waste bin (capacity: 34L), size 300 x 270 x 520mm including keyed cylinder lock and mounting hardware, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	47		
65	"F04" "Stratos - STRX618" 1.5mm thick stainless steel (18-10) push lever cream soap dispenser (capacity: 1,000ml), size 304 x 100 x 134mm including keyed cylinder lock and mounting hardware, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	49		
66	"F05" "CNTXPAR" Grade 304 (18-10) stainless steel 32mm diam. paraplegic grab rail with fine grip, size 300 x 300 x 96mm deep, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
67	"F06" "CNTXBR" Grade 304 (18-10) stainless steel 32mm diam. cistern & amp flush valve back rail with fine grip, size 750 x 260mm, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
68	"F07" "CNTX600" Grade 304 (18-10) stainless steel 32mm diam. straight grab rail with fine grip, size 600 x 95mm deep, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
69	"F08" "CNTX400A" Stainless steel fold down shower seat, size 484 x 115 x 526mm high, complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	1		
70	"F10" "Medius - MEDX001HP" polished stainless steel towel rail, size 600 x 85mm 54mm plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	5		
	Carried Forward			R	

Section No. 2
Bill No. 10
IRONMONGERY

	Brought Forward			R	
71	"F15" "BBR6" stainless steel (18-10) bedpan and bottle rack with removable drip tray, size 960. x 350 long x 505mm, fixed to walls with anchor bolts (No.4) complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	2		
72	"F17" "Code: 2120125" Elbow operated hand sanitiser dispenser, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	44		
73	"F33" "Chronos BS646" Stainless steel single soap dish, size 125 x 90 x22mm high with deep drawn rib tray with holes plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	13		
74	"F35" Stainless steel pedal bin (capacity: 20L) complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	48		
75	"F39" "BHM13P" Stainless steel toilet roll holder, size 145 x 75mm, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
	PINNING BOARDS, WRITING BOARDS, PROJECTION SCREENS, ETC. (PROVISIONAL)				
	Manufactured by "Vitrex" or similar approved:				
76	"F13" "Vitrex System 1000" Enamel writing board, size 1,000mm x 1,000mm high, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	22		
77	"F14" Pinning board, size 800mm x 1,000mm high, plugged to walls complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	35		
	SHELVES, ETC. (PROVISIONAL)				
78	"F41" Urban cube box shelf with a melamine foil finish, size 740 x 730 x 370mm, complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	5		
	"Manufactured by "Franke" or similar approved:				
79	"F23" 1.2mm Grade 304 18/10 stainless steel fastrack modular shelving with 750 x 400mm wide solid shelves (No.6), fixed to vertical posts with die cast aluminium corner brackets, fitted to posts, size 25mm x 1,600mm high (No.4) with adjustable foot piece and end caps complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	8		
	Carried Forward			R	

	Brought Forward			R	
80	"F22" 1.2mm Grade 304 18/10 stainless steel fastrack modular shelving with 1,000 x 400mm wide solid shelves (No.6), fixed to vertical posts with die cast aluminium corner brackets, fitted to posts, size 25mm x 1,600mm high (No.4) with adjustable foot piece and end caps complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	10		
81	"F21" 1.2mm Grade 304 18/10 stainless steel fastrack modular shelving with 1,250 x 400mm wide solid shelves (No.6), fixed to vertical posts with die cast aluminium corner brackets, fitted to posts, size 25mm x 1,600mm high (No.4) with adjustable foot piece and end caps complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	15		
82	"F29" 1.2mm Grade 304 18/10 stainless steel "Z series" shelving with 900 x 350mm wide solid shelves (No.2) with 25mm apron to front and sides, 30mm turn up at back of shelf with safety edge on corners, fixed to walls with 1,000mm long stainless steel wall band (Code: 2620125) (No.3) and bolted to walls with anchor bolts complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
83	"F40" 1.2mm Grade 304 18/10 stainless steel "Z series" shelving with 1,200 x 300mm wide solid shelves (No.2) with 25mm apron to front and sides, 30mm turn up at back of shelf with safety edge on corners, fixed to walls with 1,000mm long stainless steel wall band (Code: 2620125) (No.2) and bolted to walls with anchor bolts complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	4		
	SEATING (PROVISIONAL)				
	Manufactured by "Khanda" or similar approved:				
84	"F25" Three-seater "Downtime" moulded polypropylene (colours to Architect's approval) beam type benches, including all necessary bolts and installed in strict accordance with the manufacturers recommendations complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	47		
85	"F25" Four-seater "Downtime" moulded polypropylene (colours to Architect's approval) beam type benches, including all necessary bolts and installed in strict accordance with the manufacturers recommendations complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	10		
	Carried Forward			R	

	Brought Forward			R	
86	"F25" Five-seater "Downtime" moulded polypropylene (colours to Architect's approval) beam type benches, including all necessary bolts and installed in strict accordance with the manufacturers recommendations complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	1		
	Manufactured by "Franke" or similar approved:				
87	"F26" Purpose made 1,2mm Grade 304 18/10 stainless steel wall bench, size 1,200 x 650mm with 150mm high integral splashback to rear, 50 x 10mm turndown with undersides sprayed with vermin proof bitumastic sound deadening, fixed to walls with anchor bolts 900mm from finished floor level and supported on Grade 304 (18/10) stainless steel square gallows brackets (Code: 352662) complete as per Architect's Drawing (PS2023-07-WD-531-00).	No	25		
88	"F27" Purpose made 1,2mm Grade 304 18/10 stainless steel wall bench, size 1,500 x 650 x 1,050mm with 150mm high integral splashback to rear, 50 x 10mm turndown with undersides sprayed with vermin proof bitumastic sound deadening, fixed to walls with anchor bolts 900mm from finished floor level and supported on Grade 304 (18/10) stainless steel square gallows brackets (Code: 352662) complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	2		
89	"F28" Purpose made 1,2mm Grade 304 18/10 stainless steel wall bench, size 1,850 x 650mm with 150mm high integral splashback to rear, 50 x 10mm turndown with undersides sprayed with vermin proof bitumastic sound deadening, fixed to walls with anchor bolts 900mm from finished floor level and supported on Grade 304 (18/10) stainless steel square gallows brackets (Code: 352662) complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	2		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 10
IRONMONGERY

Item No		Unit	Quantity	Rate	Amount
	SECTION NO. 2 **BUILDING WORKS** **BILL NO. 11** **METALWORK**				
	(CPAP Work Group No. 136 Unless Otherwise Stated)				
	SUPPLEMENTARY PREAMBLES				
	The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. **Note:** All aluminium windows and doors including frames to be "Class 2 Powder coated" by the manufacturer. Colour: Charcoal. **Note:** All aluminium louvres to be "Class 2 Powder coated" by the manufacturer. Colour: Charcoal. **Note:** All ironmongery, handles, openers, hinges, screws, fasteners, etc. for aluminium products are deemed to be included and measured complete, any claim for additional items will not be entertained.				
	Carried Forward			R	

Brought Forward R

Descriptions of bolts, anchors, etc.:
Descriptions of bolts shall be deemed to include nuts and washers.

Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete.

Items described as "holed for bolt(s)" shall be deemed to exclude the bolts unless otherwise described.

Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres.

Aluminium doors, windows, etc.:
Doors and windows shall comply with AAAMSA design criteria.

Glazing shall comply with SAGGA regulations.

Glass thickness shall comply with SAGGA regulations irrespective of the thickness shown on the schedules/drawings.

Doors and windows shall be supplied with protective tape and plastic and shall be removed only once surrounding trades have been completed.

The following certificates shall be provided prior to commencement of site work:
1) A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product;

2) A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively.

3) A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process.

4) A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 0137, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked.

Carried Forward R

	Brought Forward			R	
	5) A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against de-lamination and colour degradation for a period of not less than five years.				
	Testing of windows for water-tightness: Each window shall be tested for water-tightness with water sprayed on by means of a 20mm hosepipe using adequate pressure. If in the opinion of the principal agent, the pressure proves to be inadequate, then the pressure in the hosepipe shall be boosted by means of compressed air or other approved means.				
	The contractor will be required to take all dimensions affecting the existing buildings on the site and he will be held solely responsible for the accuracy of all such dimensions where used in the manufacture of new items (doors, windows, fittings, etc.).				
	Note: Tenderers are referred to Architect's drawings indicated in the general window layout as annexed to these bills of quantities for tender purposes.				
	Note: Name of manufacturer permanently marked on each sheet to be visible after glazing.				
	Use of alternative product/colour to be approved in writing by the Principal Architect and Client before use.				
	Confirmation with Schedule is mandatory before order is placed.				
	SUNDRY BRASS WORK:				
	Brass:				
1	4 x 30mm Weatherbar set in concrete flush with floor finish one side complete.	m	4		
	ALUMINIUM ROLLER SHUTTERS, ETC.				
	Carried Forward			R	

	Brought Forward			R	
	"Serranda" or similar approved epoxy powder coated roller shutters with 77 x 2mm slats fixed to brickwork or concrete:				
2	"DRS1" Manual push-up slatted roller shutter for opening, size 1,000 x 1,705mm high including overhead box 285mm high and canopy cover with endlocked 77 x 2mm thick slats, 75mm wide guides, extruded aluminium T-bar with rubber seals and slide bolt (No.2) on either side to internal face, fixed to brickwork or concrete surfaces and installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	1		
	GATES, SCREENS, ETC.				
	GATES				
	Manufactured by "Cochrane Global" or similar approved:				
3	"G01" "ClearVu" marine fusion bonded coated (colour: charcoal) double leaf swing gate, size 1,800 x 1,840mm high with "ClearVu"mesh infill including manufacturer's large hinges and T-Slide lock with lock box, drop bolts (No.2) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	1		
4	"G04" "ClearVu" marine fusion bonded coated (colour: charcoal) single leaf swing gate, size 978 x 1,840mm high with "ClearVu"mesh infill including manufacturer's large hinges and T-Slide lock with lock box, drop bolts (No.1) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	1		
5	"G05" "ClearVu" marine fusion bonded coated (colour: charcoal) double leaf swing gate, size 2,400 x 2,460mm high with "ClearVu"mesh infill including manufacturer's large hinges and T-Slide lock with lock box, drop bolts (No.2) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	2		
6	"G06" "ClearVu" marine fusion bonded coated (colour: charcoal) double leaf swing gate, size 1,570 x 2,035mm high with "ClearVu"mesh infill including manufacturer's large hinges and T-Slide lock with lock box, drop bolts (No.2) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	1		
	Carried Forward			R	

	Brought Forward			R	
7	"G07" "ClearVu" marine fusion bonded coated (colour: charcoal) single leaf swing gate, size 978 x 2,035mm high with "ClearVu"mesh infill including manufacturer's large hinges and T-Slide lock with lock box, drop bolts (No.1) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	1		
	POSTS, ETC.				
	Manufactured by "Cochrane Global" or similar approved:				
8	3,000mm Long x 85mm with a depth of 85mm galvanised and marine fusion bond coated post including locking recess mechanism to secure panel edge including UV stabilized polymer cap set into concrete bases (elsewhere) complete.	No	12		
	STEEL RECORDROOM AND STRONGROOM DOORS, VENTILATORS, ETC.				
	Strongroom doors and frames, etc. suitable for 220mm walls fixed to brickwork or concrete:				
9	"D14" "Mutual Austen Safes DS1" right hand record room strongroom door and frame, overall size 1,000 x 2,032.5mm high with a mass of 180kg including 7-lever security lock and 3-wheel combination lock installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	1		
	ALUMINIUM WINDOWS, DOORS, ETC.				
	ALUMINIUM CASEMENT WINDOWS				
	Carried Forward			R	

	Brought Forward			R	
	Powder coated casement windows as per "Crealco SWIFT 38" system, complete with subframes, ironmongery, factory glazed with 6.38mm "SolarVue Neutral" laminated safety glass with clip-on glazing beads to match with neoprene seals, etc. nd including over all opening sections 12mm aluminium SQ burglar proofing bars pop-riveted to aluminium window frames and fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
10	"WS01" Purpose made aluminium window with louvre inserts, overall size 1,155 x 1,200mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-520).	No	19		
	Powder coated casement windows as per "Crealco SWIFT 38" system, complete with subframes, ironmongery, factory glazed with 6.38mm "SolarVue Neutral" laminated safety frosted glass with clip-on glazing beads to match with neoprene seals, etc. nd including over all opening sections 12mm aluminium SQ burglar proofing bars pop-riveted to aluminium window frames and fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
11	"WS02" Purpose made aluminium window with louvre inserts, overall size 1,155 x 1,200mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-520).	No	4		
	Powder coated casement windows as per "Crealco SWIFT 38" system, complete with subframes, ironmongery, factory glazed with 6.38mm "SolarVue Neutral" laminated safety glass with clip-on glazing beads to match with neoprene seals, etc. including "Trox" weather resistant louvre, Type "AWG2" as inserts and including over all opening sections 12mm aluminium SQ burglar proofing bars pop-riveted to aluminium window frames and fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
12	"W01" Purpose made aluminium window with louvre inserts, overall size 1,800 x 1,824mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	51		
	Carried Forward			R	

	Brought Forward			R	
13	"W02" Purpose made aluminium window with louvre inserts, overall size 1,250 x 1,824mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	20		
14	"W03" Purpose made aluminium window with louvre inserts, overall size 600 x 1,444mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	24		
15	"W04" Purpose made aluminium window with louvre inserts, overall size 2,770 x 2,600mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	4		
16	"W05" Purpose made aluminium window with louvre inserts, overall size 1,800 x 2,600mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	1		
17	"W06" Purpose made aluminium window with louvre inserts, overall size 1,250 x 2,600mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	2		
18	"W08" Purpose made aluminium window with louvre inserts, overall size 2,750 x 2,560mm high installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-510-00).	No	2		
	ALUMINIUM DOORS				
	Powder coated aluminium doors and frames, factory glazed with 6.38mm "SolarVue Neutral" laminated safety glass with clip-on glazing beads to match with neoprene seals, woolpile weather strip, etc. fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
19	"D12" Purpose made single door and frame with fixed pane sidelight, overall size 1,491 x 2,435mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	1		
	Carried Forward			R	

	Brought Forward			R	
20	"D13" Purpose made single door and frame with fixed pane sidelight, overall size 1,491 x 2,690mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	1		
21	"DS01" Purpose made double door and frame, overall size 1,150 x 2,091mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	4		
22	"DS02" Purpose made single door and frame, overall size 978 x 2,091mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	4		
	Powder coated aluminium doors and frames, factory glazed with 6.38mm "SolarVue Neutral" laminated safety glass with clip-on glazing beads to match with neoprene seals, woolpile weather strip, etc. including "Trox" weather resistant louvre, Type "AWG2" as inserts and including over all opening sections 12mm aluminium SQ burglar proofing bars pop-riveted to aluminium window frames and fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
23	"D01" Purpose made double door and frame, overall size 1,800 x 2,690mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	4		
24	"D02" Purpose made one and a half door and frame, overall size 1,350 x 2,690mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	8		
25	"D03" Purpose made one and a half door and frame, overall size 1,350 x 2,690mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	5		
26	"D16" Purpose made double door and frame including side lights with two top hung sections each (No.2), overall size 2,764 x 3,000mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	1		
	Carried Forward			R	

	Brought Forward			R	
	Powder coated aluminium doors and frames, including "Trox" weather resistant louvred panels and fanlight, Type "AWG2" as inserts and woolpile weather strip, etc. and fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
27	"D19" Purpose made louvred panel single door and frame with fanlight, overall size 891 x 2,690mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	3		
	Powder coated aluminium doors and frames, including "Sheerline" aluminium ribbed panels, Type "T29" as inserts to door and "Trox" Type AWG2 insert to fanlight and woolpile weather strip, etc. with fixing to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
28	"D20" Purpose made ribbed panel single door and frame with fanlight, overall size 891 x 2,690mm high installed with strict adherence to manufacturer's installation guidelines, complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	1		
	ALUMINIUM LOUVRE UNITS				
	POWDER COATED HORIZONTAL ALUMINIUM LOUVRE UNITS				
	"Trox" or similar approved fixed louvre units fixed to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
29	"WL01" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,500 x 550mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	1		
30	"WL02" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,770 x 1,670mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	1		
	Carried Forward			R	

	Brought Forward			R	
31	"WL03" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,770 x 2,550mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	1		
32	"WL04" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,500 x 1,500mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	2		
33	"WL05" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,500 x 750mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	5		
34	"WL06" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,500 x 1,000mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	6		
35	"WL07" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 2,500 x 1,250mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	9		
36	"WL07" Purpose made weather resistant louvre unit Type "AWG2" with aluminium insect mesh for 1,955 x 1,250mm high opening, installed with strict adherence to manufacturer's installation guidelines ,complete as per Architect's Schedule (PS2023-07-WD-511-00).	No	1		
	GALVANISED PRESSED STEEL DOOR FRAMES				
	1.6mm Double rebated frames suitable for half brick walls with mitred top corners, joints seam welded and corner stiffeners, fixed to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
37	"D04" Frame for double door, overall size 1,350 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	2		
	Carried Forward			R	

	Brought Forward			R	
38	"D05" Frame for double door, overall size 1,350 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	1		
39	"D06" Frame for single door, overall size 1,078 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	17		
40	"D07" Frame for single door, overall size 891 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	13		
41	"D08" Frame for single door, overall size 891 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	8		
42	"D09" Frame for single door, overall size 891 x 2,435mm high with fixed fanlight 444mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	7		
43	"D11" Frame for single door, overall size 1,078 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	2		
44	"D15" Frame for double door, overall size 950 x 2,091mm high complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	6		
45	"DS03" Frame for single door, overall size 891 x 2,091mm high complete as per Architect's Schedule (PS2023-07-WD-520-00).	No	9		
	Carried Forward			R	

	Brought Forward			R	
	1.6mm Double rebated frames suitable for one brick walls with mitred top corners, joints seam welded and corner stiffeners, fixed to brickwork or concrete with minimum three lugs per side in strict accordance with manufacturer's installation guidelines:				
46	"D04" Frame for double door, overall size 1,350 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	2		
47	"D05" Frame for double door, overall size 1,350 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	3		
48	"D06" Frame for single door, overall size 1,078 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	3		
49	"D07" Frame for single door, overall size 891 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	8		
50	"D08" Frame for single door, overall size 891 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	5		
51	"D10" Frame for single door, overall size 978 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	1		
52	"D11" Frame for single door, overall size 1,078 x 2,435mm high with fixed fanlight 344mm high (glazing elsewhere) with standard pressed steel glazing beads on one side of fanlight complete as per Architect's Schedule (PS2023-07-WD-500-00).	No	2		
53	"D15" Frame for double door, overall size 950 x 2,091mm high complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	2		
	Carried Forward			R	

	Brought Forward			R	
54	"D17" Frame for double door, overall size 1,250 x 2,091mm high complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	8		
55	"D18" Frame for double door, overall size 1,250 x 2,091mm high complete as per Architect's Schedule (PS2023-07-WD-501-00).	No	2		
	Preparation of frames for fixing of ironmongery:				
56	Arm of door closer (Provisional).	No	11		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 11
METALWORK

Item No		Unit	Quantity	Rate	Amount
	SECTION NO. 2 **BUILDING WORKS** **BILL NO. 12** **PLASTERING**				
	(CPAP Work Group No. 142 Unless Otherwise Stated)				
	SUPPLEMENTARY PREAMBLES				
	The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. **Sealers, topcoats etc.:** Rates for epoxy resin floors and skirtings shall include for surface applied sealers and topcoats as per specifications. **Cleaning:** Rates shall include for proper cleaning on completion. **Specialised plaster type wall coatings:** All specialised plaster type wall coatings are to be executed in strict accordance with the manufacturer's instructions.				
	SCREEDS				
	Cement plaster screeds (1:4) wood floated, on concrete:				
1	30mm Thick on floors and landings.	m2	813		
	Carried Forward			R	

	Brought Forward			R	
	Cement plaster screeds (1:4) wood floated for tiles, on concrete:				
2	30mm Thick on floors and landings.	m2	517		
	INTERNAL PLASTER				
	15mm Thick cement plaster (1:4) wood floated for tiles, on brickwork:				
3	On walls (Provisional).	m2	682		
	15mm Thick cement plaster (1:4) steel trowelled, on brickwork:				
4	On walls.	m2	4,057		
5	On narrow widths not exceeding 300mm girth.	m2	152		
	13mm Thick cement plaster (1:3) wood floated, on concrete:				
6	On ceilings.	m2	16		
	15mm Thick cement plaster (1:3) steel trowelled, on concrete:				
7	On sides of beams, etc..	m2	487		
8	On soffits of beams, etc..	m2	52		
	EXTERNAL PLASTER				
	15mm Thick cement plaster (1:4) wood floated, on brickwork:				
9	On walls.	m2	755		
10	On narrow widths not exceeding 300mm girth.	m2	13		
	15mm Thick cement plaster (1:4) wood floated, on concrete:				
11	On narrow widths not exceeding 300mm girth.	m2	108		
12	On sides of beams, etc..	m2	289		
	GRANOLITHIC				
	Carried Forward			R	

	Brought Forward			R	
	Untinted granolithic waterproofed with "Sika Cemflex" or similar approved waterproofing additive, on concrete surface beds, etc. (elsewhere):				
13	50mm Thick on floors and landings to falls.	m2	616		
	SPECIALIST FLOOR COVERINGS, ETC.				
	Epoxy seamless slip resistant floor finish including approved bonding agent:				
14	4mm Thick on floors and landings.	m2	27		
	SUNDRIES				
	V-joints, etc.:				
15	10 x 10mm V-joints formed in plaster at intersections between brick and concrete surfaces (Provisional).	m	3,232		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 12
PLASTERING

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 13
TILING

(CPAP Work Group No. 144 Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Patterns:
Unless otherwise described, tiles shall be laid with continuous joints in both directions.

Fixing:
Unless described as "fixed with adhesive to plaster (plaster elsewhere)" descriptions of tiling on brick or concrete walls, columns, etc. shall be deemed to include 1:4 cement plaster backing and descriptions of tiling on concrete floors etc. shall be deemed to include 1:3 plaster bedding.

Tiling described as "fixed with adhesive on power floated concrete" shall be deemed to include for approved tiling key-coat.

Carried Forward R

	Brought Forward			R	
	Ceramic, porcelain, marble and granite tiles are to be fixed and grouted with suitable adhesives and grouts as recommended by the manufacturer of the tiles.				
	WALL TILING (PROVISIONAL)				
	Allow the Prime Cost (R550/m2) for porcelain tiles fixed with and including adhesive to plastered walls (elsewhere) in compliance with minimum certification rating of R10/R11 with and including flush pointed 3mm tinted grouted joints:				
1	On walls.	m2	617		
2	On walls in isolated panels, splashbacks, etc. not exceeding 1m².	m2	65		
	FLOOR TILING				
	Allow the Prime Cost (R550/m2) for porcelain slip resistant tiles fixed with and including adhesive to screeded floors (elsewhere) in compliance with minimum certification rating of R10/R11 with and including flush pointed 3mm tinted grouted joints:				
3	On floors and landings.	m2	517		
4	Skirting 150mm high of cut tiles.	m	364		
	SUNDRIES (PROVISIONAL)				
	Stainless steel (Grade 304) corner protectors, stair nosings, expansion joint strips, etc.:				
5	76 x 76 x 1.6mm corner protectors.	m	167		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 13
TILING

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 14
PLUMBING & DRAINAGE (PROVISIONAL)

(CPAP Work Group No.148, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Chasing:
Chasing pipes into new walls shall be regarded as "building in" and is not measured separately. The cost of chasing, wrapping in suitable bown paper and making good shall be included in the rates for pipes.

Holes for pipes through new walls:
No allowance for holes and drilling for pipes through new walls has been made in these bills of quantities, the price for all holes and making good shall be deemed to be included in the description of pipes

Carried Forward R

Brought Forward			R	
Reduced fittings: Where fittings have reducing ends or branches they are described as 'reducing'. In the case of pipes with diameters not exceeding 60mm only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm all sizes are given and no claim for extra bushes, reducers, etc. will be entertained.				
Stainless steel basins, sinks, wash troughs, urinals, etc.: Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable.				
Fixing: Descriptions of wall mounted, floor standing, drop-in, etc. type sanitary fittings shall be deemed to include fixing in position and all fixing accessories. Descriptions of proprietary items shall include fixing in position and all fixing accessories as specified by the manufacturer.				
Copper pipes: Pipes shall be hard drawn and half-hard pipes of the class stated, and insulated, unless stated otherwise. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), class 2 (half-hard) (internal) and class 3 (heavy walled half-hard) (external) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and antisyphon pipes, capillary solder fittings and compression fittings shall be 'Cobra Watertech' type or similar approved. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition.				
Carried Forward			R	

	Brought Forward			R	
	Reduction fittings: Where fittings have reducing ends or branches they are described as "reducing" and only the largest end or branch size is given. Should the contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained.				
	Fixing of pipes: Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc, casting in, building in or suspending not exceeding 1m below suspension level.				
	Disinfection of water pipework: Water pipework is to be disinfected at completion.				
	Maintenance and guarantee: Maintenance of efficient and safe working for a period of12 months after completion.				
	RAINWATER DISPOSAL				
	0.8mm Seamless aluminium pre-painted gutters and rainwater pipes:				
1	85 x 85 x 0.60mm "OGEE" seamless aluminium gutter (colour: to Architect's approval) including aluminium holding bracket and fixing to fascias (elsewhere) with stainless steel screws.	m	63		
2	Extra over for pipe connector to gutter outlet to suit 75mm diam. PVC-U downpipe.	No	8		
3	150 x 125 x 0.80mm "OGEE" seamless aluminium gutter (colour: to Architect's approval) including aluminium holding bracket and fixing to fascias (elsewhere) with stainless steel screws.	m	340		
4	Extra over for pipe connector to gutter outlet to suit 110mm diam. PVC-U downpipe.	No	41		
	PVC-U gutters and rainwater pipes:				
5	75mm Diameter rainwater pipes including holding brackets and plugged to brick/concrete walls (elsewhere) with stainless steel screws.	m	28		
6	Extra over for bend.	No	16		
7	Extra over for shoe.	No	8		
	Carried Forward			R	

	Brought Forward			R	
8	110mm Diameter rainwater pipes including holding brackets and plugged to brick/concrete walls (elsewhere) with stainless steel screws.	m	159		
9	Extra over for bend.	No	82		
10	Extra over for shoe.	No	41		
	SANITARY PLUMBING				
	Testing:				
11	Testing waste pipe system.		Item		
	WATER SUPPLIES				
	Testing:				
12	Testing water pipe system complete.		Item		
	ELECTRIC WATER HEATERS				
	Manufactured by "Kwikot" or similar approved:				
13	150 Litre, 400KPa "DSG-150-5 Superline" dual wall electric geyser, wall mounted and including vacuum breakers, pressure reducing valve and relief valve including all joints to copper pipes and placing into position and fastening to walls as per strict adherence to manufacturer's guidelines and connect up complete.	No	4		
	Manufactured by "Franke" or similar approved:				
14	15 Litre "Zip" instant boiling water dispenser with white epoxy powder coated finish including all joints to copper pipes, fixing to wall as per manufacturer's guidelines and connecting up complete.	No	3		
	AS-BUILT DRAWINGS				
15	Provision of as-built drawings.		Item		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 14
PLUMBING & DRAINAGE (PROVISIONAL)

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 15
GLAZING

(CPAP Work Group No.150, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Proprietary items:
Where applicable the manufacturers' names or product catalogue titles are given in sub-headings preceding the items.

Float glass:
The term "float glass" is used for monolithic annealed glass.

Laminated glass:
Laminated glass to have polyvinyl butyral (PVB) interlayer(s).

TOPS, SHELVES, DOORS, MIRRORS, ETC.

Carried Forward R

	Brought Forward				R
	Manufactured by "Franke" or similar approved:				
1	"F11" "M600HD" 8mm Mirror, size 600 x 500mm high plugged/glued to walls complete as per Architect's Drawing (PS2023-07-WD-531-00) (Provisional).	No	50		
	GLAZING TO STEEL WITH PUTTY				
	4mm Clear toughened safety glass:				
2	Panes exceeding 0,1m² and not exceeding 0,5m².	m2	26		
	GLAZING TO WOOD WITH PUTTY				
	6.38mm Cear laminated safety glass:				
3	Panes exceeding 0,1m² and not exceeding 0,5m².	m2	1		
	Carried Forward to Summary of Section No. 2				R

Section No. 2
Bill No. 15
GLAZING

Item No		Unit	Quantity	Rate	Amount

SECTION NO. 2
BUILDING WORKS
BILL NO. 16
PAINTWORK

(CPAP Work Group No.152, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Colours:
Unless otherwise described all paintwork shall be eemed to have a colour value in excess of 7 on the Munsell system in accordance with SANS 1091.

Note:
Tenderers to refer to Architect's Finishing schedule and Paint Specifications attached to these Bill of Quantities.

PAINTWORK, ETC. TO NEW WORK

ON INTERNAL FLOATED PLASTER SURFACES

Carried Forward R

	Brought Forward			R	
	Prepare surface as per manufacturer's specifications and apply one coat Plascon plaster primer, one coat Plascon alkyd based universal undercoat and two coats Plascon Wall & All acrylic paint for interior use (colour to Architect's approval):				
1	Walls.	m2	4,743		
2	Ceilings and beams.	m2	539		
	ON EXTERNAL FLOATED PLASTER SURFACES				
	Prepare surface as per manufacturer's specifications and apply one coat Plascon plaster primer, one coat Plascon alkyd based universal undercoat and two coats Plascon Wall & All acrylic paint for exterior use (colour to Architect's approval):				
3	Walls.	m2	828		
4	On narrow widths not exceeding 300mm girth.	m2	1		
5	Ceilings and beams.	m2	289		
	ON FAIR FACED BRICKWORK				
	Clean down with spirits of salts solution and apply two coats "Dulux Brick Dressing" or similar approved on:				
6	Walls in foundations.	m2	145		
7	Walls.	m2	1,778		
	ON SMOOTH CONCRETE SURFACES				
	Prepare surface as per manufacturer's specifications and apply one coat Plascon plaster primer, one coat Plascon alkyd based universal undercoat and two coats Plascon Wall & All acrylic paint for interior use (colour to Architect's approval):				
8	Ceilings and beams ("White" colour group).	m2	16		
	ON PLASTERBOARD SURFACES				
	Carried Forward			R	

	Brought Forward			R	
	Prepare surface as per manufacturer's specifications and apply one coat Plascon Professional gypsum & plaster primer, one coat Plascon alkyd based universal undercoat and two coats Plascon Velvaglo non-drip enamel paint (colour to Architect's approval):				
9	Ceilings and cornices ("White" colour group).	m2	521		
	ON FIBRE-CEMENT BOARD SURFACES				
	Prepare surface as per manufacturer's specifications and apply one coat Plascon Professional gypsum & plaster primer, one coat Plascon alkyd based universal undercoat and two coats Plascon Velvaglo non-drip enamel paint (colour to Architect's approval):				
10	Ceilings and cornices, including priming metal cover strips and nailheads ("White" colour group).	m2	1,049		
11	Fascias and barge boards, including priming metal jointing strips.	m2	193		
	ON METAL SURFACES				
	Prepare surface as per manufacturer's specifications and apply one coat Plascon Metalcare galvanised iron primer and two coats Plascon Super Universal enamel paint (colour to Architect's approval):				
12	Door frames.	m2	108		
	ON WOOD SURFACES				
	Prepare surface as per manufacturer's specifications and apply one coat Plascon Wood (Pink) primer and two coats Plascon Velvaglo non-drip enamel paint (colour to Architect's approval):				
13	Doors.	m2	411		
	Stop, sand down, prepare and apply three coats "Plascon Woodcare" or similar approved polyurethane varnish (smooth suede) (light sand between each coat):				
14	Skirtings, rails, cornices, etc. not exceeding 300mm girth	m	981		
	Stop, sand down, prepare and apply three coats superior quality clear matt varnish (light sand between each coat):				
15	On general timber surfaces, etc. (Provisional).	m2	125		
	Carried Forward to Summary of Section No. 2			R	

Section No. 2
Bill No. 16
PAINTWORK

SECTION SUMMARY - SECTION NO. 2: BUILDING WORKS

Carried to Final Summary R

Section No. 2

Item No		Quantity	Rate	Amount
	SECTION NO. 3 **ELECTRICAL INSTALLATION** **(PROVISIONAL)** **BILL NO. 1** **PRELIMINARIES & GENERAL**			
	(CPAP Work Group No.160, Unless Otherwise Stated)			
	SUPPLEMENTARY PREAMBLES			
	NOTE: THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED.			
	Note: All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work.			
	Note: Tenders are advised to study the specifications before pricing these Bills.			
	PRELIMINARIES & GENERAL			
	Allow for all the preliminary and general items required to provide the health & safety for the electrical installation for this project, but excluding items priced elsewhere in these Bills (These amounts will be paid pro-rata to the rest of the amounts claimed by the contractor, relative to the tender amount).			
	CONTRACTUAL REQUIREMENTS			
1	Tenderers to allow for compliance with all the conditions of the contract (See principle contractors Preliminaries, Bill No. 1).	Item		
	JOINT TRADES			
2	Tenderers to allow for all costs which may be required in order to co-ordinate and liaise with the other Trade Contractors, especially with the electrical contractor.	Item		
	Carried Forward		R	

	Brought Forward			R
	SUPERVISOR			
3	Tenderer to allow for a full time working supervisor during the duration of the contract, who shall have the delegated authority to receive instructions and make decisions regarding the contract.	Item		
	SITE ESTABLISHMENT			
4	Tenderers to allow for all costs which may be required in order to place the necessary facilities on site for safe storage and orderly management purposes for the duration of the contract.	Item		
	REMOVAL OF WASTE			
5	Tenderer to allow for all costs associated with cleaning the site of all rubbish and waste caused by this contract.	Item		
	HEALTH AND SAFETY			
6	Allow for Health, Safety and Environmental in accordance with the Specification.	Item		
	Carried Forward to Summary of Section No. 3			R

Section No. 3
Bill No. 1
PRELIMINARIES

Item No		Quantity	Rate	Amount
	SECTION NO. 3 **ELECTRICAL INSTALLATION** **(PROVISIONAL)** **BILL NO. 2** **ELECTRICAL WORK**			
	(CPAP Work Group No.160, Unless Otherwise Stated)			
	SUPPLEMENTARY PREAMBLES			
	NOTE: THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED.			
	Note: All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work.			
	Note: Tenders are advised to study the specifications before pricing these Bills.			
	ELECTRICAL POINT OF SUPPLY			
1	Allow budgetary amount of R245 000,00 for the connection fee of a 250A Three Phase supply to site by the supply authority, Eskom.	Item		245,000.00
2	Add for Profit.	Item		
3	Add for General attendance to Supply Authority.	Item		
	NEW ELECTRICAL INSTALLATION			
	LUMINAIRES AND EQUIPMENT			
	Supply and install luminaires or equipment complete with lamps, connections, outlet boxes, etc., mounted in position all as per drawing or engineers instruction.			
	Carried Forward		R	

	Brought Forward			R	
	Note: All Luminaires shall be as per Project Specification.				
	LUMINAIRES:				
4	Type A1.	No	125		
5	Type A1E.	No	27		
6	Type A2.	No	8		
7	Type A2E.	No	6		
8	Type A3.	No	3		
9	Type A3E.	No	3		
10	Type B1.	No	3		
11	Type B2E.	No	2		
12	Type D1.	No	2		
13	Type D1E.	No	2		
14	Type D2.	No	1		
15	Type D2E.	No	1		
16	Type E1.	No	63		
17	Type E1E.	No	22		
18	Type G1.	No	12		
19	Type G1E.	No	4		
20	Type G2.	No	19		
21	Type G2E.	No	6		
22	Type G3.	No	19		
23	Type G3E.	No	36		
24	Type G4.	No	1		
25	Type G5.	No	39		
	Carried Forward			R	

	Brought Forward			R	
26	Type 1 POST TOP FITTING.	No	17		
27	Type 1 POST TOP FITTING 6m GALVANISED STEEL POLE.	No	17		
28	Type 2&3 STREET LIGHT FITTING.	No	1		
29	Type 2&3 STREET LIGHT FITTING 12m GALVANISED STEEL POLE.	No	1		
30	Photo electric cell complete with plug set suitable for mounting on and including galvanised steel pressed conduit box and neoprene gasket.	No	14		
	JUNCTION BOXES:				
31	Junction box 253mm x 194mm x 100mm deep. IP65 with screw lid.	No	7		
	POWERSKIRTING:				
	Powerskirting complete with cover surface mounted to brickwork, concrete and drywall including all necessary accessories (i.e. Bends, End Caps, Elbows, etc.).				
	"CABSTRUT EXECUDUCT MKII PVC" or other approved:				
32	Two Compartment Including covers Powerskirting (Colour to be confirmed on site).	m	126		
	OUTLETS ON POWERSKIRTING				
	Crabtree Outlets or other approved:				
	All outlets shall be complete with standard coverplates and all necessary accessories.				
33	16A single switched socket outlet complete.	No	36		
34	16A single switched socket outlet SANS 164-2.	No	36		
35	16A single switched socket outlet (Dedicated) complete.	No	36		
36	RJ11 Sockets complete.	No	36		
37	RJ45 Sockets complete.	No	72		
38	Aircon Isolators 20A SP IP 65.	No	50		
	Carried Forward			R	

	Brought Forward			R	
39	Isolators 20A SP CORD GRIP.	No	28		
40	Isolators 32A SP WITH PIOLET LIGHT - STOVE ISOLATOR.	No	4		
41	32A Three Pole + N, Isolator.	No	4		
	TRUNKING				
	Galvanised wiring trunking including channel clamps joint pieces, support clamps, concrete anchors, hanger brackets, GALVANISED STEEL cover plates and all necessary accessories:				
42	Welded wire mesh cable basket - 300mm wide.	m	420		
43	P 9000 (127 x 76.2mm).	m	675		
44	P 9000 COVER-STEEL.	m	675		
45	CL 76 MEDIUM DUTY CABLE LADDER - 400mm.	m	60		
46	CL 76 MEDIUM DUTY CABLE LADDER - 300mm.	m	60		
	GALVANISED STEEL CONDUITS				
	All conduits to be complete with fixings, extension boxes, covers, bends, elbows, cutting, threading, saddles and all necessary accessories:				
47	20mm diameter.	m	465		
48	25mm diameter.	m	20		
49	32mm diameter.	m	35		
	PVC CONDUITS				
	All conduits to be complete with fixings, extension boxes, covers, bends, elbows, cutting, threading, saddles and all necessary accessories:				
50	20mm diameter.	m	1,206		
51	25mm diameter.	m	1,006		
52	32mm diameter.	m	217		
	CONDUIT BOXES AND FITTINGS				
	Carried Forward			R	

				R	
	Brought Forward				
	All fittings to be complete with all necessary accessories:				
53	100 x 50mm (2" x 4") galvanised connection box recessed.	No	125		
54	100 x 50mm (2" x 4") galvanised extension box surface mounted (white).	No	10		
55	100 x 100mm (4" x 4") galvanised connection box recessed.	No	341		
56	100 x 100mm (4" x 4") galvanised extension box surface mounted (white).	No	10		
57	60mm Round conduit box complete with cover.	No	240		
	ENGRAVING OF COVER PLATES				
58	Allow for the engraving of cover plates as per project specification.	No	300		
	LIGHT SWITCHES				
	All light switches are to be complete with steel cover plates, and all necessary accessories. (4 x 2 boxes measured in item 45):				
59	16A One lever one way switch .	No	125		
60	16A Two lever one way switch.	No	125		
61	16A Three lever one way switch.	No	1		
62	16A water tight one way switch.	No	4		
63	16A One lever two way switch.	No	4		
	SWITCHED SOCKET OUTLETS				
	All switch socket outlets shall be complete with steel cover plates and all necessary accessories. (4 x 4 boxes measured in item 45):				
64	16A DOUBLE three - pin switched socket outlet.	No	35		
65	16A Double three - pin switched socket outlet with SANS 164-2 plug.	No	35		
66	16A Single dedicated switched socket outlet (RED).	No	14		
	Carried Forward			R	

	Brought Forward			R	
67	16A Single switched socket outlet (RED).	No	49		
68	16A Single dedicated switched socket outlet (BLUE).	No	10		
69	16A single three - pin switched socket outlet.	No	10		
	Blank cover plates:				
70	100 x 100mm Steel Cover plate.	No	10		
71	100 x 50mm Steel Cover plate.	No	10		
	POWER POINTS				
72	5A unswitched socket outlet.	No	318		
	GEYSER / HYDROBOIL / AIRCONDITIONING:				
73	20A DP isolator with pilot light.	No	12		
	TIMERS				
74	Seven day 24 hour digital timer with back-up controlled via contactor.	No	6		
	CONTACTORS				
75	ABB 230V -20A RATED.	No	6		
	DISTRIBUTION BOARDS				
	Distribution boards complete with sheetmetal tray, frames, sub-frames, busbars, legend card, circuit breakers, fuses, relay, volt-meter, ammeter, transformer, earth leakage unit, time switch, surge arrestors, etc., including all necessary accessories required for installation.				
	Switchgear to be "CBI, SCHNEIDER,ABB" or other approved:				
76	MAIN LV PANEL.	No	1		
77	Distribution Board-A.	No	1		
78	Distribution Board-B.	No	1		
79	Distribution Board-C.	No	1		
80	Distribution Board-G.	No	1		
	Carried Forward			R	

	Brought Forward			R	
81	Distribution Board-H.	No	1		
82	Distribution Board-K (DISTRIBUTION KIOSK).	No	1		
83	Distribution Board-K1, K2, K3, K4.	No	4		
	CABLING (PROVISIONAL):				
	The PVC/SWA/PVC ECC insulated 600V/1000V grade copper cables:				
84	6mm sq x 3-Core.	m	300		
85	6mm sq x 2-Core+ E SURFIX BLACK.	m	920		
86	10mm sq x 4-Core.	m	465		
87	16mm sq x 4-Core.	m	265		
88	120mm sq x 4-Core.	m	80		
	EARTH CONTINUITY CONDUCTOR (PROVISIONAL):				
	The insulated 600/1000V grade copper earth cable:				
89	10 mm sq.	m	465		
90	16mm sq.	m	265		
91	95mm sq.	m	80		
	CABLE TERMINATIONS (PROVISIONAL)				
	Termination for the PVC/SWA/PVC/ECC insulated 600/1000V grade copper cables All terminations to include cable glands, gland plates, shrouds, etc. and all necessary accessories required for installation:				
92	6mm sq x 3-Core.	No	72		
93	10mm sq x 3-Core.	No	20		
94	10mm sq x 4-Core.	No	12		
95	16mm sq x 4-Core.	No	5		
96	35mm sq x 4-Core.	No	2		
	CONDUCTORS				
	Carried Forward			R	

	Brought Forward			R	
	PVC insulated stranded copper earth conductor drawn into wireways (Rate to include for feruling of all joints):				
97	2.5mm sq.	m	5,310		
98	4mm sq.	m	6,120		
	Bare earth copper conductor drawn into wireways:				
99	2.5mm sq.	m	2,070		
	DRAW WIRE				
100	Galvanised draw wires drawn into wireways 0.6mm Diameter.	m	2,070		
	CABLE WARNING TAPE				
	Cable warning tape, placed 150mm above cables in excavations:				
101	300mm wide Yellow PVC cable warning tape with the words "Electrical Cable Below".	m	300		
	CABLE MARKERS				
102	Cable route markers must consist of 150x150x300mm high concrete blocks with aluminium or other rust free metal marked with arrows to indicate cable route.	No	4		
	EXCAVATIONS (PROVISIONAL)				
	Trenching dimensions shall be of 800mm deep x 400mm wide.				
103	Excavation in soft material not exceeding 2m deep.	m	80		
	Extra over trench and hole excavations in soft material for excavations in:				
104	Intermediate Material.	m3	5		
105	Hard Rock.	m3	1		
	Extra over all excavations for carting away:				
106	Surplus material from excavations and/or stock piles on site to dumping site located by the contractor.	m3	10		
	Carried Forward			R	

	Brought Forward			R
	Keeping excavations free of water:			
107	Keeping excavations free of all water other than subterranean.		Item	
	Selected granular material supplied and carted onto site by contractor in backfilling to trenches compacted to a density of 97% Mod. AASHTO maximum density:			
108	Backfilling to trenches etc.	m3	80	
	MANHOLES			
	Heavy duty manhole complete with frame, cover, Precast with cable knock outs:			
109	1m x 1m x 800mm brick manhole for Electrical installation.	No	3	
110	600 x 600 x 800mm brick manhole for Electrical installation.	No	2	
	SLEEVES			
	Unplasticised polyvinyl chloride(UPVC) sleeve piping including short lengths and jointing, laid in trench (trench and backfilling measured elsewhere):			
111	160mm.	m	80	
112	110mm.	m	320	
	Extra on UPVC piping for:			
113	160mm Diameter pipe 45 degree slow bends.	No	30	
114	110mm Diameter pipe 45 degree slow bends.	No	20	
	Carried Forward to Summary of Section No. 3			R

Section No. 3
Bill No. 2
ELECTRICAL WORK

Item No		Quantity	Rate	Amount
	SECTION NO. 3 **ELECTRICAL INSTALLATION** **(PROVISIONAL)** **BILL NO. 3** **STANDBY GENERATING SET** *(CPAP Work Group No.160, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** **NOTE:** THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED. **Note:** All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work. **Note:** Tenders are advised to study the specifications before pricing these Bills. **STANDBY GENERATING SET** For the complete supply (including delivery), rigging, installation (including testing, commissioning and handing over) of the complete standby generating sets to the building. The system shall include all generating sets, automatic change over panels, controls, transfer switches, paralleling systems, synchronisation, remote controlling, automatic voltage regulation, automatic voltage regulation, weatherproof canopy, etc. All systems shall include all necessary fittings, fixtures and accessories for the works. All works shall be in accordance with the requirements as set out in the specification and as required by the manufacturer:			
1	PERKINS 88KVA Standby, Three Phase, 1500rpm, diesel generator. The unit shall have a weatherproof(IP65), soundproof(silent) canopy, ATS panel, AVR, Protection module. The unit shall also include a base plinth constructed of reinforced concrete.	Item		
	Carried Forward		R	

	Brought Forward			R
2	FAMS CUBE-T1K: Self bunded, 1000litre diesel fuel tank complete with stand, sight glass, dip stick, vent pipe, pipework and remote fuelling facility and all other necessary equipment, fittings, fixtures and accessories required for the works.	Item		
3	Manual bypass switch on Changeover panel.	Item		
4	Control Panel (Deep sea control).	Item		
5	All other associated connections, terminations, fittings, fixtures, cabling, controls and accessories required to complete the works.	Item		
	GENERATING SETS: TESTING & COMMISSIONING			
6	Allow for Commissioning, testing and issuing of Certificate of Installation and Commissioning for works at practical completion.	Item		
7	Allow for three sets of "as-build" drawings, maintenance, operation manuals and handover file as specified in the electrical project specification at practical completion.	Item		
8	Allow for twelve months service, maintenance and guarantee from Final completion.	Item		
9	Allow for preparation of workshop drawings and printing.	Item		
10	Allow for training of the clients staff in the correct operation of the installation as per project specification requirements at practical completion.	Item		
11	Allow for supply and delivery of maintenance tools and equipment applicable to the installation.	Item		
	Carried Forward to Summary of Section No. 3			R

Section No. 3
Bill No. 3
STAND BY GENERATING SET

Item No		Quantity	Rate	Amount

SECTION NO. 3
ELECTRICAL INSTALLATION (PROVISIONAL)
BILL NO. 4
UNINTERRUPTIBLE POWER SUPPLIES

(CPAP Work Group No.160, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

NOTE:
THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED.

Note:
All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work.

Note:
Tenders are advised to study the specifications before pricing these Bills.

UNINTERRUPTIBLE POWER SUPPLIES

For the complete supply (including delivery), rigging, installation (including testing, commissioning and handing over) of the complete uninterruptible power supplies to the hospital. The systems shall include all UPS, racks, frames, batteries, inverters, forced ventilation, static bypass switches, online power supplies, double transformation technology, etc. All systems shall include all necessary fittings, fixtures and accessories for the works. All works shall be in accordance with the requirements as set out in the specification and as required by the manufacturer.

Carried Forward R

	Brought Forward			R
	Note: Uninterruptible Power Supply (UPS) are to be of TESCOM product range. Equal alternative offers may be considered under separate cover-letter submission. General UPS Design Criteria and Performance:-Double conversion, Transformer design with Static By-pass Switch. Efficiency of minimum of 0.93%. Power factor of 0.9 lagging. Overload capacity of minimum of 110% for 10minutes. Supply and install Battery Box and Batteries for 15min back-up at full-load, with 5year design life, complete (only sealed lead acid CSB, Royal or Delcor batteries will be permitted) complete with all fittings, fixtures, equipment and accessories Supply and install all interlinking power cables to load isolators and battery cables, complete with terminations, etc.:			
1	TESCOM: 3KVA, 230/230V, SINGLE phase + N, UPS, Online power supply, static bypass switch (non-interruption switch), double transformation technology and complete separation of output power. The unit shall include the batteries as described above.	Item		
2	TESCOM: 5KVA, 230/230V, SINGLE + N, UPS, Online power supply, static bypass switch (non-interruption switch), double transformation technology and complete separation of output power. The unit shall include the batteries as described above.	Item		
	UPS: TESTING & COMMISSIONING			
3	Allow for Commissioning, testing and issuing of Certificate of Installation and Commissioning for works at practical completion.	Item		
4	Allow for twelve months service, maintenance and guarantee from practical completion.	Item		
5	Allow for instructing the clients staff in the correct operation of the installation as per special project specification requirements.	Item		
	Allow for an extended guarantee period for all UPS systems and associated equipment:			
6	12 months extended period.	Item		
7	24 months extended period.	Item		
	Carried Forward to Summary of Section No. 3			R

Section No. 3
Bill No. 4
UNINTERRUPTIBLE POWER SUPPLIES

Item No		Quantity	Rate	Amount

SECTION NO. 3
ELECTRICAL INSTALLATION (PROVISIONAL)
BILL NO. 5
MEDICAL EQUIPMENT

(CPAP Work Group No.160, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

NOTE:
THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED.

Note:
All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work.

Note:
Tenders are advised to study the specifications before pricing these Bills.

BEDHEAD TRUNKING AND MEDICAL LIGHTING

For the complete supply (including delivery), installation (including testing, commissioning and handing over) of the complete horizontal service delivery system (bedhead trunking system), theatre panels and theatre pendants to provide medical gas, illumination and electrical services to the patient area and shall include all risers, power outlets, switched socket outlets (normal and dedicated), medical gas outlets, lighting, accessories, wiring, cabling, etc. in accordance with the requirements as set out in the specification and as required by the manufacturer.

The contractor shall refer to the relevant schedules for details of the equipment breakdown required in each of the areas for the equipment specified.

BEDHEAD DUCTING

Carried Forward R

					R
	Brought Forward				
	EMERGENCY ROOM:				
1	Hutz HU 19 -02 -free standing vertical bedhead system for emergency rooms.	No	1		
	PROCEDURE ROOM:				
2	Hutz HU 10 -01 -wall mounted horizontal bedhead system for procedure rooms.	No	2		
	MEDICAL LIGHTING				
	EMERGENCY ROOM:				
3	HUTZ HUGO LED M - Mobile examination light (30 000 lux).	No	1		
	PROCEDURE ROOM:				
4	HUTZ HUGO LED M - Mobile examination light (50 000 lux).	No	1		
	CONSULTING ROOMS:				
5	HUTZ HUGO LED W - Wall mounted examination light (10 000 lux).	No	7		
	TESTING AND COMMISSIONING				
6	Allow for Commissioning, testing and issuing of Certificate of Installation and Commissioning for relevant sections, zones, sub zones, building and the Complete installation.		Item		
7	Allow for three sets of maintenance, operation manuals and handover files as specified.		Item		
8	Allow for twelve months free maintenance and guarantee.		Item		
9	Allow for preparation of workshop drawings and printing.		Item		
10	Allow for instructing the clients staff in the correct operation of the installation as per special project specification requirements		Item		
11	Allow for preparation of "as installed drawings" in AutoCad Format.		Item		
12	Allow for supply and delivery of maintenance tools and equipment applicable to the installation.		Item		
	Carried Forward to Summary of Section No. 3				R

Section No. 3
Bill No. 5
BEDHEAD TRUNKING AND MEDICAL LIGHTING

Item No		Quantity	Rate	Amount

SECTION NO. 3
ELECTRICAL INSTALLATION (PROVISIONAL)
BILL NO. 6
LIGHTNING PROTECTION & EARTHING

(CPAP Work Group No.160, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

NOTE:
THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED.

Note:
All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work.

Note:
Tenders are advised to study the specifications before pricing these Bills.

LIGHTNING PROTECTION SYSTEM & EARTHING

Supply, design, deliver and install lightning protection system in accordance to SANS 10313: 2012 and/or other related SANS codes. The system shall include all air terminations, bonds, 70mm sq earth conductors, earth rods, test points, terminals, necessary fittings, fixtures and accessories to complete the works. This work is to be done by a specialist contractor. The contractor shall refer to the architectural layout and roofing detail of the building.

1	Allow for visiting of the site and the carrying out of the required pre resistivity tests and the issuing of the test results to the Engineer prior to the works (earthing & lightning protection system).	Item		

	Carried Forward	R	

				R	
	Brought Forward				
2	Allow for the preparation of design workshop drawings of the earthing system and submission to the Engineer for comment.		Item		
3	Complete termination arrangement of the bare conductor to the steel sheeting roof and down pipes. The work shall include all associated brackets, bolts, fittings, fixtures and accessories to complete the works.	No	65		
4	Complete termination arrangement of the bare copper conductor to the installed electrodes. The work shall include all associated brackets, bolts, clamps, fittings, fixtures and accessories to complete the works.	No	65		
5	Lightning protection points test in enclosed 100 x 100 box and engraved cover.	No	65		
6	Complete termination arrangement of the bare conductor to the steel sheeting roof and down pipes.	No	65		
7	Complete termination arrangement of the bare copper conductor to the installed electrodes.	No	65		
8	70mm² aluminium conductors installed on surface and in 25mm PVC conduit.	m	390		
9	70mm² PVC insulated stranded copper conductor laid in ground.	m	130		
10	Sealing of all joints with Denso tapes.		Item		
11	Excavate in earth for earth conductor not exceeding 1m deep.	m3	65		
12	25mm diameter flush PVC conduit in the external walls from the ceiling space down to the ground.	m	390		
13	1.5m long Cadweld type copper electrodes driven into the ground.	No	65		
14	Allow for the breaking into the concrete and opening of suitable hole to attach terminal to vertical reinforcement steel in completed columns for d/c fixing.	No	65		
15	Allow for the required resistivity tests of the completed system and the issue of the prescribed test certificate in terms of the SANS regulations prior to practical completion to the Engineer for approval.		Item		
	Carried Forward			R	

	Brought Forward			R
	GENERAL ELECTRICAL EARTHING			
16	Allow for bonding of all extraneous conductive parts that does not form part of the electrical installation and is liable to introduce an electric potential example water pipes, HVAC systems, etc.	Item		
17	Allow for the complete earthing and bonding as per SANS 10142: Wiring Code, latest revision and associated regulations for the complete electrical works.	Item		
	Carried Forward to Summary of Section No. 3			R

Section No. 3
Bill No. 6
LIGHTING PROTECTION AND EARTHING

Item No		Quantity	Rate	Amount

SECTION NO. 3
ELECTRICAL INSTALLATION (PROVISIONAL)
BILL NO. 7
TESTING AND COMMISSIONING

(CPAP Work Group No.160, Unless Otherwise Stated)

SUPPLEMENTARY PREAMBLES

NOTE:
THE WORK DETAILED BELOW AS WELL AS IN ALL OF THE SUBSEQUENT BILLS IN THIS ELECTRICAL INSTALLATION IS FOR THE COMPLETE SUPPLY, DELIVERY ON SITE AND CONSTRUCTION OF THE FOLLOWING MATERIAL AND EQUIPMENT AND THE GUARANTEE THEREOF, AS SPECIFIED.

Note:
All prices listed below must make provision for the delivery to Site and must include all materials deemed necessary for commissioning of equipment in full, including all handling costs, insurance and any other costs involved in the delivery of material and equipment to complete installation of the electrical work.

Note:
Tenders are advised to study the specifications before pricing these Bills.

TESTING AND COMMISSIONING

Allow for the testing, commissioning and issuing of the Electrical Compliance Certificate in terms of SANS10142: Wiring Code, latest revision and to be completed by the recognised person in terms of the Wiring Code and Department of Labour.

Allow for inspection, testing and commissioning of the complete installation and the issuing of all Certificates of Compliance at practical completion:

1	MAIN LV PANEL.	Item		
2	Distribution Board-A.	Item		
3	Distribution Board-B.	Item		
4	Distribution Board-C.	Item		

Carried Forward R

	Brought Forward			R	
5	Distribution Board-G.		Item		
6	Distribution Board-H.		Item		
7	Distribution Board-K (DISTRIBUTION KIOSK).		Item		
8	Distribution Board-K1, K2, K3, K4.	No	4		
9	Allow for three sets of "as-build" drawings, maintenance, operation manuals and handover file as specified in the electrical project specification at practical completion.		Item		
10	Allow for twelve months service, maintenance and guarantee from Final completion.		Item		
11	Allow for preparation of workshop drawings and printing.		Item		
12	Allow for instructing the clients staff in the correct operation of the installation as per special project specification requirements before practical completion.		Item		
13	Allow for supply and delivery of maintenance tools and equipment applicable to the installation.		Item		
	Carried Forward to Summary of Section No. 3			R	

Section No. 3
Bill No. 7
TESTING AND COMMISSIONING

SECTION SUMMARY - SECTION NO. 3: ELECTRICAL INSTALLATION (PROV

Bill No		Page No	Amount
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7	TESTING AND COMMISSIONING	120	

Carried to Final Summary R

Section No. 3

Item No		Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 1** **PRELIMINARIES & GENERAL**			
	(CPAP Work Group No.160, Unless Otherwise Stated)			
	SUPPLEMENTARY PREAMBLES			
	Allow for all preliminary and general items required to provide the security installation for this project, but excluding items priced elsewhere in these Bills (These amounts will be paid pro rata to the rest of the amounts claimed by the contractor relative to the tender amount).			
	PRELIMINARIES			
	CONTRACTUAL REQUIREMENTS			
1	Tenderers to allow for compliance with all the conditions of contract.	Item		
	JOINT TRADES			
2	Tenderers to allow for all costs which may be required in order to co-ordinate and liaise with the other Trade contractors.	Item		
	SUPERVISOR			
3	Tenderers to allow for a full time working supervisor during the duration of the contract, who shall have the delegated authority to receive instructions and make decisions regarding this contract.	Item		
	SITE ESTABLISHMENT			
4	Tenderers to allow for all costs which may be required in order to place the necessary facilities on site for safe storage and orderly management purposes for the duration of the contract.	Item		
	REMOVAL OF WASTE			
5	Tenderers to allow for all costs associated with cleaning the site of all rubbish and waste caused by this contract Provision for Health and Safety in accordance with the Construction Regulations and OHS Act.	Item		
	Carried Forward		R	

	Brought Forward			R
	GENERAL ITEMS			
6	Any additional items that the Tenderer deems necessary for the successful and total completion of the portion of the work required for this Bill (specify): (a) _____ (b) _____ (c) _____ (d) _____ (e) _____ (f) _____		Item	
	Carried Forward to Summary of Section No. 4			R

Section No. 4
Bill No. 1
PRELIMINARIES

Item No			Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 2** **CCTV SYSTEM** *(CPAP Work Group No.160, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** Allow for the supply, delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover of all active and passive equipment required in the Control Room and indicated points to provide the specified CCTV solution, inclusive of all smaller items not included elsewhere but required under this heading. Also refer to relevant section in Technical Specification. **CCTV** **Note:** *Rates to include CAT6a cabling, labelling of cables at all contact points (switches, cameras, ceiling void containment, etc.), software configuration to connect all the cameras and integrate the entire system, testing and commissioning certificate. Adjustment of camera and focus for monitoring of desired areas to Engineer's acceptance to be included.* *Preferred brands: HikVision, LG, Sony, Avigilon.* Supply and Install:				
1	4MP WDR Vari-focal Network Bullet Camera, PoE, IP67, Audio and Alarm I/O (Rate per point including CAT6a cabling etc.).	No	55		
2	4MP Infra-red Network Dome Camera, PoE, IP67, Audio and Alarm I/O (Rate per point including CAT6a cabling etc.).	No	8		
3	IP PTZ Camera 32x Zoom (PoE) (Rate per point including CAT6a cabling etc.).	No	1		
4	Controller for PTZ Cameras.	No	1		
5	Gooseneck.	No	1		
6	CCTV Pole.	No	1		
	Carried Forward			R	

	Brought Forward			R
	CCTV - HEAD END			
	Note: *Licensing, software, UI setup and co-ordination as set out Section 2: Part 2&3 of Spec.*			
7	64-Channel Professional Embedded NVR. HDMI1 output at 4K & VGA1 output @2k resolution; HDMI2/VGA2 output resolution @1080p; Incoming / Outgoing bandwidth: 320/256 Mbps; Hard disk: 8 SATA interfaces (with expansion bracket); 1x Two-way audio input.	No	1	
8	Western Digital Surveillance, 8 TB 3.5" SATA Hard Drive.	No	4	
9	CORE I7 Viewing PC 2 Monitor out 16GB RAM.	No	1	
10	Samsung 40" Full HD Flat TV. (UA40M5000).	No	3	
11	Complete Installation of Head End Equipment.	No	1	
	GENERAL PROVISION			
	Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications.			
	Specify:			
12	(a) _____		Item	
13	(b) _____		Item	
14	(c) _____		Item	
15	(d) _____		Item	
	Carried Forward to Summary of Section No. 4			R
	Section No. 4 Bill No. 2 CCTV SYSTEM			

Item No			Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 3** **ACCESS CONTROL SYSTEM** *(CPAP Work Group No.160, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** Allow for the supply, delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover of all active and passive equipment required in the Control Room and indicated points to provide the specified Access Control solution, inclusive of all smaller items not included elsewhere but required under this heading. **ACCESS CONTROL** ***Note:*** *Rates to include CAT6a cabling, labelling of cables at all contact points (switches, readers, controllers, ceiling void containment, etc.), software configuration to connect all items on system and integrate the entire system, testing and commissioning certificate.* *Prefered brands: Impro, Sagem, Nitgen, Comex.* Supply and Install:				
1	Biometric Reader - Stand Alone.	No	4		
2	No Touch To Exit.	No	4		
3	IP Door Controller (incl. PSU, Battery backup, I/O Expansion module).	No	4		
4	Biometric Enrollment Station.	No	1		
5	Card Enrolment Station and Card Printer.	No	1		
6	Maglock 300kg (incl. ZL Bracket and door closer).	No	4		
7	Green Break Glass Unit.	No	8		
8	Door Release Button (REX).	No	4		
	Carried Forward			R	

	Brought Forward			R	
9	Goosenecks.	No	3		
10	Intercom Video.	No	2		
11	IP Intercom Master Station.	No	6		
12	IP Intercom Slave/Door Station.	No	8		
13	Mylar Cable.	m	1,500		
	ACCESS CONTROL - HEADEND				
	Note: *Licensing, software, UI setup and co-ordination as set out Section 2: Part 2&3 of Spec.*				
14	CORE I7 Viewing PC 2 Monitor out 16GB RAM, HDD 1 TB.	No	1		
15	Samsung 40" Full HD Flat TV. (UA40M5000).	No	1		
16	Complete Installation of Head End Equipment.		Item		
	GENERAL PROVISION				
	Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications.				
	Specify:				
17	(a) _____		Item		
18	(b) _____		Item		
19	(c) _____		Item		
20	(d) _____		Item		
	Carried Forward to Summary of Section No. 4			R	

Section No. 4
Bill No. 3
ACCESS CONTROL SYSTEM

Item No			Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 4** **FIRE DETECTION SYSTEM** *(CPAP Work Group No.160, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** Allow for the supply, delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover of all active and passive equipment required in the indicated positions to provide the specified Fire Detection System solution, inclusive of all smaller items not included elsewhere but required under this heading. **DETECTORS & BREAKGLASS UNITS** Supply and Install:				
1	Optical Smoke Detectors incl. base.	No	130		
2	Heat Detectors incl. base.	No	2		
3	Red Breakglass Unit (MCP).	No	16		
4	Audible & Visual Alarm.	No	17		
	FIRE ALARM PANEL *Supply, delivery, installation, testing, commissioning and handing over of a complete Fire Panel, complete with all equipment. Note: Rates to include PSU, Battery back-up, dial out facility.* Supply and Install:				
5	ZP3 4-Loop (addressable, 120+ items per line).	No	1		
6	PH 120 Cabling.	m	2,500		
7	Block Plan - Laminated in aluminium frame as minimum.	No	4		
8	Ziton Addressable Fire Relay (I/O Modules).	No	20		
	Carried Forward			R	

	Brought Forward			R
	GENERAL PROVISION			
	Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications.			
	Specify:			
9	(a) _____	Item		
10	(b) _____	Item		
11	(c) _____	Item		
	Carried Forward to Summary of Section No. 4			R

Section No. 4
Bill No. 4
FIRE DETECTION SYSTEM

Item No			Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 5** **VOICE EVACUATION SYSTEM** *(CPAP Work Group No.160, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** Design, supply, delivery, installation, testing, commissioning and handing over of a complete public address system complete with all peripherals as shown on the drawings and as specified. **VOICE EVACUATION SYSTEM**				
1	Integrated mini PA/VA unit: 2 x AB (4 lines); amp 2 x 160W (inc. spare amp.); 1 x audio; LCD, fiber network card, fireman mic.; charger; w/o batteries. Code: EST-VES-4002-LN.	No	1		
2	Zone microphone. Code: EST-DMS.	No	2		
3	Battery 12V 26Ah. Code: BS129N.	No	4		
4	Complete fire ceiling speaker Power: 6W, 100V, (diameter 20 cm). Code: EST-S206B.	No	122		
5	PH120 Cabling for fully functional speaker system.	m	2,500		
	GENERAL PROVISION Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications. Specify:				
6	(a) _____		Item		
7	(b) _____		Item		
8	(c) _____		Item		
	Carried Forward to Summary of Section No. 4			R	
	Section No. 4 Bill No. 5 VOICE EVACUATION SYSTEM				

Item No			Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 6** **INTRUDER ALARM SYSTEM** *(CPAP Work Group No.160, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** Allow for the supply, delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover of all active and passive equipment required in the indicated positions to provide the specified Intruder Alarm System solution, inclusive of all smaller items not included elsewhere but required under this heading. **INTRUDER ALARM SYSTEM** Supply and Install:				
1	Texecom Premier Elite 168 alarm control panel with metal box.	No	1		
2	Premier Elite-8XP expander board.	No	10		
3	Texecom Capture D20 Quad 20m Dual Tech Detector.	No	70		
4	Texecom LCD Large display keypad.	No	7		
5	Texecom Connect SmartCom.	No	1		
6	Texecom IPCOM.	No	1		
7	Texecom SMS Module.	No	1		
8	Transformer 16Vac 40VA.	No	1		
9	6 Core Security Cable.	m	2,000		
	GENERAL PROVISION Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications. Specify:				
10	(a) Program system with free Wintex Software.		Item		
	Carried Forward			R	

	Brought Forward			R
11	(b) _____	Item		
12	(c) _____	Item		
	Carried Forward to Summary of Section No. 4			R

Section No. 4
Bill No. 6
INTRUDER ALARM SYSTEM

Item No		Quantity	Rate	Amount
	SECTION NO. 4 **SECURITY INSTALLATION (PROVISIONAL)** **BILL NO. 7** **O&M MANUALS, TESTING AND COMMISSIONING**			
	(CPAP Work Group No.160, Unless Otherwise Stated)			
	SUPPLEMENTARY PREAMBLES			
	Tenderers to allow for all the commissioning requirements, including testing, attendance, as-built drawings, manuals, etc. as set out in Section 2: Part 3: Project Specification, prior to the installation being taken over as complete			
	O&M MANUALS, TESTING AND COMMISSIONING			
1	CCTV SYSTEM.	Item		
2	ACCESS CONTROL SYSTEM.	Item		
3	FIRE DETECTION SYSTEM.	Item		
4	VOICE EVACUATION SYSTEM.	Item		
5	INTRUDER ALARM SYSTEM.	Item		
	OPERATOR TRAINING			
	Tenderers to allow for all the training requirements as set out in Section 2: Part 3: Project Specification, prior to the installation being taken over as complete.			
6	Operator training.	Item		
7	Technical Training.	Item		
	MAINTENANCE CONTRACT			
	Tenderers to allow for all the maintenance requirements as set out in Section 2: Part 3: Project Specification.			
8	12 Month Maintenance Contract.	Item		
	Carried Forward		R	

	Brought Forward		R	
	GENERAL PROVISION			
	Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications.			
	Specify:			
9	(a) _____	Item		
10	(b) _____	Item		
11	(c) _____	Item		
12	(d) _____	Item		
	Carried Forward to Summary of Section No. 4		R	

Section No. 4
Bill No. 7
COMMISSIONING, TRAINING AND MAINTENANCE

SECTION SUMMARY - SECTION NO. 4: SECURITY INSTALLATION (PROVISI

Carried to Final Summary R

Section No. 4

Item No		Quantity	Rate	Amount
	SECTION NO. 5 **ICT INSTALLATION (PROVISIONAL)** **BILL NO. 1** **PRELIMINARIES & GENERAL**			
	(CPAP Work Group No.160, Unless Otherwise Stated)			
	SUPPLEMENTARY PREAMBLES			
	Allow for all preliminary and general items required to provide the security installation for this project, but excluding items priced elsewhere in these Bills.			
	PRELIMINARIES			
	CONTRACTUAL REQUIREMENTS			
1	Tenderers to allow for compliance with all the conditions of contract, including that of the main contractor.	Item		
	JOINT TRADES			
2	Tenderers to allow for all costs which may be required in order to co-ordinate and liaise with the other Trade contractors.	Item		
	SUPERVISOR			
3	Tenderers to allow for a full time working supervisor during the duration of the contract, who shall have the delegated authority to receive instructions and make decisions regarding this contract	Item		
	SITE ESTABLISHMENT			
4	Tenderers to allow for all costs which may be required in order to place the necessary facilities on site for safe storage and orderly management purposes for the duration of the contract	Item		
	REMOVAL OF WASTE			
5	Tenderers to allow for all costs associated with cleaning the site of all rubbish and waste caused by this contract.	Item		
	Carried Forward		R	

	Brought Forward			R
	GENERAL ITEMS			
6	Any additional items that the Tenderer deems necessary for the successful and total completion of the portion of the work required for this Bill (specify): (a) _____ (b) _____ (c) _____ (d) _____ (e) _____ (f) _____		Item	
	Carried Forward to Summary of Section No. 5			R

Section No. 5
Bill No. 1
PRELIMINARIES

Item No			Quantity	Rate	Amount
	SECTION NO. 5 **ICT INSTALLATION (PROVISIONAL)** **BILL NO. 2** **LOCAL AREA NETWORK**				
	(CPAP Work Group No.160, Unless Otherwise Stated)				
	SUPPLEMENTARY PREAMBLES				
	Allow for the supply, delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover of all active and passive equipment required in the Server Room to provide the specified IT&T solution, inclusive of all smaller items not included elsewhere but required under this heading.				
	LOCAL AREA NETWORK				
	PASSIVE COMPONETS				
1	SERVER ROOM - 22U Pivot Frame, wall mounted, Equipment Cabinet, c/w 2 x AC fan units.	No	1		
2	Supply and install of all cable tray's and wire ways required inside the equipment rooms to accommodate all cabling and wiring required. Layout as per detail on drawing.	Item			
3	Effective Earthing of all Equipment and Cabinets.	Item			
4	48 Port Category 6 patch panels.	No	3		
5	Cable management panels (Brush type) **NOTE:** Brush Panels to be used between all equipment and patch panels.	No	6		
6	Sundries.	Item			
	ACTIVE COMPONENTS				
	Core Switch Stack:				
7	C9300-48U-A - Catalyst 9300 48-port UPOE, Network Advantage.	m	2		
8	CON-3SNT-C93004UA - 3YR SNTC 8X5XNBD Catalyst 9300 48-port UPOE, Network Advantage.	No	1		
	Carried Forward			R	

	Brought Forward			R	
9	C9300-NW-A-48 - C9300 Network Advantage, 48-port license.	No	1		
10	S9300UK9-168 - UNIVERSAL.	No	1		
11	PWR-C1-1100WAC - 1100W AC Config. 1 Power Supply.	No	1		
12	PWR-C1-1100WAC/2 - 1100W AC Config. 1 Secondary Power Supply.	No	1		
13	C9300-NM-8X - Catalyst 9300 8 x 10GE Network Module.	No	1		
14	CAB-TA-IN - India AC Type A Power Cable.	No	2		
15	STACK-T1-50CM - 50CM Type 1 Stacking Cable.	No	1		
16	CAB-SPWR-30CM - Catalyst Stack Power Cable 30 CM.	No	1		
17	C9300-DNA-A-48 - C9300 DNA Advantage, 48-Port Term Licenses.	No	1		
18	C9300-DNA-A-48-3Y - C9300 DNA Advantage, 48-Port, 3 Year Term License.	No	1		
19	Ubiquiti Wireless Access Point 1000 Mbit/s PoE White.	No	21		
20	Total Installation.		Item		
21	Total Testing.		Item		
22	Total Commissioning.		Item		
	CABLING INSTALLATION - RATE PER POINT COMPLETE				
	Supply, install & test CAT 6A F/UTP cable with all connectors, boots and labels from network cabinet to outlet point.				
	Note: Infrastructure measured elsewhere.				
	Supply and Install:				
23	Data outlet in power skirting with 2.5m FLYLEAD (rate per point complete).	No	37		
	Carried Forward			R	

Section No. 5
Bill No. 2
LOCAL AREA NETWORK

	Brought Forward				R
24	Data outlet in ceiling void for Wi-Fi Access Point (rate per point complete).	No	21		
25	Data outlet in Floor Box (rate per point complete).	No	4		
	OPTIC FIBRE INSTALLATION - ITEM COMPLETE				
	Supply, install & test Dual 4-core OM3 Optic Fibre cable complete with terminations in patch panels. Including links to network switches with LC-LC connectors.				
	Supply and Install:				
26	Dual 4-core OM3 from fibre router to network switches.	m	80		
	GENERAL PROVISION				
	Any other item that the Tenderer deems necessary to price under this Bill to provide the full service as intended by the specifications.				
	Specify:				
27	(a) _____		Item		
28	(b) _____		Item		
29	(c) _____		Item		
	Carried Forward to Summary of Section No. 5				R

Section No. 5
Bill No. 2
LOCAL AREA NETWORK

Item No			Quantity	Rate	Amount
	SECTION NO. 5 **ICT INSTALLATION (PROVISIONAL)** **BILL NO. 3** **IP TELEPHONES (VOIP)**				
	(CPAP Work Group No.160, Unless Otherwise Stated)				
	SUPPLEMENTARY PREAMBLES				
	Allow for the supply, delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover of all active and passive equipment required in the indicated positions to provide the specified IP Telephone Solution, inclusive of all smaller items not included elsewhere but required under this heading.				
	IP TELEPHONES (VOIP)				
1	IPX-MPRI2P/EUS - PRI Line 2 Port.		Item		
2	IPX-S300BP/EUS - IP-PBX Main Cabinet (4 Expansion slots, Dual Power, including mounting brackets).		Item		
	IP Handsets:				
3	SMT-i3105D/UKA - 5 BLF Button IP Phone.	No	32		
4	SMT-i5264D/UKA - 64 Button IP AOM.	No	1		
5	SMT-i6011K/XA - SMT-i6010 Gigabit, 12 Button.	No	2		
6	SMT-i6020K/XA - SMT-i6010 Gigabit, 24 Button.	No	1		
7	Telephone Management System (Man 3000).			SUM	
8	Allow for ALL required Licensing & Software for the IPT to function. All warranties included.			SUM	
9	Customised messaging / music on hold.			SUM	
10	Complete installation and commissioning including voicemail set up.			SUM	
11	Maintenance and support for 3 years.			SUM	
	Carried Forward			R	

	Brought Forward			R	
	NOTE: Terms and conditions for maintenance and support shall be clearly detailed with supporting documents submitted with this tender document as part of the returnable documents.				
	GENERAL PROVISION				
	Specify:				
12	(a) Samsung SIP .	No	32		
13	(b) Patch Leads.	No	32		
	Carried Forward to Summary of Section No. 5			R	

Section No. 5
Bill No. 3
IPT

SECTION SUMMARY - SECTION NO. 5: ICT INSTALLATION (PROVISIONAL)

Bill No		Page No		Amount
1	PRELIMINARIES	137		
2	LOCAL AREA NETWORK	140		
3	IPT	142		
	Carried to Final Summary		R	

Section No. 5

Item No		Quantity	Rate	Amount
	SECTION NO. 6 **MECHANICAL INSTALLATION** **BILL NO. 1** **MECHANICAL INSTALLATION (PROVISIONAL)** *(CPAP Work Group No.170, Unless Otherwise Stated)* **SUPPLEMENTARY PREAMBLES** The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400. **MECHANICAL INSTALLATION**			
1	Allow the amount of ***R 7,680,000.00*** (Seven Million Six Hundred and Eighty Thousand Rand) for Mechanical Installation complete.	Item		7,680,000.00
	Carried to Final Summary		R	

Item No			Quantity	Rate	Amount
	SECTION NO. 7 **EXTERNAL WORKS (PROVISIONAL)** **BILL NO. 1** **LANDSCAPING, FENCING, ETC.**				
	SUPPLEMENTARY PREAMBLES				
	The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same. Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence. Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.				
	LANDSCAPING, ETC.				
	GRASSED AREAS, TREES, SHRUBS, ETC.				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavate in earth and dispose on site:				
1	Not exceeding 150mm deep to remove humps, form shallow ditches, etc.	m2	491		
	Ground preparation:				
2	Cultivation and preparation of areas to be planted	m2	491		
	Well sifted topsoil supplied by the contractor, including spreading and levelling:				
3	In plant beds, grassed areas and holes for trees, shrubs, etc	m3	49		
	Carried Forward			R	

	Brought Forward			R	
4	In plant boxes, pots, etc	m3	15		
	Compost, lime and fertilizer:				
5	Super phosphate granular commercial fertilizer for trees, shrubs, ground covers, etc.	kg	50		
	Mulch:				
6	25mm Thick mulch layer in plant beds between plants.	m2	491		
	Grassing, ground covers, etc.:				
7	"Berea" seeds in rows at 250mm centres.	m2	3,692		
8	"Berea" rolls 50mm thick.	m2	491		
	Tree, shrubs, bulbs and plants:				
9	Allowance of R 50,000.00 (Fifty Thousand Rand) for trees, shrubs and bushes, etc. as specified by the Architect.		Item		50,000.00
10	Profit.		Item		
11	Attendance.		Item		
	Maintenance:				
12	Allow for maintaining landscaping for a period of 3 months after practical completion, including watering, weeding, cutting, replacing dead plants, etc.		Item		
	FENCING, ETC.				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavation in earth not exceeding 2m deep below ground level:				
13	Trenches.	m3	167		
14	Holes.	m3	52		
	Extra over excavations in earth for excavation in:				
15	Soft rock.	m3	22		
	Carried Forward			R	

	Brought Forward			R	
16	Hard rock.	m3	11		
	Extra over all excavations for carting away:				
17	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor:	m3	46		
	Risk of collapse of excavations:				
18	Sides of bulk excavations not exceeding 1,5m deep.	m2	792		
	Keeping excavations free of water:				
19	Keeping excavations free of all water other than subterranean water.		Item		
	Selected earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
20	Backfilling to trenches, holes, etc.	m3	172		
	WEED KILLERS, INSECTICIDES, ETC.				
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
21	To bottoms and sides of holes, etc.	m2	508		
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES				
	(CPAP Work Group No.110, Unless Otherwise Stated)				
	30MPa/19mm concrete:				
22	Bases.	m3	46		
	TEST CUBES				
	Tests, etc.:				
23	Making and testing (sets of three) 150 x 150 x 150mm concrete strength test cubes.	No	11		
	FENCING PANELS, POSTS, GATES, ETC.				
	(CPAP Work Group No. 136 Unless Otherwise Stated)				
	Carried Forward			R	

	Brought Forward			R	
	<u>High density anti-climb anti-cut pressed mesh panel security fencing:</u>				
24	3,035 x 1,800mm high panel formed of 4mm diameter high tensile horizontal and vertical galvanised wires including marine fusion bond coating green in colour, aperture size 76,2mm x 12,7mm reinforcing with "V" formation horizontal recessed bands 4 x 50mm deep, including 2 x 70 degree flanges along sides and 1 x 90 degree flange along top, including 1 x 30 degree flange along toe, including reinforced high tensile steel bar cage positioned at 152.4mm intervals. Panels fixed to posts (elsewhere measured) strictly in accordance with manufacturers specifications.	No	153		
	<u>Taper locking post:</u>				
25	3,000mm Long x 85mm tapering to 45mm with a depth of 85mm galvanised and marine fusion bond coated post including locking recess mechanism to secure panel edge including UV stabilized polymer cap set into concrete bases (elsewhere) complete.	No	229		
	<u>Square post:</u>				
26	3,000mm Long x 85mm with a depth of 85mm galvanised and marine fusion bond coated post including locking recess mechanism to secure panel edge including UV stabilized polymer cap set into concrete bases (elsewhere) complete.	No	26		
	<u>Galvanised steel toppings, etc.:</u>				
27	500mm Diameter "Ripper" flat wrap fixed to tops of fencing panels (elsewhere) complete.	m	371		
	<u>Underdig, etc.:</u>				
28	3305 x 600mm high "ClearVu" anti-burrow single skin underdig fencing panel formed of 3mm diameter high horizontal and vertical tensile wires, galvanized and bitumen dipped, aperture size 76,2mm x 12,7mm and reinforcing V-section ribs and panels bolted to posts (posts elsewhere measured) with vandal resistant bolts and clamping plates, strictly in accordance with manufacturer's specifications.	m	371		
	Carried Forward			R	

	Brought Forward			R	
	High density anti-climb anti-cut pressed mesh panel security sliding gates/swing gates:				
29	"G02" "Cochrane ClearVu" marine fusion bonded coated (colour: charcoal) sliding gate (motorisation elsehwere), size 3,000 x 1,800mm high with "ClearVu"mesh infill and "Sharktooth" spikes topping including manufacturer's wheels and stoppers and T-Slide lock with lock box, drop bolts (No.1) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	1		
30	"G03" "Cochrane ClearVu" marine fusion bonded coated (colour: charcoal) automated sliding gate (motorisation elsehwere), size 6,000 x 1,800mm high with "ClearVu"mesh infill and "Sharktooth" spikes topping including manufacturer's wheels and stoppers and T-Slide lock with lock box, drop bolts (No.1) and grab handles installed with strict adherence to manufacturer's installation guidelines complete as per Architect's Drawing (PS2023-07-WD-505-00).	No	1		
	ACCESS CONTROL				
	(CPAP Work Group No. 136 Unless Otherwise Stated)				
	Boom gates, etc.:				
31	Supply and install anodised octagonal barrier arm (3m length) size, 90mm x 45mm x 1.5mm wall thickness with red reflector stripes including adjustable tip support and base overall size 200 x 200 x 1,047mm high with finish, mild steel with UV resistant exterior grade powder coat finish (white base and blue lid) with strict adherence to manufacturer's guidelines complete.	No	1		
	BOLLARDS, ETC.				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavation in earth not exceeding 2m deep:				
32	Holes.	m3	5		
	Extra over all excavations for carting away:				
33	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor.	m3	4		
	Carried Forward			R	

	Brought Forward			R	
	Risk of collapse of excavations:				
34	Sides of trench and hole excavations not exceeding 1.5m deep.	m2	51		
	Keeping excavations free of water:				
35	Keeping excavations free of all water other than subterranean water.		Item		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 95% Mod AASHTO density:				
36	Backfilling to trenches, holes, etc.	m3	1		
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
37	To sides of trenches, holes, etc.	m2	51		
38	To bottoms of trenches, holes, etc.	m2	10		
	CONCRETE, FORMWORK AND REINFORCEMENT				
	(CPAP Work Group No.110, Unless Otherwise Stated)				
	30MPa/19mm mass concrete cast against excavated surfaces:				
39	Bases.	m3	4		
	PRECAST CONCRETE				
	(CPAP Work Group No.112, Unless Otherwise Stated)				
	Manufactured by "WilsonStone" or similar approved:				
40	"Boulders" precast concrete bollard (finish: polished concrete), size 200mm diam. x 1,200mm high, with one end set into concrete bases (elsewhere) 200mm deep complete.	No	64		
	ENTRANCE WALLS, BOUNDARY WALLS, ETC.				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Carried Forward			R	

				R	
	Brought Forward				
	Excavation in earth not exceeding 2m deep:				
41	Trenches.	m3	22		
	Extra over all excavations in earth for excavation in:				
42	Soft rock.	m3	2		
43	Hard rock.	m3	1		
	Extra over all excavations for carting away:				
44	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor.	m3	11		
	Risk of collapse of excavations:				
45	Sides of trench and hole excavations not exceeding 1.5m deep.	m2	55		
	Keeping excavations free of water:				
46	Keeping excavations free of all water other than subterranean water.		Item		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 95% Mod AASHTO density:				
47	Backfilling to trenches, holes, etc.	m3	11		
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
48	To sides of trenches, holes, etc.	m2	55		
49	To bottoms of trenches, holes, etc.	m2	18		
	CONCRETE, FORMWORK & REINFORCEMENT				
	(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)				
	10MPa/19mm concrete cast against excavated surfaces:				
50	Surface blinding under footings and bases.	m3	1		
	Carried Forward			R	

	Brought Forward			R	
	30MPa/19mm concrete cast against excavated surfaces:				
51	Strip footings.	m3	5		
	BRICKWORK				
	(CPAP Work Group No.118, Unless Otherwise Stated)				
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar:				
52	One brick walls in foundations.	m2	22		
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar:				
53	One brick walls in superstructure.	m2	39		
	2.5mm Galvanised brick reinforcement in foundation brickwork, etc.:				
54	150mm Wide reinforcement built in horizontally.	m	261		
	2.5mm Galvanised brick reinforcement in superstructure brickwork, etc.:				
55	150mm Wide reinforcement built in horizontally.	m	459		
	Bag down outer face of inner skin of brick wall with 4:1 cement slurry and apply two coats bituminous emulsion including working around ties:				
56	On brick walls, piers, etc. in foundations.	m2	22		
57	On brick walls, piers, etc.	m2	39		
	WATERPROOFING				
	(CPAP Work Group No.120, Unless Otherwise Stated)				
	"Sika Sealoflex" or similar approved acrylic waterproofing agent applied to plastered walls:				
58	On plastered narrow widths not exceeding 300mm girth (plaster elsewhere).	m2	5		
	PLASTERING				
	(CPAP Work Group No. 142 Unless Otherwise Stated)				
	Carried Forward			R	

					R
	Brought Forward				
	15mm Thick cement plaster (1:4) wood floated, on brickwork:				
59	On walls.	m2	84		
60	On narrow widths, not exceeding 300mm girth.	m2	5		
	PAINTWORK				
	(CPAP Work Group No.152, Unless Otherwise Stated)				
	Prepare surface as per manufacturer's specifications and apply one coat Plascon plaster primer, one coat Plascon alkyd based universal undercoat and two coats Plascon Wall & All acrylic paint for exterior use (colour to Architect's approval):				
61	Walls.	m2	89		
	Carried Forward to Summary of Section No. 7				R

Section No. 7
Bill No. 1
LANDSCAPING, FENCING, ETC.

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 2
BULK EARTHWORKS, RETAINING STRUCTURES, ETC.

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Nature of material to be excavated:
The material to be excavated is assumed to be predominantly of a composition that will allow excavation in "earth" as specified, but including a percentage of excavation in "soft rock" and "hard rock".

Carting away of excavated material:
Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations, or alternatively, from stock piles situated on the building site.

Carried Forward R

	Brought Forward			R	
	De-watering of excavations: The Contractor shall allow for removing seepage and other water from subterranean sources from the excavations by pumping, baling or otherwise accurate records of all such de-watering shall be kept to determine the total volume of water so removed and a clear distinction shall be made between water from subterranean sources and other water.				
	Density testing on filling: Rates for filling, etc. shall include for all density and soil type testing to prove that the specified compaction is achieved. When additional testing is done on instruction of the principal agent and these tests are successful, they will be paid for additionally.				
	Imported fill: Filling and bedding to trenches, etc. to be in compliance with SABS 1200 DB and LB respectively.				
	BULK EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	PLATFORMS, ETC.				
	Site clearance:				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth.	m2	17,863		
	Open face excavation in earth over sloping site:				
2	Open face excavation.	m3	1,949		
	Extra over bulk excavations in earth for excavation in:				
3	Soft rock.	m3	390		
4	Hard rock.	m3	195		
	Extra over all excavations for carting away:				
5	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor.	m3	292		
	Carried Forward			R	

	Brought Forward			R	
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
6	Over site to form platforms.	m3	1,657		
	Selected earth filling (G7) imported to site, compacted to 93% Mod AASHTO density:				
7	Over site to form platforms.	m3	975		
	Selected earth filling (G5) imported to site, compacted to 95% Mod AASHTO density:				
8	Over site to form platforms.	m3	975		
	Compaction of surfaces:				
9	Compaction of ground surface over site, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 90% Mod AASHTO density.	m2	1,949		
	Prescribed tests to determine degree of compaction or other properties of ground or filling to be used at the sole discretion of the Client and/or Principal Agent:				
10	"Modified AASHTO Density" test	No	10		
11	"Field Density" test including "Optimum Moisture Content" test (four readings per test)	No	10		
	Carried Forward to Summary of Section No. 7			R	

Section No. 7
Bill No. 2
BULK EARTHWORKS, RETAINING STRUCTURES, ETC

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 3
ROADWORKS, ETC.

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Nature of material to be excavated:
The material to be excavated is assumed to be predominantly of a composition that will allow excavation in "earth" as specified, but including a percentage of excavation in "soft rock" and "hard rock".

Carting away of excavated material:
Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations, or alternatively, from stock piles situated on the building site.

De-watering of excavations:
The Contractor shall allow for removing seepage and other water from subterranean sources from the excavations by pumping, baling or otherwise accurate records of all such de-watering shall be kept to determine the total volume of water so removed and a clear distinction shall be made between water from subterranean sources and other water.

Carried Forward R

Brought Forward R

Density testing on filling:
Rates for filling, etc. shall include for all density and soil type testing to prove that the specified compaction is achieved.

When additional testing is done on instruction of the principal agent and these tests are successful, they will be paid for additionally.

Imported fill:
Filling and bedding to trenches, etc. to be in compliance with SABS 1200 DB and LB respectively.

Cost of tests:
The costs of making, storing and testing of concrete test cubes as required under clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests for approval.

The testing shall be undertaken by an approved independent firm or institution nominated by the contractor (test cubes are measured separately).

Formwork:
Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use.

The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself.

Formwork to soffits of solid slabs, etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described.

Formwork to soffits of slabs, beams, etc. shall be deemed to be propped up exceeding 1,5m and not exceeding 3,5m high unless otherwise described.

Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the engineer for design reasons.

Carried Forward R

	Brought Forward			R	
	Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".				
	Where kerbstones, blocks, etc. are laid in ground descriptions shall be deemed to include necessary excavation, filling in and ramming.				
	PARKING AREA, DRIVEWAYS, ETC.				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Site clearance:				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc. and trees not exceeding 200mm girth.	m2	1,875		
	Digging up topsoil:				
2	Digging up topsoil to an average depth of 200mm and preserving for use as filling.	m2	1,875		
	Open face excavation in earth over sloping site:				
3	Open face excavation to form platforms under parking areas, etc.	m3	1,181		
	Extra over open face excavations in earth for excavation in:				
4	Soft rock.	m3	118		
5	Hard rock.	m3	59		
	Extra over all excavations for carting away:				
6	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor.	m3	1,181		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
7	Rip, scarify, wet and compact exposed surfaces under parking areas, etc.	m2	1,875		
	Carried Forward			R	

	Brought Forward			R	
	Imported stabilised earth filling (C4) in sub-base course supplied by the contractor, compacted to 95% Mod AASHTO density:				
8	Sub-base course under parking areas, etc.	m3	281		
	Earth filling (G7) supplied by the contractor, compacted to 95% Mod AASHTO density:				
9	Base course under parking areas, etc.	m3	844		
	Filling of coarse river sand supplied by the contractor, consolidated:				
10	Under floors, etc.	m3	56		
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
11	Under paving, etc.	m2	1,875		
	Prescribed tests to determine degree of compaction or other properties of ground or filling to be used at the sole discretion of the Client and/or Principal Agent:				
12	"Modified AASHTO Density" test.	No	10		
13	"Field Density" test, including "Optimum Moisture Content" test (four readings per test).	No	10		
	PRECAST CONCRETE				
	(CPAP Work Group No.112, Unless Otherwise Stated)				
	Precast concrete finished smooth on exposed surfaces, including bedding, jointing and pointing:				
14	150 x 250mm High kerbs (SANS 927 fig 4) with a 450 x 125mm unreinforced concrete footing (15MPa) and including triangular concrete haunching (28MPa), size 150 x 150mm at back of each joint with concrete infill (28MPa) in front between kerb and road finish (elsewhere) with cement grouted joints, including excavation, backfilling, etc.	m	207		
15	Ditto, but circular on plan not exceeding 4,000mm radius.	m	24		
	Carried Forward			R	

	Brought Forward			R	
16	125 x 230mm High kerbs (SANS 927 fig 6) with a 450 x 125mm unreinforced concrete footing (15MPa) and including triangular concrete haunching (28MPa), size 150 x 150mm at back of each joint with concrete infill (28MPa) in front between kerb and road finish (elsewhere) with cement grouted joints, including excavation, backfilling, etc.	m	58		
17	Ditto, but circular on plan not exceeding 4,000mm radius.	m	81		
	MASONRY				
	(CPAP Work Group No.118, Unless Otherwise Stated)				
	Paving of "Corobrick - Corolock" or similar approved interlocking precast concrete paving blocks (colour to Architect's approval) complying with SANS 1058, with butt joints on 25mm thick river sand bed with sand swept into joints (preparation of ground or filling elsewhere):				
18	Paving of 80mm thick blocks laid in herringbone pattern including edge blocks, to falls.	m2	1,875		
	PAINTWORK				
	(CPAP Work Group No.152, Unless Otherwise Stated)				
	Two coats reflective road marking paint on precast concrete pavers (elsewhere):				
19	Line 100mm wide.	m	167		
20	Numeral or letter 2500mm high.	No	16		
21	Traffic arrow 4000 x 500mm wide extreme.	No	3		
22	Traffic arrow 4000 x 750mm wide extreme.	No	2		
23	Paraplegic parking sign.	No	2		
	Road signs:				
24	Standard "STOP" sign with 50mm diameter galvanised mild steel post bedded in and including unreinforced concrete base, including any necessary excavation, paint finish, etc. complete.	No	4		
	Carried Forward to Summary of Section No. 7			R	

Section No. 7
Bill No. 3
ROADWORKS, ETC.

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 4
WALKWAYS, PAVED AREAS, ETC.

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

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Quarry tiles, cement, terrazzo and similar tiles, precast concrete bricks, blocks, etc.:
Tiles shall be of approved manufacture, well burnt or cured, and uniform and true in size, shape and colour

Density testing on filling:
Rates for filling, etc. shall include for all density and soil type testing to prove that the specified compaction is achieved.

When additional testing is done on instruction of the principal agent and these tests are successful, they will be paid for additionally.

Imported fill:
Filling and bedding to trenches, etc. to be in compliance with SABS 1200 DB and LB respectively.

WALKWAYS, PAVING, ETC.

Carried Forward R

	Brought Forward			R	
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Site clearance:				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth.	m2	432		
	Digging up topsoil:				
2	Digging up topsoil to an average depth of 150mm and preserving for use as filling.	m2	432		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
3	Rip, scarify, wet and compact exposed surfaces under paved areas, etc.	m2	432		
	Earth filling (G5) supplied by the contractor, compacted to 98% Mod AASHTO density:				
4	Base course under paved areas, etc.	m3	65		
	Filling of clean river sand supplied by the contractor, consolidated:				
5	Under paving, etc.	m3	13		
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
6	Under paving, etc.	m2	432		
	PRECAST CONCRETE				
	(CPAP Work Group No.112, Unless Otherwise Stated)				
	Precast concrete finished smooth on exposed surfaces, including bedding, jointing and pointing:				
7	75 x 150mm High kerbs (SANS 927 fig 12) with a 225 x 100mm unreinforced concrete footing (15MPa) and including triangular concrete haunching (28MPa), size 75 x 75mm at back of each joint with concrete infill (28MPa) in front between kerb and road finish (elsewhere) with cement grouted joints, including excavation, backfilling, etc.	m	291		
	Carried Forward			R	

	Brought Forward			R	
8	Ditto, but circular on plan not exceeding 4,000mm radius.	m	4		
	MASONRY				
	(CPAP Work Group No.118, Unless Otherwise Stated)				
	Paving of "Corobrick - Burgundy Modular (Class A)" or similar approved clay paving brick complying with SANS 1058, with butt joints on 25mm thick river sand bed with sand swept into joints (preparation of ground or filling elsewhere):				
9	Paving of 65mm thick clay paving bricks including edge blocks.	m2	432		
	Carried Forward to Summary of Section No. 7			R	

Section No. 7
Bill No. 4
WALKWAYS, PAVED AREAS, ETC.

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 5
WATER RETICULATION, ETC.

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

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Disinfection of water pipework:
Water pipework is to be disinfected at completion.

Maintenance and guarantee:
Maintenance of efficient and safe working for a period of12 months after completion.

PVC-U pipes and fittings:
Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings.

Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings.

Carried Forward R

Brought Forward R

PVC-U pressure pipes and fittings:
Pipes of 50mm diameter and smaller shall be plain ended with solvent welded PVC-U loose sockets and fittings

Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be PVC-U and all other fittings shall be cast iron, all with similar push-in type joints

High density polyethylene (HDPe) pipes and fittings:
Pipes shall be type IV and of the class specified with compression fittings

Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with heat welded thermoplastic or where so described compression fittings

Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions

Laying, backfilling, bedding, etc. of pipes:
Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled

Where no manufacturers' instructions exist, pipes shall be laid in accordance with the relevant section of SANS 2001

General:
Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 95% Mod AASHTO density and disposal of surplus material on site.

Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately)

Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured)

Carried Forward R

	Brought Forward			R	
	As-built drawings: Where required, the contractor shall prepare an updated set of as-built drawings. At completion of the contract the contractor shall hand these drawings to the principal agent for reproducing onto the originals for handing over to the employer (provision for allowance of as-built drawings elsewhere).				
	DOMESTIC WATER SUPPLIES IN GROUND				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavations:				
1	Excavation in earth not exceeding 1m deep for pipe trenches.	m3	375		
	Extra over excavations in earth for:				
2	Water pipe trenches, inspection chambers, etc. for excavations in soft rock.	m3	37		
3	Ditto, but in hard rock.	m3	19		
	Extra over all excavations for carting away:				
4	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor.	m3	375		
	Keeping excavations free of water:				
5	Keeping excavations free of water other than subterranean water.		Item		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
6	Backfilling to pipe trenches.	m3	8		
	Imported earth filling supplied by the contractor, compacted to 98% Mod AASHTO density:				
7	Backfilling to pipe trenches with selected material compacted in 150mm layers to 93% Mod AASHTO density.	m3	225		
8	Selected granular filling in bedding under and filling around pipes.	m3	142		
	Carried Forward			R	

	Brought Forward			R	
	CONCRETE, FORMWORK AND REINFORCEMENT				
	(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)				
	Thrust blocks (Provisional):				
9	Supply and place 20MPa / 19mm concrete cast in-situ.	m3	5		
	Sundries:				
10	Making and testing 150 x 150 x 150mm concrete strength test cubes (sets of three) (Provisional).	No	1		
	PLUMBING				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Polyethylene (HDPE) (PN16/Class 16) piping with socket joints as described for water supply:				
11	75mm Domestic main water piping including short lengths and jointing, laid in trenches (elsewhere measured).	m	551		
	Extra over on HDPE (PN16/Class 16) piping for the following fittings (brass compression type):				
12	75mm Bend.	No	24		
13	75mm Elbow.	No	5		
14	75mm Equal T-piece.	No	12		
	Brass, wedge-gate type, clockwise opening, gate valves with non-rising spindle:				
15	75mm HDPE (Class 16) Isolation valve.	No	12		
16	75mm Polished brass gate valve.	No	3		
	Testing:				
17	Allow for testing all drains, and water supplies to the satisfaction of the Principal Agent. All defective work is to be taken out and replaced at the Contractor's expense.		Item		
	FIRE SUPPLIES IN GROUND, ETC.				
	Carried Forward			R	

	Brought Forward			R
	EARTHWORKS			
	(CPAP Work Group No.104, Unless Otherwise Stated)			
	Excavations, backfilling, etc.:			
18	Excavation in earth not exceeding 1m deep for pipe trenches.	m3	167	
	Extra over excavations in earth:			
19	Extra over excavations in pickable material for water pipe trenches, inspection chambers, etc. for excavations in soft rock.	m3	17	
20	Ditto, but in hard rock.	m3	8	
	Extra over all excavations for carting away:			
21	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor.	m3	167	
	Keeping excavations free of water:			
22	Keeping excavations free of water other than subterranean water.		Item	
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:			
23	Backfilling to pipe trenches.	m3	167	
	Imported earth filling supplied by the contractor, compacted to 98% Mod AASHTO density:			
24	Backfilling to pipe trenches with selected material compacted in 150mm layers to 93% Mod AASHTO density.	m3	75	
25	Selected granular filling in bedding under and filling around pipes.	m3	47	
	CONCRETE, FORMWORK AND REINFORCEMENT			
	(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)			
	Thrust blocks (Provisional):			
26	Supply and place 20MPa / 19mm concrete cast in-situ	m3	5	
	Carried Forward			R

				R		
	Brought Forward					
	Sundries:					
27	Making and testing 150 x 150 x 150mm concrete strength test cubes (sets of three) (Provisional).	No	1			
	PLUMBING					
	(CPAP Work Group No.148, Unless Otherwise Stated)					
	HDPE (Class 16) piping with socket joints as described for fire supply:					
28	40mm Fire supply piping including short lengths and jointing, laid in trenches (elsewhere measured).	m	100			
29	75mm Fire supply piping including short lengths and jointing, laid in trenches (elsewhere measured).	m	150			
	Extra over on HDPE (Class 16) piping for the following fittings (compression type):					
30	40mm Diam. bend.	No	15			
31	75mm Diam. bend.	No	15			
32	75mm Equal T-piece.	No	5			
33	40 x 75mm Unequal T-piece.	No	5			
	Brass, wedge-gate type, clockwise opening, gate valves with non-rising spindle:					
34	75mm HPDE Class 16 gate valve.	No	2			
	Testing:					
35	Allow for testing all drains, and water supplies to the satisfaction of the Principal Agent. All defective work is to be taken out and replaced at the Contractor's expense.		Item			
	MANHOLES, ETC.					
	EARTHWORKS					
	(CPAP Work Group No.104, Unless Otherwise Stated)					
	Excavation in earth not exceeding 2m deep:					
36	Holes.	m3	17			
	Carried Forward			R		

	Brought Forward			R	
	Extra over all excavations for carting away:				
37	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor.	m3	17		
	CONCRETE, FORMWORK AND REINFORCEMENT				
	(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)				
	20MPa/19mm concrete:				
38	Bases.	m3	1		
	MASONRY				
	(CPAP Work Group No.118, Unless Otherwise Stated)				
	Brickwork in foundations of NFX bricks (14 MPa nominal compressive strength) in class I mortar:				
39	Half brick walls.	m2	11		
	"Cementile" or equal approved:				
40	Valve/hydrant chamber (MS 1105), size 665 x 565 x 200mm high complete.	No	17		
41	Valve box Lid-V (MS 2226), size 455 x 355 x 85mm high.	No	17		
	WATER METERS, ETC.				
	PLUMBING				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Extra over cast iron pipes with SSN couplings for fittings:				
42	50mm Flange adapter.	No	2		
	Polyethylene (HDPE) (Class 10) piping with socket joints as described for water supply:				
43	40mm Domestic main water piping including short lengths and jointing, laid in trenches (elsewhere measured).	m	5		
	Carried Forward			R	

	Brought Forward			R	
	Extra over on HDPE (Class 16) piping for the following fittings (compression type):				
44	40 x 40mm Female adaptor.	No	2		
45	50 x 40mm Reducing coupling.	No	1		
	Water Meters, etc.:				
46	50mm Water meter including pvc meter box complete.	No	1		
	SUNDRIES, ETC.				
	PLUMBING				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Fire hydrants, etc.:				
47	"Woodlands WHE-100SC STD" or similar approved hi-efficiency fire hydrant set (100mm) with pedestal including all necessary earthworks, concrete, piping, connections, etc. complete.	No	2		
	Blocking off existing services:				
48	Safely block off existing water main and make good at Contractor's own expense where any damage occurs by account of Contractor.		Item		
	Service connections:				
49	Connection to existing water main.		Item		
	MISCELLANEOUS				
	As-built drawings:				
50	As-built survey by a registered Land Surveyor of existing water line includes the location of individual connections complete with levels. All data must be based on the WGS84 coordinate system in electronic ASCII or text format as well as hard copy.		Item		
	Carried Forward to Summary of Section No. 7			R	

Section No. 7
Bill No. 5
WATER RETICULATION, ETC.

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 6
WATER STORAGE, ETC.

SUPPLEMENTARY PREAMBLES

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Note:
Rainwater storage tanks to be filled with water before Practical Completion.

Cost of tests:
The costs of making, storing and testing of concrete test cubes as required under clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests for approval.

The testing shall be undertaken by an approved independent firm or institution nominated by the contractor (test cubes are measured separately).

RAINWATER TANK AND PLINTH

EARTHWORKS

(CPAP Work Group No.104, Unless Otherwise Stated)

Carried Forward R

	Brought Forward			R	
	Excavation in earth not exceeding 2m deep:				
1	Trenches.	m3	55		
	Extra over all excavations in earth for excavation in:				
2	Soft rock.	m3	6		
3	Hard rock.	m3	3		
	Extra over all excavations for carting away:				
4	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor.	m3	31		
	Risk of collapse of excavations:				
5	Sides of excavations exceeding 1,5m deep.	m2	69		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 95% Mod AASHTO density:				
6	Backfilling to trenches, holes, etc.	m3	24		
	Imported earth filling (G5) supplied by the contractor, compacted to 98% Mod AASHTO density in layers not exceeding 150mm thick:				
7	Under floors, steps, pavings, etc.	m3	17		
	Filling of coarse river sand supplied by the contractor, filtered, consolidated and compacted:				
8	Under floors, etc.	m3	2		
	Approved brand of anti-termite soil poison applied by a Registered Pest Control Company and guaranteed against termite infestation for ten years:				
9	To sides of trenches, holes, etc.	m2	69		
10	To bottoms of trenches, holes, etc.	m2	64		
11	Under floors etc., including forming and poisoning shallow furrows against foundation walls etc., filling in furrows and ramming.	m2	33		
	Carried Forward			R	

	Brought Forward			R	
	CONCRETE, FORMWORK AND REINFORCEMENT				
	(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)				
	10MPa/19mm unreinforced concrete cast against excavated surfaces:				
12	Surface blinding under footings and bases.	m3	3		
	30MPa/19mm unreinforced concrete cast against excavated surfaces:				
13	Strip footings.	m3	19		
14	Surface beds on waterproofing.	m3	3		
	Tests, etc.:				
15	Making and testing 150 x 150 x 150mm concrete strength test cube (sets of three).	No	33		
	Finishing top surfaces of concrete smooth with a wood float:				
16	Surface beds, slabs etc.	m2	33		
	"Jointex" or similar approved expanded polyethylene in slip joints between horizontal concrete and brick surfaces including cement mortar bed:				
17	Not exceeding 300mm wide in foundations.	m	80		
	Fabric reinforcement:				
18	Type 193 fabric reinforcement in concrete surface beds, etc.	m2	38		
	MASONRY				
	(CPAP Work Group No.118, Unless Otherwise Stated)				
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar:				
19	One brick walls in foundations.	m2	41		
20	One brick walls in superstructure.	m2	34		
	Carried Forward			R	

	Brought Forward			R	
	2.5mm Galvanised brick reinforcement in foundation brickwork, etc.:				
21	150mm Wide reinforcement built in horizontally.	m	480		
	2.5mm Galvanised brick reinforcement in superstructure brickwork, etc.:				
22	150mm Wide reinforcement built in horizontally.	m	400		
	Bag down outer face of inner skin of brick wall with 4:1 cement slurry and apply two coats bituminous emulsion including working around ties:				
23	On brick walls, piers, etc. in foundations.	m2	41		
24	On brick walls, piers, etc.	m2	34		
	"Corobrik Firelight Satin FBX" or similar approved face bricks in stretcher bond pointed with recessed horizontal and vertical joints:				
25	Extra over brickwork for face brickwork.	m2	14		
26	Extra over brickwork for face brickwork.	m2	34		
	Brick-on-edge header course copings, sills, etc of "Corobrik Firelight Satin FBX" face bricks, pointed with recessed joints on all exposed faces:				
27	220mm Copings on top of one brick walls	m	80		
	WATERPROOFING				
	(CPAP Work Group No.120, Unless Otherwise Stated)				
	One layer 250 micron green polyethylene waterproof sheeting (SANS 952-1985 type C) sealed at laps with PVC self-adhesive tape:				
28	Under surface beds including turn-ups, etc.	m2	38		
	PLUMBING & DRAINAGE				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Carried Forward			R	

	Brought Forward			R	
	Manufactured by "Eco Tanks" or similar approved:				
29	5,050 Litre polyethylene vertical water storage tank, size 1,790mm diam. x 2,220mm high with manufacturer's screw lid, fitted with and including 15mm brass bibtap (Type 108LK15) with suitable adaptor and setting in position on concrete tankstand (elsewhere) and tying down with 8mm diam. galvanised round strand steel rope, fastened and secured to side of tank stand with one end fixed to galvanized gutter bolt embedded into concrete.	No	8		
	PAINTWORK				
	(CPAP Work Group No.152, Unless Otherwise Stated)				
	Clean down with spirits of salts solution and apply two coats "Dulux Brick Dressing" or similar approved on:				
30	Walls in foundations.	m2	14		
31	Walls.	m2	34		
	Carried Forward to Summary of Section No. 7			R	

Section No. 7
Bill No. 6
WATER STORAGE, ETC.

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 7
STORMWATER MANAGEMENT, ETC.

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

PVC-U pipes and fittings:
Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings.

Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings.

PVC-U pressure pipes and fittings:
Pipes of 50mm diameter and smaller shall be plain ended with solvent welded PVC-U loose sockets and fittings

Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be PVC-U and all other fittings shall be cast iron, all with similar push-in type joints

Laying, backfilling, bedding, etc. of pipes:
Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled

Carried Forward R

	Brought Forward			R	
	Where no manufacturers' instructions exist, pipes shall be laid in accordance with the relevant section of SANS 2001				
	General: Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 95% Mod AASHTO density and disposal of surplus material on site.				
	Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately)				
	Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured)				
	As-built drawings: Where required, the contractor shall prepare an updated set of as-built drawings. At completion of the contract the contractor shall hand these drawings to the principal agent for reproducing onto the originals for handing over to the employer (provision for allowance of as-built drawings elsewhere).				
	CONCRETE APRONS, ETC.				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
1	Rip, scarify, wet and compact exposed surfaces under aprons, precast drains, etc.	m3	59		
	Imported earth filling (G5) supplied by the contractor, compacted to 95% Mod AASHTO density in layers not exceeding 150mm thick:				
2	Under aprons, precast drains, etc.	m3	59		
	CONCRETE, FORMWORK AND REINFORCEMENT				
	(CPAP Work Groups No.110, 111 & 114, Unless Otherwise Stated)				
	Carried Forward			R	

	Brought Forward			R	
	30MPa/19mm concrete:				
3	V-drains, channels, aprons, etc. to falls.	m3	51		
	Test cubes:				
4	Making and testing 150 x 150 x 150mm concrete strength test cube (Provisional)	No	8		
	Finishing top surfaces of concrete smooth with a steel trowel:				
5	V-drains, channels, aprons, etc. to falls.	m2	392		
	Smooth formwork to sides:				
6	Edges, risers, ends and reveals not exceeding 300mm high.	m	594		
	Expansion joints with 10mm bitumen impregnated softboard between vertical concrete surfaces:				
7	Not exceeding 300mm high to edges of surface beds, aprons, etc.	m	594		
	PRECAST CONCRETE				
	(CPAP Work Group No.112, Unless Otherwise Stated)				
	Pre-cast concrete channels finished smooth on exposed surfaces:				
8	U-drain size 300 x 190mm high overall, laid in lengths not exceeding 1000mm on a well rammed earth bottom.	m	116		
9	Extra over for angles, intersections, ends, dressing into sides of catch pits, etc.	No	5		
	STORMWATER DRAINAGE				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavations in earth:				
10	Excavation in earth not exceeding 1m deep for pipe trenches	m3	137		
11	Excavation in earth exceeding 1m and not exceeding 2m deep for pipe trenches.	m3	73		
	Carried Forward			R	

	Brought Forward			R	
12	Excavation in earth exceeding 2m and not exceeding 3m deep for pipe trenches.	m3	20		
	Extra over for:				
13	Extra over excavations in pickable material for stormwater pipe trenches, inspection chambers, etc. for excavations in soft rock.	m3	23		
14	Ditto, but in hard rock.	m3	12		
	Extra over all excavations for carting away:				
15	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor.	m3	44		
	Backfilling:				
16	Backfilling to pipe trenches compacted to 93% Mod AASHTO density including compaction, tests, etc.	m3	231		
17	Unreinforced concrete bedding (15MPa) under pipes.	m3	44		
	PLUMBING & DRAINAGE				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Class 100D concrete pipes with spigot and socket joints with rubber rings:				
18	375mm Pipes laid in trenches (trenches elsewhere).	m	200		
	Sumps, catchpits, inspection chambers, etc. including concrete kerbs or precast concrete cover slabs (gratings and covers elsewhere):				
19	Junction box, overall size 990 x 990mm with internal depth not exceeding 1,000mm deep internally to invert level, formed of hard burnt 230mm brick sides in 1:3 cement mortar on and including 125mm thick reinforced (mesh ref. 193) concrete (30MPa at 28 days in 19mm stone) bottom and mass concrete (25MPa at 28 days in 19mm stone) benching with 25mm thick 1:3 cement/sand trowelled to smooth finish, rendered internally in 1:3 cement plaster with reinforced in-situ concrete cover (30MPa at 28 days in 19mm stone) on top, size 890 x 890 x 125mm thick, including all necessary fittings, excavations, formwork, holes through sides for pipes, etc. complete.	No	10		
	Carried Forward			R	

	Brought Forward			R	
20	Catchpit, overall size 1,190 x 1,190mm with internal depth not exceeding 1,000mm deep internally to invert level, formed of hard burnt 230mm brick sides in 1:3 cement mortar on and including 150mm thick reinforced (mesh ref. 193) concrete (30MPa at 28 days in 19mm stone) bottom and mass concrete (25MPa at 28 days in 19mm stone) benching with 25mm thick 1:3 cement/sand trowelled to smooth finish, rendered internally in 1:3 cement plaster with reinforced in-situ concrete (30MPa at 28 days in 19mm stone) around edges on top, size 300 x 150mm, rebated for grid inlet and frame (elsewhere) including all necessary fittings, excavations, formwork, holes through sides for pipes, etc. complete.	No	23		
	<u>Manholes, gulleys, traps, valve chambers, etc.:</u>				
21	Manhole, internal size 900 x 600mm with internal depth not exceeding 1,000mm deep to invert level formed of hard burnt 230mm brick sides in 1:3 cement mortar on and including 150mm thick reinforced (mesh ref.193) concrete (30MPa at 28 days in 19mm stone) bottom, size 1,490 x 1,190mm and mass concrete (25MPa at 28 days in 19mm stone) benching with 25mm thick 1:3 cement/sand trowelled to smooth finish, rendered internally in 1:3 cement plaster with reinforced insitu concrete (30MPa at 28 days in 19mm stone) around edges on top, size 400 x 100mm thick, rebated for and fitted with galvanised steel grid inlet and frame (elsewhere) including all necessary fittings, excavations, formwork, holes through sides for pipes, etc. complete.	No	2		
22	Manhole, internal size 900 x 600mm with internal depth exceeding 1,000 and not exceeding 2,000mm deep to invert level formed of hard burnt 230mm brick sides in 1:3 cement mortar on and including 150mm thick reinforced (mesh ref.193) concrete (30MPa at 28 days in 19mm stone) bottom, size 1,490 x 1,190mm and mass concrete (25MPa at 28 days in 19mm stone) benching with 25mm thick 1:3 cement/sand trowelled to smooth finish, rendered internally in 1:3 cement plaster with reinforced insitu concrete (30MPa at 28 days in 19mm stone) around edges on top, size 400 x 100mm thick, rebated for and fitted with galvanised steel grid inlet and frame (elsewhere) including all necessary fittings, excavations, formwork, holes through sides for pipes, etc. complete.	No	2		
	Carried Forward			R	

	Brought Forward			R	
23	Manhole, internal size 900 x 600mm with internal depth exceeding 2,000 and not exceeding 3,000mm deep to invert level formed of hard burnt 230mm brick sides in 1:3 cement mortar on and including 150mm thick reinforced (mesh ref.193) concrete (30MPa at 28 days in 19mm stone) bottom, size 1,490 x 1,190mm and mass concrete (25MPa at 28 days in 19mm stone) benching with 25mm thick 1:3 cement/sand trowelled to smooth finish, rendered internally in 1:3 cement plaster with reinforced insitu concrete (30MPa at 28 days in 19mm stone) around edges on top, size 400 x 100mm thick, rebated for and fitted with galvanised steel grid inlet and frame (elsewhere) including all necessary fittings, excavations, formwork, holes through sides for pipes, etc. complete.	No	4		
24	Manhole, internal size 900 x 600mm with internal depth exceeding 3,000 and not exceeding 4,000mm deep to invert level formed of hard burnt 230mm brick sides in 1:3 cement mortar on and including 150mm thick reinforced (mesh ref.193) concrete (30MPa at 28 days in 19mm stone) bottom, size 1,490 x 1,190mm and mass concrete (25MPa at 28 days in 19mm stone) benching with 25mm thick 1:3 cement/sand trowelled to smooth finish, rendered internally in 1:3 cement plaster with reinforced insitu concrete (30MPa at 28 days in 19mm stone) around edges on top, size 400 x 100mm thick, rebated for and fitted with galvanised steel grid inlet and frame (elsewhere) including all necessary fittings, excavations, formwork, holes through sides for pipes, etc. complete.	No	1		
	<u>Cast iron gratings, covers, etc.:</u>				
25	450 x 450mm Dished grating and frame (Saint Gobain No.2946 or similar approved), bedded in 1:3 cement mortar to catchpit opening and sealed including all necessary fittings, etc. complete.	No	23		
26	"Type 4" manhole cover and frame, bedded in 1:3 cement mortar to manholes opening and sealed including all necessary fittings, etc. complete.	No	4		
27	"Type 2A" manhole cover and frame, bedded in 1:3 cement mortar to manholes opening and sealed including all necessary fittings, etc. complete.	No	5		
28	Lifting key for manhole covers, etc.	No	3		
	<u>SUBSOIL DRAINAGE</u>				
	Carried Forward			R	

				R	
	Brought Forward				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavations:				
29	Excavation in earth not exceeding 1m deep for pipe trenches.	m3	31		
	Extra over all excavations in earth for excavation in:				
30	Soft rock.	m3	3		
31	Hard rock.	m3	2		
	Extra over all excavations for carting away:				
32	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor.	m3	21		
	Risk of collapse of excavations:				
33	Sides of trench and hole excavations not exceeding 1.5m deep.	m2	210		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 95% Mod AASHTO density:				
34	Backfilling to trenches, holes, etc.	m3	10		
	PLUMBING & DRAINAGE				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Drainage, etc.:				
35	19mm Crushed stone encasing to pipes.	m3	78		
36	"BIDIM U24" geofabric filter blanket wrapped around 300 x 300mm stone encasing with 150mm side and 150mm end laps, including stitching.	m2	1,232		
	Perforated PVC-U (Class 12) drainage pipes:				
37	110mm Pipes laid in stone encasing (encasing elsewhere).	m	751		
	Carried Forward			R	

	Brought Forward				R
	Extra over perforated PVC-U (Class 12) drainage pipes for fittings:				
38	110mm Bend.	No	72		
	uPVC (Class 12) sewer and drain pipes:				
39	110mm Pipes vertically or ramped to cleaning eyes, etc. laid in trenches (elsewhere measured).	m	22		
	Extra over uPVC (Class 12) sewer and drain pipes for fittings:				
40	110mm Access coupling with screw end cap.	No	15		
41	110mm 45 degree bend.	No	15		
42	110mm 45 degree oblique tee.	No	15		
	Cast iron gratings, covers, etc.:				
43	100 x 230 x 230mm "Type 3B" or similar approved cast iron valve box with cover and frame complete.	No	15		
	HEAD WALL INCLUDING DISCHARGE BARRIER				
	Head and wing walls:				
44	Head and wing wall, overall size 895 x 2,225 x 550mm high (30MPa/19mm) including forming concrete footing and base, wood floating surfaces, Ref.245 fabric reinforcement, one brick wing walls (x2), size 800 x 525mm high and centre wall, size 900 x 525mm high, smooth plaster to sides of walls, tops, etc. with upright concrete projections, size 100 x 100 x 100mm high (no.5) complete.	No	2		
45	2,225 x 1,000 x 300mm Gabion basket complete.	No	2		
	SUNDRIES, ETC.				
	Municipal connection:				
46	Provide the sum of R 15,000.00 (Fifteen Thousand Rand) for municipal connection.		Item		
47	Profit.		Item		
	Carried Forward to Summary of Section No. 7				R

Section No. 7
Bill No. 7
STORMWATER MANAGEMENT, ETC.

Item No		Quantity	Rate	Amount

SECTION NO. 7
EXTERNAL WORKS (PROVISIONAL)
BILL NO. 8
SEWER NETWORK, ETC.

SUPPLEMENTARY PREAMBLES

The bidder is referred to the relevant clauses in the KwaZulu-Natal Department of Health **"STANDARD PREAMBLES TO ALL TRADES REV 3 - JANUARY 2009"** (available on request), to the Architectural and Structural/Civil Engineering specifications documents, to the drawings (which are to be read in conjunction with the architectural specification), and to all general and project-specific specifications as contained in the complete Bid Documents. Bidders are thus urged to study these documents as rates will be deemed to be inclusive of all requirements as included in same.

Further, should any discrepancy be noted between these Bills of Quantities and the Specifications, the Specifications shall take precedence.

Further to the above, Bidders are to note that the latest edition of SANS 10400, current at the time of the tender will form part of the specifications to this contract and as such, pricing shall be deemed to include for complete conformance in all respects to the requirements of SANS 10400.

Maintenance and guarantee:
Maintenance of efficient and safe working for a period of12 months after completion.

PVC-U pipes and fittings:
Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings.

Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings.

PVC-U pressure pipes and fittings:
Pipes of 50mm diameter and smaller shall be plain ended with solvent welded PVC-U loose sockets and fittings

Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be PVC-U and all other fittings shall be cast iron, all with similar push-in type joints

Carried Forward R

	Brought Forward			R	
	Laying, backfilling, bedding, etc. of pipes: Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with the relevant section of SANS 2001 **General:** Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 95% Mod AASHTO density and disposal of surplus material on site. Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) **As-built drawings:** Where required, the contractor shall prepare an updated set of as-built drawings. At completion of the contract the contractor shall hand these drawings to the principal agent for reproducing onto the originals for handing over to the employer (provision for allowance of as-built drawings elsewhere).				
	SOIL DRAINAGE				
	EARTHWORKS				
	(CPAP Work Group No.104, Unless Otherwise Stated)				
	Excavations:				
1	Excavation in earth not exceeding 1m deep for pipe trenches.	m3	217		
2	Excavation in earth exceeding 1m and not exceeding 2m deep for pipe trenches.	m3	123		
3	Excavation in earth exceeding 2m and not exceeding 3m deep for pipe trenches.	m3	46		
	Extra over for excavations in earth:				
4	Extra over excavations in pickable material for sewer pipe trenches, inspection chambers, etc. for excavations in soft rock.	m3	39		
	Carried Forward			R	

	Brought Forward			R	
5	Ditto, but in hard rock.	m3	19		
	Extra over all excavations for carting away:				
6	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor.	m3	385		
	Keeping excavations free of water:				
7	Keeping excavations free of water other than subterranean water.		Item		
	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density:				
8	Backfilling to pipe trenches.	m3	385		
	Imported earth filling supplied by the contractor, compacted to 98% Mod AASHTO density:				
9	Backfilling to pipe trenches with selected material compacted in 150mm layers to 93% Mod AASHTO density.	m3	148		
10	Selected granular filling in bedding under and filling around pipes.	m3	116		
11	19mm Crushed stone bedding under pipes.	m3	48		
12	Unreinforced concrete bedding (15MPa) under pipes.	m3	69		
	PLUMBING & DRAINAGE				
	(CPAP Work Group No.148, Unless Otherwise Stated)				
	Heavy duty (Class 34) uPVC sewer and drain pipes:				
13	160mm Pipes laid in trenches (elsewhere measured).	m	476		
14	160mm Pipes vertically or ramped to cleaning eyes, etc. laid in trenches (elsewhere measured).	m	44		
	Extra over heavy duty (Class 34) uPVC sewer and drain pipes for fittings:				
15	160mm Bend.	No	15		
16	160mm Junction.	No	8		
17	160mm Rodding eye.	No	12		
	Carried Forward			R	

	Brought Forward				R
18	160mm Inspection eye.	No	29		
	Cast iron:				
19	150 x 100mm, 45 degree cleaning eye with lid complete.	No	29		
	Pre-cast concrete gulleys, etc.:				
20	445 x 430 x 165mm High dished gulley with opening, size 125mm Diam. including setting into position and supply of circular PVC grating to suit opening complete.	No	4		
	Cast iron covers, etc.:				
21	"Type 4A" - 550mm Diam. mild duty manhole cover and frame, overall size 710mm diam. to suit manholes (elsewhere) complete.	No	15		
22	Lifting-key set for manhole covers (No.2) (handed to employer).	No	2		
	Precast concrete circular inspection chambers, including benching (covers elsewhere), excavations in earth, backfilling, risk of collapse, concrete, etc.:				
23	1,000mm Diameter inspection chamber not exceeding 1,000mm deep internally complete.	No	5		
24	1,000mm Diameter inspection chamber exceeding 1,000mm and not exceeding 2,000mm deep internally complete.	No	5		
25	1,000mm Diameter inspection chamber exceeding 2,000mm and not exceeding 3,000mm deep internally complete.	No	5		
	SUNDRIES, ETC.				
	Miscellaneous:				
26	850 x 450 x 300mm High concrete cover slab to cleaning eyes (elsewhere measured) complete.	No	29		
27	Cutting into side of existing inspection chamber for and connecting 160mm pipe, including inserting 160mm channel junction and making good concrete benching.	No	1		
	Municipal connection:				
28	Provide the sum of R 15 000.00 (fifteen thousand rand) for municipal connection.		Item		
	Carried Forward				R

Section No. 7
Bill No. 8
SEWER NETWORK, ETC.

	Brought Forward			R
29	Profit.	Item		
	Testing:			
30	Testing soil drainage system.	Item		
	Carried Forward to Summary of Section No. 7			R

Section No. 7
Bill No. 8
SEWER NETWORK, ETC.

SECTION SUMMARY - SECTION NO. 7: EXTERNAL WORKS (PROVISIONAL)

Carried to Final Summary R

Section No. 7

Item No		Quantity	Rate	Amount
	SECTION NO. 8 **PROVISIONAL SUM ALLOWANCES, ETC.** **BILL NO. 1** **PROVISIONAL SUM ALLOWANCES, ETC.**			
	SUPPLEMENTARY PREAMBLES			
	Note: 1. The following sums and amounts are *NET*. 2. Under no circumstances may any Provisional Sum be extended at an amount lower than the amount given in the bill. 3. Unless a specific percentage mark-up for Attendance is indicated in a rate column, the amount priced by the Contractor for Attendance against each Provisional Sum shall be deemed to be the Lump Sum and shall not be adjusted unless the scope of the sub contract varies significantly. 4. Provisional Sums contained here-in may be omitted or reduced at the employer's sole discretion and the Contractor shall not be entitled to claim for any loss by way of reductions or omissions or any discount, or percentage relating to Provisional Sums or PC amounts or any loss of profit related thereto.			
	PROVISIONAL SUM ALLOWANCES			
	ROOM SIGNAGE			
1	Provide the amount of R 70,000.00 (Seventy Thousand Rand) for the supply and installation of Room Signage complete.	Item		70,000.00
	ENTRANCE WALL SIGNAGE			
2	Provide the amount of R 50,000.00 (Fifty Thousand Rand) for the supply and installation of Entrance Wall Signage complete.	Item		50,000.00
	COMMUNITY LIAISON OFFICER			
3	Provide the amount of R 180,000.00 (One Hundred and Eighty Thousand Rand) for the complete requirements for a Community Liaison Offer.	Item		180,000.00
	Carried Forward		R	

	Brought Forward		R	
	SEPTIC TANK, SOAKAWAY & REED BED			
4	Provide the amount of R 500,000.00 (Five Hundred Thousand Rand) for the complete requirements for a Septic Tank, Soakaway & Reed Bed.	Item		500,000.00
	ATTENUATION TANK / DETENTION POND			
5	Provide the amount of R 300,000.00 (Three Hundred Thousand Rand) for the complete requirements for an Attenuation Tank / Detention Pond.	Item		300,000.00
	WATER TREATMENT			
6	Provide the amount of R 300,000.00 (Three Hundred Thousand Rand) for the Water Treatment complete.	Item		300,000.00
7	Profit.	Item		
8	Attendance.	Item		
	CARPORT STRUCTURE & COVERINGS			
9	Provide the amount of R 175,000.00 (One Hundred and Seventy-Five Thousand Rand) for the complete requirements for the Carport Structure & Coverings.	Item		175,000.00
10	Profit.	Item		
11	Attendance.	Item		
	TIMBER ROOF STRUCTURE AND ROOF SUPPORTS, ETC.			
12	Provide the amount of R 250,000.00 (Two Hundred and Fifty Thousand Rand) for the complete requirements for the Timber Roof Structures and Roof Supports, etc.	Item		250,000.00
13	Profit.	Item		
14	Attendance.	Item		
	ARTISAN TRAINING			
15	Provide the amount of R 450,000.00 (Four Hundred and Fifty Thousand Rand) for the complete requirements for Artisan Training.	Item		450,000.00
16	Profit.	Item		
	Carried Forward		R	

	Brought Forward		R	
17	Attendance.	Item		
	SECURITY ACCESS CONTROL, ETC.			
18	Provide the amount of R 740,000.00 (Seven Hundred and Forty Thousand Rand) for Security Access Control, etc.	Item		740,000.00
19	Profit.	Item		
20	Attendance.	Item		
	BOREHOLE INSTALLATION			
21	Provide the amount of R 700,000.00 (Seven Hundred Thousand Rand) for Borehole Installation complete.	Item		700,000.00
22	Profit.	Item		
23	Attendance.	Item		
	ELEVATED WATER STORAGE TANK INCL. TANK STAND			
24	Provide the amount of R 1,150,000.00 (One Million One Hundred and Fifty Thousand Rand) for the supply and installation of the Rainwater Storage Tank incl. tank stand complete.	Item		1,150,000.00
25	Profit.	Item		
26	Attendance.	Item		
	JOINERY & LOOSE FITTINGS			
27	Provide the amount of R 1,480,000.00 (One Million Four Hundred and Eighty Thousand Rand) for the supply and installation of Joinery & Loose Fittings complete.	Item		1,480,000.00
28	Profit.	Item		
29	Attendance.	Item		
	STRUCTURAL STEEL ROOF STRUCTURE AND ROOF SUPPORTS, ETC.			
30	Provide the amount of R 5,000,000.00 (Five Million Rand) for the complete requirements for the Structural Steel Roof Structure and Roof Supports, etc.	Item		5,000,000.00
	Carried Forward		R	

	Brought Forward			R
31	Profit.	Item		
32	Attendance.	Item		
	Carried to Final Summary			R

Section No. 8
Bill No. 1
PROVISIONAL SUM ALLOWANCES, ETC.

FINAL SUMMARY

Section No		Page No		Amount
1	SECTION NO. 1: PRELIMINARIES	29		
	SUB TOTAL		R	
2	SECTION NO. 2: BUILDING WORKS	98		
3	SECTION NO. 3: ELECTRICAL INSTALLATION (PROVISIONAL)	121		
4	SECTION NO. 4: SECURITY INSTALLATION (PROVISIONAL)	135		
5	SECTION NO. 5: ICT INSTALLATION (PROVISIONAL)	143		
6	SECTION NO. 6: MECHANICAL INSTALLATION	144		
7	SECTION NO. 7: EXTERNAL WORKS (PROVISIONAL)	191		
	SUB TOTAL		R	
8	SECTION NO. 8: PROVISIONAL SUM ALLOWANCES, ETC.	195		
	SUB TOTAL		R	

MONETARY PROVISIONS

Note:
The following monetary provisions have been made in the contract and must be omitted from the contract sum at the start of the contract and used as directed below.

These are monetary provisions only and the use, value and payment thereof are subject to adjustment based on actual costs through contractually approved variation orders and escalation costs calculated in terms of the prescribed contractual escalation calculations directives respectively.

ESCALATION

Provide the amount of R 3,800,000.00 (Three Million Eight Hundred Thousand Rand) for statutory increases (CPAP), to be adjusted, used and paid as instructed by the Client for and based on contractually calculated escalation per item 6.8.1 of the contract data of the Preliminaries Bill.	Item		3,800,000.00
Carried Forward		R	

FINAL SUMMARY

Section No		Page No		Amount
	Brought Forward		R	
	SUB TOTAL		R	
	ADD: VAT 15%		R	
	Carried to Form of Tender		R	

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

PART C3. SCOPE OF WORKS

C3.1 SCOPE OF WORKS
GCC FOR CONSTRUCTION WORKS (Edition 2 of 2010)

Scope of Works complied in accordance with SANS 10403 where reference is made to this part of SANS 1921-1:2004

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender no:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

SECTION 1

1 EXTENT OF THE WORKS

1.1 EMPLOYERS OBJECTIVES

Construction of a new very small Clinic with staff accommodation in the town of Mpolweni.

1.2 OVERVIEW OF THE WORKS

The works include the construction of a new very small clinic with staff accommodation. The clinic consists of the following areas:
- Guardhouse & Public Ablutions
- Administration
- Emergency & Support Services
- Services & Stores
- Promotive & Preventable
- Acute Care
- Chronic Care
- Youth & Outreach Office

1.3 EXTENT OF THE WORKS

The Construction of the Mpolweni Clinic with staff accommodation including external works (i.e. site works, bulk services, landscaping, fencing, paved roadways and parking, concrete walkways).

1.4 LOCATION OF THE WORKS

Ward 9 of the Umshwati Local Municipality

1.5 TEMPORARY WORKS

All temporary work to comply with the Occupational Health and safety Act (Act 85 of 1993)

2 ENGINEERING

2.1 EMPLOYER'S/CONTRACTOR'S DESIGN

Not applicable

2.2 DESIGN BRIEF

Not applicable

2.3 DRAWINGS

See list of Drawings/Annexures attached to this document

	2.4	**DESIGN PROCEDURES**
		Not applicable
3		**PROCUREMENT**
	3.1	**PREFERENTIAL PROCUREMENT PROCEDURES**
		This tender will be subject to the implementation of the Preferential Procurement Regulations, 2022 pertaining to the Preferential Procurement Policy Framework Act, Act Number 5 of 2000 and the relevant Supply Chain Management Legislation and the KwaZulu-Natal Supply Chain Management Policy Framework published by the KwaZulu-Natal Provincial Treasury. Tenderders are referred to www.kzntreasury.gov.za for access to the relevant documents. Tenderders are advised to familiarize themselves with the contents of the KwaZulu-Natal Supply Chain Management Policy Framework regarding Preference Point Systems, evaluation of tenders appeals and other matters.
	3.2	**RESOURCE STANDARD PERTAINING TO TARGETED PROCUREMENT**
		NOTE : This project will be adjudicated as exceeding R 50,000 000,00
	3.3	**SCOPE OF MANDATORY SUBCONTRACT WORK**
		Not applicable
	3.4	**PREFERRED SUBCONTRACTORS/SUPPLIERS**
		Not applicable
	3.5	**SUBCONTRACTING PROCEDURES**
		Not applicable
4		**CONSTRUCTION**
	4.1	**APPLICABLE SANS 2001 STANDARDS FOR CONSTRUCTION WORKS**
		The Contractor is referred to the "Model Preambles to Trades - 2008", any "Supplementary Preambles", the Electrical Specifications and Mechanical Specification for full descriptions of materials and methods referred to in these Bills of Quantities/Lump Sum documents, insofar as they apply. The Contractor is advised to study the "Standard Preambles to all Trades", any "Supplementary Preambles", the Electrical Specifications and Mechanical Specification, before pricing Bills of Quantities/Lump Sum documents. Where the description in the Bills of Quantities/Lump Sum documents differ from those in the Standard Electrical Specifications, the descriptions in the Bills of Quantities/Lump Sum documents are to apply. No claim whatsoever will be allowed in respect of errors in pricing due to brevity of description of items in the Bills of Quantities/Lump Sum documents which are fully described when read in conjunction with the relevant Preambles and/or Specifications. Suppliers of materials and the like, whose quality systems apply with one or more of the SABS/SANS ISO 9000 Series should be used whenever possible in the absence of a particular SABS/SANS Specification Standard Mark. Wherever the words "shall be deemed to be included in the description", "shall be stated" or other words having the same effect, appear in the Standard System, it shall be deemed that all descriptions in these Bills of Quantities/Lump Sum documents incorporated such inclusions and statements whether specifically stated or not. The Contractor is hereby informed that where SABS/SANS Specifications are referred to in these Bills of Quantities/Lump Sums documents and Specifications thereto, then ONLY the Specification of Work Clauses will apply. The method of measurement and payment clauses will NOT apply to this Contract.

The Contractor is hereby informed that risk of collapse and keeping excavations free from water (excluding subterranean water) generally are deemed to be included in the descriptions unless accommodated in the system of measurement. Please refer to the Geotechnical Investigation report when included at the end of these tender documents.
Whenever reference is made to "Sub-Contractor", "Nominated Sub-Contractor" or the like in the specifications included or referred to in these Bills of Quantities/Lump Sums documents, it shall be deemed to mean "Contractor" as defined.

4.2 APPLICABLE NATIONAL AND INTERNATIONAL STANDARDS

See above 4.1

4.3 PARTICULAR / GENERIC SPECIFICATIONS

The Contractor is referred to the following documents whether attached to this document or not:

SPECIFICATION	PAGES
Specification for HIV/AIDS Awareness (CIDB)	HIV1 TO HIV3
Specific Construction, Safety, Health and Environmental Plan	
Standard Preambles for all Trades (Rev 3) - DOH 2009	1 to 95
General Electrical Specification	E/1 to E/20
Lightning Protection Installation	LP/1 to LP/6

4.4 CERTIFICATION BY RECOGNIZED BODIES

Appointed consultants must be actively registered with their relevant professional discipline

4.5 AGRÉMENT CERTIFICATES

Not applicable

4.6 PLANT AND MATERIAL PROVIDED BY THE EMPLOYER

Not applicable

4.7 SERVICES AND FACILITIES PROVIDED BY THE EMPLOYER

None.

4.8 OTHER SERVICES AND FACILITIES

The Contractor shall provide any artificial lighting which may be necessary or required for the proper execution of the works, and provide electric power and water required by all Sub-Contractors, Nominated Sub-Contractors and Sub-Contractors appointed directly by the Administration.
The Contractor shall give all notices and pay all fees in connection with temporary electrical and water connections and shall connect temporary Electrical and Water meters for and pay for all current and water consumed.
The Contractor is advised that the permanent light fittings and water points of any kind installed in the Works are not to be used to provide temporary lighting and supplement water requirements for construction purposes.

5	**MANAGEMENT**
5.1	**APPLICABLE SANS 1921 STANDARDS** SANS 876:2016 - Cable terminations and live conductors within air-filled enclosures (insulation co-ordination) for rated a.c. voltages from 7,2 kV up to and including 36 kV. SANS 1874:2015 - Switchgear - Metal-enclosed ring main units for rated a.c. voltages above 1 kV and up to and including 36 kV. o The Occupational Health and Safety Act (Act 85, 1993) as amended o The control panel, associated components and wiring shall be installed in compliance with the latest, relevant and applicable standards. o SANS 10147: Refrigerating systems, including plants associated with AC systems o SANS 347: Categorization and conformity assessment criteria for all pressure equipment o SANS 10142: Code of Practice for Wiring of Premises o SANS 60947-1: 2005/IEC 60947-1: 2004 to SANS 60947-8: 2004/IEC 60947-8: 2004: Low voltage switch gear and control gear. o A Certificate of Conformity, in accordance with the OHS Act as amended and SANS 347, will be required for all refrigeration and air-conditioning works o KwaZulu-Natal Department of Health Policy on Design of Mechanical Installations o An Electrical Certificate of Compliance, in accordance with the OHS Act as amended, will be required for all Electrical Works. o The Machinery and Occupational Safety Act - Act 6/1983 o The Municipal by-laws and any special requirements of the Supply Authorities of the area or district concerned. o Local Fire Regulations. o All building works shall be in accordance with the Standard Preambles to All Trades. The contractor should fully familiarise himself with these documents prior to quoting.
5.2	**RECORDING OF WEATHER** The Contractor shall keep record of abnormal climatic conditions to facilitate the adjudication of claims for extension of the contract period.
	The Contractor shall allow in his programme 3 days per month for inclement weather (rain > 10mm per day) for the duration of the construction period.
5.3	**MANAGEMENT MEETINGS** In order to facilitate the smooth functioning of the Works and to ensure the closest co-operation between all the parties concerned, the Employer will call for regular meetings to be held on the site, at which a senior member of the Contracting firm and the General Foreman of the Works will always be required to be present. In addition to the above, other persons will be required to attend these meetings as and when their presence is necessary, e.g., Consultants in all disciplines, representatives of the various Sub-Contractors, etc. Proper minutes of these meetings will be kept by the Employer\Principal Agent and copies will be circulated to all persons attending the meetings and to others who need to be kept informed.
5.4	**FORMS FOR CONTRACT ADMINISTRATION** The Employer shall provide all necessary forms.
5.5	**ELECTRONIC PAYMENTS** The Contractor shall provide all required information to the Employer to facilitate electronic payments upon request.

5.6	**DAILY RECORDS** The Contractor shall keep daily records of people and equipment employed as well as a site diary in respect of work performed on the site. At the end of each week the Contractor shall provide the Principal Agent with a written record, in schedule form, reflecting the number and description of tradesmen and labourers employed by him and all Sub-Contractors on the works each day. At the end of each week the Contractor shall provide the Principal Agent with a written record, in schedule form, reflecting the number, type and capacity of all plant, excluding hand tools, currently used on the works.
5.7	**BONDS AND GUARANTEES** The Contractor shall within 10 calendar days after receiving notice from the Engineer and prior to receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the Employer's agent (whose details are given in the contract data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the Contract Data.
5.8	**PAYMENT CERTIFICATES** Requirements will be in accordance with the Employers prescriptions.
5.9	**PERMITS** The Contractor is advised that, in the case of an existing building or institution, all security measures in force will remain in operation and he must acquaint himself and his Employees with them as he and his Employees will at all times be subject to these measures. The Contractor will on no account extend his operations beyond the confines of the building site as indicated by the Employer and must ensure that all his Employees are made aware of these limits. Any Employee disregarding this instruction and found outside the limit of the building site without authority, shall be redeployed immediately and shall not again be employed on this Contract. The Contractor will be responsible for ensuring that this instruction is strictly enforced and must provide and remove upon completion or when directed, such other necessary temporary barriers, fences, etc., as may be required and is to allow opposite this item for any charges he may wish to make in this connection. The Employer will accept no responsibility whatsoever for damage to or the loss of plant, materials, etc., from the site.

5.10	**PROOF OF COMPLIANCE WITH THE LAW** The following certificates must be provided before first delivery is taken: - Electrical Compliance Certificate - Lightning Certificate - Electrical and Mechanical test certificates - SANS 10400-A:2010 compliance certificates - Latest National Building Regulation - Asbestos removal compliance certificates
5.11	**INSURANCE PROVIDED BY THE EMPLOYER** Not Applicable

SECTION 2

SPECIFICATION DATA ASSOCIATED WITH SANS 1921-2004

Clause Numbers	
4.1.7	**The requirements for drawings, information and calculations for which the Contractor is responsible are:**
	0
4.2.1	**The responsibility strategy assigned to the Contractor for the works is:**
	Strategy A
4.2.2	**The structural engineer is:**
	0
4.2.3	**Drawings & other info are to be submitted in accordance with the contractors programme**
	Not applicable
4.3	**The planning, programme and method statement are to comply with the following:**
	N/A
4.12.1	**Samples of materials**
	The work is to be executed with materials of the best specified and in the most substantial and workmanlike manner under the inspection of the Employer and to his satisfaction. The Contractor shall furnish, without delay, such samples as called for or may be called for by the Employer, who may reject all materials or workmanship not corresponding with the approved sample. The samples of materials, workmanship and finishes that the Contractor is to provide and deliver to the employer are: TBC
4.12.2	**Fabrication drawings that the contractor is to provide to the employer are:**
	None

4.12.3	**Office accommodation, equipment, accommodation for site meetings and other facilities for use by the employer and his agents are:**
	OFFICE FOR FOREMAN
	Provide, erect, maintain and remove at completion a suitable temporary office for the Contractor or his Foreman, perfectly secured, lighted and ventilated and having a desk with drawers.
	TELEPHONE
	The Contractor shall provide a telephone on the site for the use of the Contractor and all Sub-Contractors for the duration of the Contract, and must make the necessary application for connection, give all notices and pay all fees, rentals and charges for the service and also for all calls.
	OFFICE FOR INSPECTOR OF WORKS
	Provide, erect, maintain and remove at completion a well constructed temporary office for the Inspector of Works not less than 4 x 3 m on plan and 3 m high to eaves to the approval of the Employer. The office shall be constructed of wood framing covered externally with corrugated iron or corrugated asbestos and with a lean-to roof covered with the same material as the external wall covering. The office shall be lined internally with soft board or other approved material and a ceiling shall be provided of the same material as the internal lining. A suspended wood floor shall be provided and is to finish not less than 300 mm above the ground level. A lockable door and a window, which provides adequate light and ventilation, shall be fitted. An office constructed of 115 mm thick brick-work and provided with a screeded concrete floor and roofed and ceiled as above described may be accepted as an alterative but prior permission of the Employer will be necessary before construction of such an office is commenced and his requirements shall be stated and fulfilled by the Contractor. The office shall be fitted in an approved manner with a sloping topped desk of height and length suitable for the laying out and studying of drawings, a desk or table with not less than two lock-up drawers, shelves, seating and wash-stand, and the Contractor shall provide all necessary attendance.
	TELEPHONE IN OFFICE FOR INSPECTOR OF WORKS
	The Contractor shall arrange for the installation of a lockable telephone in the Office for the Inspector of Works for the duration of the Contract. The Contractor will be required to make the necessary application for connection and give all notices on behalf of the Employer. The Employer will, however, be responsible for the direct payment of all fees, rentals and other charges by Telkom for the service for the Inspector of Works and for all calls made from this telephone.
	SHED
	Provide, erect, maintain and remove at completion, ample temporary sheds for the proper storage of materials and for the use of the workmen, and remove when no longer required.
4.14.6	**The requirement for provision and erection of signboards are:**
	Supply, erect, maintain and remove at completion a painted notice board, size overall 2800 x 2345 mm high sign written to detail as Drawing No. T9506 which drawing is available from offices of the Department of Public Works. Only the official notice board is to be displayed on the site and no Sub-Contractor's boards will be permitted. The Contractor, at his own cost, may provide a board on which all sub-contract firms' names may be sign written. The notice board is to be to the approval of the Employer and is to be maintained in first class condition and placed where directed at the entrance to the site and remain there for the duration of the Contract.

4.17.1	**Requirement for the termination, diversion or maintenance of existing services:**
	Should the Contractor come in contact with any underground cables or pipes during excavations, immediate notification must be made to the Employer and all work in the vicinity of such cables, pipes, etc., shall cease until authority to proceed has been obtained from the Employer. Should the Contractor damage underground cables or pipes resulting in a disruption of services to an existing institution such damage shall be repaired immediately.
4.17.3	**Services which are known to exist on the site:**
	Investigate and provide detail drawings.
4.17.4	**Requirement for detection apparatus**
	None
4.18	**ADDITIONAL HEALTH AND SAFETY REQUIREMENTS ARE:**
	By the submission of a tender, any Tenderder will, if awarded the contract to which this tender document relates, be deemed to be the mandatory as envisaged by Section 37 (2) of the Act. As a mandatory the successful Tenderder will be deemed to be the “principal contractor” and an employer in his/her/their own right with duties as prescribed in the Act and accordingly will be deemed to have agreed to be solely responsible for ensuring that in connection with the service to which this tender document relates, all work will be performed and machinery and plant used in accordance with the Act. Should the Contractor, for whatever reason be unable to perform as required by the Act, the Contractor undertakes to inform the Employer accordingly. Tenderders are advised that it is a Condition of this Tender that a 'Construction Phase Safety, Health and Environmental Plan' specifically relates to the project for which tenders are being submitted and must be prepared by the Tenderder and submitted with the other tender documents at the time of tender. Failure to do so Tenderders are therefore advised to study the 'Construction Safety, Health and Environmental Specification' which is issued as part of this tender document, the Model Preambles to Trades - 2008, any project Specification included in this tender document and any and all drawings which are referred to and issued as part of this tender document before preparing their own project specific 'Construction Phase Safety, Health and Environmental Plan' . Tenderders are also advised that such a plan which is submitted with a tender but is incomplete or considered inadequate by the Employer or his Representative will invalidate the tender. The Contractor will be deemed to have satisfied himself with his obligations in terms of the Act and to have allowed for all costs arising from compliance with the Act as no claim for extra costs arising from compliance with, and obligations in terms of the Act will be entertained.
4.22	**WORK BY NOMINATED AND SELECTED SUBCONTRACTORS COMPRISE:**
	List of applicable sub-contractors to be compiled post award.

C3.2 - SPECIFICATION FOR HIV/AIDS AWARENESS

1 Scope

This generic specification contains requirements applicable to the reduction of the risk of transfer of the HIV virus between and among construction workers and the local community through the following four strategies:

a) raising awareness about HIV/AIDS;

b) providing construction workers with access to condoms;

c) HIV counselling, testing and referral services; and

d) Sexually Transmitted Infection diagnosis and treatment.

2 Normative references:

The following standard contains provisions that, through reference in this text, constitute provisions of this standard:

SANS 4074 ISO 4074, *Condom Rubbers*

3 Definitions and Abbreviations

3.1 Definitions

Construction Worker: all persons in the employ of the contractor or in the employ of any of the subcontractors contracted by the contractor.

Local Community: the communities local to the site which are most likely to have contact with the construction worker and, in particular, sex workers in those communities.

Service provider: the natural or juristic person recognised by the South African Department of Health as specialist in conducting Aids Awareness Programmes.

3.2 Abbreviations

STI: Sexually transmitted infection

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immune Deficiency Syndrome

4 Objectives

The objectives are to:

a) reduce the risk of transfer of the HIV virus between and among construction workers and the local community;

b) raise awareness amongst construction workers and the local community of the risk of infection with the HIV virus;

c) promote early diagnosis; and

d) assist affected individuals to access care and counselling.

b) either place and maintain HIV/AIDS awareness posters of size of not less than A1 in areas which are highly trafficked by construction workers, or provide construction workers with a pamphlet, in languages largely understood by construction workers, which

c) encourage voluntary HIV/STI testing;

d) provide information concerning counselling, support and care of those that are infected services; and

e) comply with the requirements of 5.2.

***The* provisions *of* 5.1 c) *and d) do not apply to* this contract.**

5.2 HIV awareness programme

5.2.1 The contractor shall:

a) engage a qualified service provider as described in the scope of works to conduct an HIV Awareness Programme which is structured to achieve the outcomes stated in 5.2.3 for contract workers as soon as a construction workers camp is established and populated or, where no such camp is established, within two weeks of the commencement of a significant portion of the works and at subsequent intervals, if any, provided for in the scope of works; and

b) arrange for, provide a suitable venue, and instruct all construction workers to attend the HIV Awareness Programme and notify the Employer's Representative of the date, time and venue whenever a session with construction workers is conducted.

Note: The National Department of Public Works maintains a list of qualified service providers.

5.2.2 The contractor shall do nothing to dissuade construction workers from attending such an HIV Awareness Programme and shall take all reasonable steps to ensure that a minimum of 90% of construction workers engaged in the works attend such a programme, when it is conducted.

5.2.3 The outcomes of the HIV Awareness Programme shall as a minimum, result in contract workers exposed to such a programme being able to:

a) communicate the existence of problems of HIV and be able to outline the consequences of transmission of HIV to or from the local community;

b) recall and communicate the mode of HIV transmission and preventative measures including the proper use of the condom.

The HIV/ Aids awareness programme described in 5.2 is to be repeated at four month intervals throughout the duration of the contract. (Four times in total, including the initial one at the start of the contract)

5.3 Reporting

5.3.1 The contractor shall prepare and attach to his claims for payment a brief report which outlines how the actions taken by the contractor in the period for which payment is claimed satisfy the requirements and a schedule which lists the names, identity numbers, trade / occupation and name of employer of all construction workers exposed to the programme (see **HIV/STI Compliance Report**).

5.3.2 The employer's representative shall certify the report and schedule described in 5.3.1 whenever a claim for payment is issued to the employer.

Note: In the event that the contractor fails to satisfy the requirements of this specification, the employer (Head: Public Works) may apply any of the sanctions provided for in the contract. Sanctions may include the application of a financial penalty of .04% of the Contract Sum.

The *HIV /Aids* awareness programme *described* in 5.2 shall in addition *be conducted* for the benefit *of* the local community on two occasions in the community centre nearest to the building site. The contractor shall be *responsible* for inviting identifiable community-based *institutions and organisations, churches, and schools to participate in the* programme.

C3.3 - HIV/STI COMPLIANCE REPORT

Pro-forma reporting format in terms of the SPECIFICATION FOR HIV/AIDS AWARENESS

Project Code:	0		
Payment Claim number:		Period covered by payment claim:	

1. Distribution of condoms (briefly describe where and how condoms are distributed).

2. Posters / pamphlets (briefly describe where posters were placed / how pamphlets were distributed).

3. Voluntary testing (briefly describe the actions taken / information provided to promote testing).

4. Counselling, support and care (summarise information provided).

5. HIV awareness programme (briefly describe action).

6. Schedule of construction workers exposed to the HIV awareness programme.

Name	Identity number	Trade / occupation	Name of employer

I hereby declare the above to be a true reflection of actions taken to ensure compliance with the specification.

For Contractor:

Name: _____

Signature: _____

Date: _____

Employer's representative:

Name: _____

Signature: _____

Date: _____

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MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

PART C4. SITE INFORMATION

C4.1 SITE INFORMATION
GCC FOR CONSTRUCTION WORKS (2 Edition of 2010)

Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Tender No.	**ZNB5526/2023-H**	**Project Code:**	**N/A**

C4.1 Site Information

C4.1 GENERAL

(a) The site is situated in a well populated area surrounded by houses, a community hall and sports field across the road. The site is slightly sloping and grassed. It has a number of large trees, small rocky outcrop, bollards and gravel tracks which run through from the surrounding houses to the tar road. The tar road runs right along the entire front side of the site.

(b) 0

(c) 0

C4.2 GEOTECHNICAL INVESTIGATION REPORT

(a) Please refer to Annexure No.8

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PART C5 - DRAWINGS / ANNEXURES

C5.1 - LIST OF DRAWINGS/ANNEXURES

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Tender No.:	**ZNB5526/2023-H**	**Project Code:**	**N/A**

The following drawings/annexure's shall be issued during the Tender period to form part of the tender documentation. Where applicable, drawings/annexure's could be re-issued to the Contractor at commencement of the construction phase.

DRAWING NO	**DESCRIPTION**
PS2023-07-SP-000-01	Site Plan
PS2023-07-SP-100-01	Floor Plan
PS2023-07-SP-200-01	Sections
PS2023-07-SP-300-01	Elevations
PS2023-07-SP-310-01	Staff Accommodation Elevations
PS2023-07-WD-110-00	Clinic: Block A, B & H Floor Plan
PS2023-07-WD-120-00	Clinic: Block C & D Floor Plan
PS2023-07-WD-130-01	Clinic: Block E, F & G Floor Plan
PS2023-07-WD-150-01	Clinic: Ceiling Plan
PS2023-07-WD-160-01	Clinic: Roof Plan
PS2023-07-WD-270-00	Clinic Block H: Sections H1 & H2
PS2023-07-WD-370-00	Clinic Block H: Elevations
PS2023-07-WD-200-00	Clinic Block A: Sections A1 & A2
PS2023-07-WD-210-00	Clinic Block B: Sections B1, B2 & B3
PS2023-07-WD-220-00	Clinic Block C: Sections C1
PS2023-07-WD-230-00	Clinic Block D: Sections D1
PS2023-07-WD-240-00	Clinic Block E: Sections E1 & E2
PS2023-07-WD-250-00	Clinic Block F: Sections F1, F2 & F3
PS2023-07-WD-260-00	Clinic Block G: Sections G1, G2 & G3
PS2023-07-WD-300-00	Clinic Block A: Elevations
PS2023-07-WD-310-00	Clinic Block B: Elevations
PS2023-07-WD-320-00	Clinic Block C: Elevations
PS2023-07-WD-330-00	Clinic Block D: Elevations
PS2023-07-WD-340-00	Clinic Block E: Elevations
PS2023-07-WD-350-00	Clinic Block F: Elevations
PS2023-07-WD-360-00	Clinic Block G: Elevations
PS2023-07-WD-100-00	Clinic: Floor Plan
PS2023-07-WD-500-00	Clinic: Door Schedule
PS2023-07-WD-501-00	Clinic: Door Schedule
PS2023-07-WD-510-00	Clinic: Window Schedule
PS2023-07-WD-511-00	Clinic: Window Louvre Schedule
PS2023-07-WD-180-00	Staff 1 Bed: Floor, Ceiling & Roof Plan, Section K1
PS2023-07-WD-190-00	Staff 2 Bed: Floor, Ceiling & Roof Plan, Section L1
PS2023-07-WD-380-00	Staff 1 - Bed Block K: Elevations
PS2023-07-WD-390-00	Staff 2 - Bed Block L: Elevations
PS2023-07-WD-280-00	Clinic Block M: Sections M1
PS2023-07-WD-281-00	Clinic Block M: Sections M2
PS2023-07-WD-505-00	Clinic: Gate Schedule & Fence Spec
PS2023-07-WD-520-00	Staff: Door & Window Schedule
PS2023-07-WD-531-00	Clinic: Fittings Schedule
PS2023-07-WD-532-00	Clinic: Sanitaryware Schedule

ANNEXURES	
Annexure 1	General Electrical Specifications
Annexure 2	Lightning Protection Specifications
Annexure 3	Map of Tender submission location
Annexure 4	Joint Venture Agreement
Annexure 5	Health and Safety Specification
Annexure 6	Health and Safety Bill of Quantities
Annexure 7	Builders Lien Agreement
Annexure 8	Geotechnical Investigation Report (If applicable)
Annexure 9	EPWP Employment Contract
Annexure 10	Attendance Register - Infrastructure and Other projects
Annexure 11	EPWP Data Collection tool for Phase 3 system

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ANNEXURES

ANNEXURE 1

MPOLWENI CLINIC: CONSTRUCTION OF NEW VERY SMALL CLINIC WITH STAFF ACCOMMODATION

STANDARD

ELECTRICAL SPECIFICATIONS

SECTION A: PREAMBLE TO STANDARD SPECIFICATIONS

SECTION B: INSTALLATION SPECIFICATIONS

TABLE OF CONTENTS

DESCRIPTION **PAGE NO.**

SECTION A

A.1 PRE-AMBLE TO STANDARD SPECIFICATION FOR ELECTRICAL INSTALLATIONS

GENERAL

1. INTRODUCTION

(a) These Standard Specifications cover the general technical requirements for the equipment, materials, installation, testing, commissioning and maintenance of electrical installations for the Engineer. These requirements shall be read in conjunction with the Documents as specified below.

(b) "Document" shall mean the complete set of contract documents, including the Engineer's Tender Conditions, Tender Qualifications, the Standard Specification and the Detail Technical Specification including all drawings and variation orders issued in terms of the contract.

(c) "Contractor" shall mean the person, partnership, company or firm appointed for the supply, installation, testing, commissioning and maintenance of the Electrical Installation. In the case of the Electrical Installation being a sub-contract, nominated in terms of the Main Contract or otherwise, the word "Contractor" shall also mean "Sub-Contractor" in terms of the Sub-Contract Conditions for the specific installation. Where applicable the Builder or Principal Contractor shall be referred to as "Main Contractor".

2. INSTALLATION WORK

(a) The complete installation shall comply with the requirements of this Specification. Should any discrepancies or contradictions exist between this specification and the Detail Technical Specification for the specific installation, then the latter shall take precedence.

In the event of discrepancies between the drawings, specifications and bill of quantities the Engineer shall decide whether the work as executed shall be re-measured on site or whether re-measurement shall be effected from the working drawings only.

(b) The Engineer's authorised representative will inspect the installation from time to time during the progress of the work. Discrepancies will be pointed out to the Contractor and these shall be remedied at the Contractor's expense. Under no circumstances shall these inspections relieve the Contractor of his obligations in terms of the Documents.

(c) The Contractor shall notify the Engineer timeously when the installation reaches important stages of completion (e.g. before closing cable trenches, before casting concrete, etc.) so that the Engineer's authorised representative may schedule his inspections in the best interest of all parties concerned.

3. REGULATIONS

(a) The installation shall be erected and tested in accordance with the Acts and Regulations as indicated in PW 379 or PW 379 (Civil) – “Standard Conditions in respect of the Supply-, Delivery and Installation of Electrical-, Mechanical-, Pneumatic- and Vacuum Operated Equipment, Control Systems, Plant and Materials”.

(b) The Contractor shall issue all notices and pay all of the required fees in respect of the installation to the authorities, and shall exempt the Engineer from all losses, claims, costs or expenditures which may arise as a result of the Contractor's negligence in complying with the requirements of the regulations.

(c) It shall be assumed that the Contractor is conversant with the above-mentioned requirements. Should any requirement, by-law or regulation, which contradicts the requirements of this Document, apply or

become applicable during erection of the Installation, such requirement, by-law or regulation shall overrule this Document and the Contractor shall immediately inform the Engineer of such a contradiction. Under no circumstances shall the Contractor carry out any variations to the installation in terms of such contradictions without obtaining the written permission to do so from the Engineer.

4. SITE CONDITIONS

Tenderers are advised to visit the site and acquaint themselves with all local conditions pertaining to the execution of the installation before tender closing date. No claims from the Contractor which may arise from insufficient knowledge of site access, type of site, labour conditions, establishment space, transport and loading/unloading facilities, power and water supply, etc. will be considered after submission of tenders.

For services where prior permission is required before contractors can visit the site, a visit will be arranged for all interested parties.

5. ARRANGEMENTS WITH THE SUPPLY AUTHORITY

(a) The contractor shall give all notices required by and pay all necessary fees, including any inspection fees, which may be due to the local Supply Authority unless specified to the contrary.

(b) It shall be the responsibility of the Contractor to make the necessary arrangements with the local Supply Authority at his own cost and to supply the labour, equipment and means to inspect, test and commission the installation to the satisfaction of the Local and Supply Authorities.

(c) The Contractor shall supply and install all notices and warning signs that are required by the relevant laws, regulations and/or the Documents.

6. MATERIAL AND EQUIPMENT

(a) All material and equipment shall conform in respect of quality, manufacture, tests and performance, with the requirements of the South African Bureau of Standards or where no such standards exist, with the relevant current Specification of the British Standards Institution.

(b) All material and equipment shall be of high quality and suitable for the conditions on site. These conditions shall include weather conditions as well as conditions under which materials are installed, stored and used. Should the materials not be suitable for use under temporary site conditions then the Contractor shall at his own cost provide suitable protection until these unfavourable site conditions cease to exist.

(c) The Contractor shall, where requested to do so, submit samples of equipment and material to the Engineer for approval prior to installation. Samples may be retained in the Engineer's possession until the contract is completed after which they will be returned.

7. CONNECTIONS INVOLVING ALUMINIUM (CABLES AND TRANSFORMERS)

As a result of the fact that aluminium flows when subjected to pressure and electrical connections based on this principle thus loses proper contact during the course of time, it should be noted that bolted connections between aluminium and copper or any other metal is not acceptable to this Engineer.

8. CODES OF PRACTICE OR STANDARD SPECIFICATION

Where reference is made to any Code of Practice or Standard Specification in this document the latest edition or amendment shall be applicable, except where specified to the contrary.

SECTION B.1

B.1 INSTALLATION AND TERMINATION OF CONDUITS AND CONDUIT ACCESSORIES

1. GENERAL

1.1 SCOPE

1.1.1 This section covers the installation of conduits and conduit accessories in buildings and other structures under normal environmental conditions and for system voltages up to 600 V.

1.1.2 The following types of conduit installations are included:

(a) Screwed metallic conduit - black enamelled and galvanised.

(b) Plain-end metallic conduit - black enamelled and galvanised.

(c) Non-metallic conduit.

(d) Flexible conduit.

1.1.3 Conduits may be installed as follows:

(a) In open roof spaces.

(b) Cast in concrete.

(c) Surface mounted against walls, concrete slabs, etc.

(d) In wall chases.

1.1.4 Where conduits are to be installed in concrete, this shall be undertaken while the building work is still in progress. Conduits may only be surface mounted where specified or where the Engineer has given its written consent.

1.1.5 Under no circumstances will conduit having a wall thickness of less than 1,6mm be allowed in screeding laid on top of concrete slabs.

1.1.6 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 Engineer's inspectorate staff, be completely removed and rectified and any wiring already drawn into such damaged conduits must be completely renewed at the contractor's expense.

1.1.7 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 Engineer to any claim submitted by the contractor, which may result from a lack of knowledge in regard to the supply authority's requirements.

1.1.8 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 part 2 of this specification or indicated on the drawings.

1.2 OTHER SERVICES

Conduits may not be installed closer than 150 mm to pipes containing gas, steam, hot water or other materials, which may damage the conduits or conductors. Conduits may not touch pipes of other service installations in order to prevent electrolytic corrosion. Where this is unavoidable, cathodic protection shall be provided.

Conduit and conduit accessories used for flame-proof or explosion proof installations and for the suspension of luminaries as well as all load bearing conduit shall in all instances be of the metallic screwed type.

2. SCREWED METALLIC CONDUIT

2.1 GENERAL

2.1.1 In general, screwed steel conduit shall be used in the wiring of buildings.

2.1.2 The installation shall comply with SANS 10142.

2.2 GALVANISED CONDUIT

Galvanised conduit and accessories shall be used in the following:

(a) In damp areas.
(b) In areas exposed to the weather.
(c) For all installations within 50 km of the coast.
(d) In plenum chambers containing humidifying equipment.
(e) For surface mounted conduit installations in kitchens and boiler rooms.
(f) In screeds resting directly on soil.
(g) For connection points to future installations.
(h) For underground conduit containing earthing conductors.
(I) In buildings where animals are housed such as cattle, sheep, dogs, etc.

2.3 TERMINATIONS

2.3.1 Spouted Connections.

Conduits shall be connected directly to draw-boxes with spouted connections. Conduits shall be screwed tightly home and no threads shall be visible.

2.3.2 Switchboards, Power skirting, etc.

Conduits shall be terminated by means of a brass female bush and two locknuts in pressed steel switchboards and distribution boxes, cable ducts, power skirting, etc. The conduit end shall only project far enough through the entry hole to accommodate the bush and locknut. Alternatively the method detailed in 2.3.3 may be used.

2.3.3 Draw-boxes.

A female bush and two locknuts 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.

2.3.4 Holes.

Holes to accommodate brass bushes shall be large enough to accommodate the bush with a minimum of clearance.

2.3.5 Bush-nuts.

Bush-nuts for the connection of earth conductors to conduits are not acceptable.

2.4 SCREWS, BOLTS AND NUTS

Steel locknuts of thick gauge steel with milled sides shall be used in all cases. Cadmium-plated bolts and nuts shall be used except where the installation is exposed to the weather in which case brass bolts and nuts shall be used. Screws shall be installed in all tapped holes in fittings and accessories to prevent damage to the screw thread by concrete or plaster. The screws shall be screwed completely down to prevent damage to the thread on the screw.

2.5 CONDUIT ENDS

Conduit ends shall be cut at right angles to ensure that ends butt squarely at joints. Threads shall not be visible at joints and connections except at running joints. The total length of the thread on the two conduit ends shall not exceed the length of the coupling.

2.6 JOINTS

All conduit ends shall be reamed and all joints tightly screwed. Only approved couplings shall be used. Running joints with long threads shall be kept to a minimum and locknuts shall be provided to ensure a strong mechanical and a continuous electrical joint. 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.

2.7 FINISH

All joints shall be painted with red lead to prevent them from rusting in damp areas, areas within 50 km of the coast and in cases where the installation is exposed to the weather for any length of time. Where the galvanising or black paint has been damaged, the area shall first be cleaned and a coat of zinc base paint applied subsequently. Additional coats of paint shall only be applied after the undercoat has completely dried. All surface mounted non-galvanised metallic conduit must be painted. (Refer to par. 8.8 of Section B1).

2.8 CONTINUITY

Mechanical and electrical continuity shall be maintained throughout the conduit installation.

3. PLAIN-END METALLIC CONDUIT

As an alternative to the screwed conduit, plain-end conduit complying with the Engineer's standard specification for "CONDUITS AND CONDUIT ACCESSORIES", par. 7 of Section CI, may be installed subject to the following additional conditions:

3.1 Bending and setting of plain-end conduit must be done with special benders and apparatus manufactured for this purpose and which are obtainable from the suppliers of the system. Damaged conduit resulting from the use of incorrect bending apparatus shall be completely removed and any wiring already drawn into such damaged conduits shall be completely renewed at the Contractor's expense.

3.2 Screwed conduit must be used in the following instances:

(a) In flameproof installations.
(b) Load bearing conduit.
(c) For the suspension of luminaries.
(d) Surface mounted conduit.

3.3 Plain-end conduit and associated accessories shall be manufactured of mild steel having a minimum thickness of 1,2 mm and shall comply with SANS 1065. Conduit manufactured of lighter gauge material, i.e. 0,97 mm, will not be permitted.

3.4 All conduit and accessories used in areas within 50 km of the coast shall be hot-dip galvanised to SANS 32 & 121. In inland areas Electro-galvanised or cadmium-plated accessories will be accepted.

4. NON-METALLIC CONDUIT

4.1 INSTALLATION CONDITIONS

Where specified for a particular service, non-metallic conduit may be installed under the following conditions:

4.1.1 All non-metallic conduit shall comply fully with SANS 950 and shall be installed in accordance with Appendix C of the same specification as well as SANS 10142.

4.1.2 Insulated heat-resistant boxes shall be used for outlets of totally enclosed luminaries and other fittings where excessive temperatures are likely to occur.

4.1.3 Luminaries and other fittings shall not be supported by non-metallic conduit or conduit boxes. These fittings shall be secured to the surrounding structure in a way that is acceptable to the Engineer. Refer to the Engineer's standard specification for "INSTALLATION OF LUMINAIRES", Section B9.

4.1.4 The conduit shall be supported and fixed with saddles with a maximum spacing of 1 m, even in roof spaces. (Refer to SANS 10142.) The Contractor shall supply and install all additional supporting timbers required.

4.1.5 It shall be possible to rewire the completed installation in the future without undue difficulty.

4.1.6 Non-metallic conduit and fittings shall not be used under the following conditions:

(a) Outside a building (unless protected, or sheltered under eaves).

(b) For mechanical load bearing.

(c) Where they may be subjected to temperatures below -10°C or above 70°C for prolonged periods.

(d) As primary electrical insulation.

(e) In areas where they may be subject to mechanical damage.

(f) For applications other than those for which they are designed.

(g) In concrete slab unless specified to the contrary.

4.2 PAINTING OF CONDUITS

Exposed conduit may be painted with normal oil or PVA paints, but care must be taken to ensure that the paint used does not contain any component that will soften or have any other detrimental effect on the materials from which the conduit and fittings are manufactured.

4.3 CONNECTING OF CONDUIT TO METAL EQUIPMENT/COMPONENTS

When any part of a non-metallic conduit system has to be connected to metal equipment or components (e.g. switchboard, surface socket-outlet or switch box, existing metallic conduit system, etc.) fittings and joints manufactured specifically for this purpose must be used. Non-metallic conduit must not be threaded to fit metallic connectors.

4.4 BENDS

In conduit of nominal size not exceeding 25 mm, bends may be made in accordance with par. 4.5. In all other cases bends must be achieved by the use of accessories that are introduced into the conduit run. Bends shall comply with SANS 10142.

4.5 BENDING

Conduit of nominal size up to and including 25mm may be cold bent by hand provided that the radius of the bend is greater than six times the nominal size of the conduit, and that the external angle of the bend does not exceed 90°. The procedure (which involves the use of a bending spring) should be as follows:

(a) Determine the angle through which the conduit is to be bent.

(b) Warm the cold conduit over the length to be bent by rubbing with hands.

(c) Select a bending spring which matches the conduit size and insert in to the conduit at the point where the bend is required.

(d) Bend the conduit slowly with one motion (either with the hands alone approximately 1 m apart, or across the knee) to double the required angle, release the conduit and, when its position is stable, withdraw the bending spring (turning it in an anti-clockwise direction to reduce its diameter) and gently correct the angle.

(e) Install and secure the conduit immediately following bending.

4.6 ADHESIVE JOINTS

All adhesive joints must be made in a clean dry area. The surfaces of all components to be bonded must be dry and clean.

The insertion depth should be marked on the conduit end and the adhesive applied (by means of a soft clean brush) as quickly as possible to the surfaces to be bonded by brushing lengthwise along the conduit, ensuring that a thin coating of uniform thickness is formed. The joint must be made immediately after the application of the adhesive by pushing the prepared parts squarely together with a twisting motion to the full insertion depth. Care must be taken to avoid squeezing adhesive into the cableway and all excess adhesive must be wiped off.

NOTE: Solvent adhesives contain highly volatile liquids and their containers should not be left open.

4.7 Cutting

A fine-tooth hacksaw should be used to cut conduit to the required length. Each cut end should be square and free from swarf, burrs and loose material. When determining the length of conduit to be cut, allowance must be made for the length of couplings or accessories attached to the conduit. Incorrect determination will cause bulging of the conduit or insufficient joint length.

5. FLEXIBLE CONDUIT

5.1 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 connections and where otherwise required by the Engineer, flexible conduit shall be used for the final connection to the equipment.

5.2 The installation shall comply with SANS 10142.

5.3 Flexible conduit shall preferably 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.

5.4 Flexible conduit shall consist of metal-reinforced plastic conduit or PVC-covered metal conduit with an internal diameter of at least 15mm, unless approved to the contrary. In false ceiling voids, flexible conduit of galvanised steel construction may be used. connectors for coupling to the flexible conduit shall be of the gland or screw-in type, manufactured of either brass or mild steel plated with either zinc or cadmium.

6. INSTALLATION REQUIREMENTS

6.1 POSITIONS OF OUTLETS

All accessories such as boxes for socket-outlets, switches, lights, etc. shall be accurately positioned. It is the responsibility of the Contractor to ensure that all outlets are installed level and square, at the correct height from the floor, ceiling or roof level and in the correct position relative to building lines and equipment positions as specified. It shall be the responsibility of the Contractor to determine the correct final floor, ceiling and roof levels in conjunction with the Main 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.

6.2 COVER PLATES

All draw-boxes and outlets shall be fitted with cover plates, either as part of the switch or socket assembly or with blank cover plates if unused. Blank cover plates shall match other cover plates in the same area. Flush mounted cover plates in both ceilings and walls shall overlap the draw-box and edges of the recess. If the fixing lugs are substantially deeper than the finished wall surfaces, suitable coiled steel wire or tubes shall be used as spacers.

6.3 DRAW-WIRES

Galvanised steel draw-wires shall be installed in all unwired conduits e.g. conduits for future extensions, telephone installations and other services.

6.4 BENDS

A maximum of two 90 bends or the equivalent displacement will be allowed between outlets and/or boxes.

Draw-boxes shall be installed at maximum intervals of 15 m in straight runs. All bends shall be made without heating the conduit or without reducing the diameter of the conduit. The inside radius of a bend shall not be less than five times the outside diameter of the conduit. (Refer to SANS 10142,

6.5 WALL SOCKET-OUTLETS

Where more than one socket-outlet is connected to the same circuit, the conduit shall be looped from one outlet box to the following on the same circuit. Where a metal channel is used, the conduit may be installed from the channel directly to the outlet box on condition that the conductors can be looped from one outlet to the next without making any joints in the wires.

6.6 LUMINAIRES

Where the conduit end is used to support luminaries, a ball-and socket type lid shall be fitted to the pendant box in all cases where the conduit is longer than 500 mm. In all other cases a dome lid may be used. Where luminaries are specified which are fixed directly to the pendant box, the pendant box shall be fixed independently of the conduit installation except where the pendant box is cast into concrete.

6.7 FLUSH MOUNTED OUTLET BOXES

The edges 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.

6.8 EXCESS HOLES

All excess holes in draw-boxes or other conduit accessories shall be securely blanked off by means of brass plugs to render the installation vermin proof.

6.9 DEBRIS

Care shall be taken to prevent debris or moisture from entering conduits during and after installation. Conduit ends shall be sealed by means of a solid plug which shall be screwed to the conduit end. Conduits shall be cleaned and swabbed to remove oil, moisture or other debris that may be present before conductors are installed. Swabs shall not be attached to the conductors.

6.10 Defects

Each length of conduit shall be inspected for defects and all burrs shall be removed. All conduits that are split, dented or otherwise damaged or any conduits with sharp internal edges shall be removed from site. The Contractor shall ensure that conduits are not blocked.

6.11 WITHDRAWAL OF CONDUCTORS

To ensure that all electrical conductors are easily withdrawable from conduits and to ensure that there are no joints in the conductors, the Engineer's representative will have the right to have the conductors of any circuit removed at his discretion. If the conductors are found to be in a satisfactory condition after having been withdrawn, the Engineer shall bear the cost of withdrawing and re-installing such conductors. If the conductors are found to have been damaged during installation or removal or if joints are found, they shall be replaced and the cost shall be borne by the Contractor.

7. INSTALLATION IN CONCRETE

7.1 TIMEOUS INSTALLATION

In order not to delay building operations, the Contractor shall ensure that all conduits and accessories which are to be cast in concrete are placed in position in good time. The Contractor or his representative shall be in attendance when the concrete is cast.

7.2 DRAW-BOXES

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 hollow block slabs, rear-entry draw-boxes shall be used. 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.

7.3 ELBOWS

Elbows for conduits of 32mm dia. and smaller and sharp bends will not be allowed in concrete slabs.

7.4 COVER PLATES

Draw-boxes and/or inspection boxes shall, where possible, be grouped together under a common approved cover plate, and must preferably installed in passages or male toilets. The cover plate shall be secured by means of screws.

7.5 NEUTRAL AXIS

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.

7.6 FIXING TO THE SHUTTERING

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. Wire will not be accepted for securing boxes to the shuttering where off-shutter finishes are required. Where fibreglass 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.

Before any concrete slabs are cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

7.7 CONCRETE FLOOR SLABS

Conduits will not be allowed in concrete floor slabs of boiler rooms (or boiler houses), laundries or other damp areas. All socket outlets and three phase outlets in damp areas shall be supplied from above with galvanised conduit and accessories.

7.8 EXPANSION JOINTS

As far as possible, conduits shall not be installed across expansion joints. Where this is unavoidable a conduit expansion joint shall be provided. (Refer to par. 10)

7.9 SCREEDS

The installation of conduits in floor screeds shall be kept to a minimum. Where conduits are installed in screeds, 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. This ruling will always be applicable to the lowest floor of a building. 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 m. The Contractor shall ensure that conduits are not visible above the screed where the conduits leave the screed.

7.10 INSPECTION

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 by telephone and confirmed in writing in order that an alternative route can be planned and approved by the Engineer before the additional concrete is cast. Any additional cost shall be for the Contractor's account.

8. SURFACE INSTALLATIONS AND INSTALLATIONS IN ROOF SPACES

Wherever possible, the conduit installation is to be concealed in the building work; however, where unavoidable or otherwise specified, conduit installed on the surface must be plumbed or levelled and only straight lengths shall be used.

8.1 APPEARANCE

(a) All conduits shall be installed horizontally or vertically as determined by the route and the Contractor shall take all measures to ensure a neat installation.

(b) Where conduits are to be installed directly alongside door frames, beams, etc. that are not true, conduits shall be installed parallel to the frames, beams, etc.

(c) All labels shall be removed from surface mounted conduit.

8.2 SADDLES

Conduits shall be firmly secured by means of saddles and screws and in accordance with SANS 10142. Where saddles are used to secure vertical lengths of conduit connected to surface mounted switch boxes or socket outlet boxes, the saddles shall be spaced so that the intervals between the box and the first saddle, between any two successive saddles and between the last saddle and the ceiling or roof are equidistant. Conduits shall be secured within 150 mm before and after each 90° bend and within 100mm of each outlet box.

8.3 JOINTS

Joints will only be allowed in surface conduit lengths exceeding 3,5 m. Threads shall not be visible at joints of completed installations, except where running joints are used. Running joints will be allowed only when absolutely necessary. All running joints shall be provided with locknuts and shall be painted with red lead immediately after installation.

8.4 ACCESSORIES

Inspection bends or tee pieces shall not be used. Non-inspection type bends may be used in the case of 32mm or 50 mm diameter conduits. All draw-boxes supporting luminaries or other equipment shall be fixed independently of the conduit installation.

8.5 OFFSETS

Where an offset is required at conduit terminations or crossovers, the conduit shall be saddled at the offset.

8.6 CROSS-OVER

Conduit routes shall be carefully planned to avoid crossovers. Where a crossover is inevitable, one conduit only shall be offset to cross the other. Crossovers shall be as short as possible and shall be uniform. Alternatively, crossovers shall be installed in purpose-made boxes. This method shall be employed on face brick walls and in other circumstances where required by the Engineer.

8.7 PARALLEL CONDUIT

Parallel conduit runs shall be equidistant and saddles shall be installed in line. Alternatively, a special clamp may be used to secure all conduits in unison. In the case of conduits of different diameters, the latter method shall only be used if a purpose-made clamp designed to accommodate the various conduit sizes, is provided.

8.8 PAINTING OF CONDUIT

All surface mounted conduits and accessories shall be painted with two coats of a high quality enamel paint or as otherwise specified. The colour shall comply with the colour code specified for the installation or where no code has been specified, shall match the colour of the surrounding finishes.

8.9 CONDUIT IN ROOF SPACES

8.9.1 In open roof spaces (no ceiling) conduits shall run along the wall plates and the rafters. The installation of conduits suspended between the rafters is not acceptable.

8.9.2 Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,5 m by means of saddles screwed to the roof timbers for metallic conduit and 1m for non-metallic conduit.

8.9.3 Nails or crampets will not be allowed.

8.9.4 Under flat roofs in false ceilings or where there is less than 900 mm clearance, or in instances where the ceilings are insulated with glass-wool or other insulating material impeding access, the conduit shall be installed in a manner which allows for wiring from below the ceilings.

8.9.5 Conduit runs from switchboards shall terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards. Refer to the Engineer's standard specification for "CONNECTIONS TO SWITCHBOARDS", par. 2 of Section B10.

8.9.6 Spare conduits covering the total number of spare ways on switchboards, shall be provided between the boards and the roof draw-box.

8.9.7 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 450mm throughout the installation. The contractor shall supply and install all additional supporting timbers in the roof space as required.

8.10 FIXING TO WALLS

Only approved plugging materials such as aluminium inserts, fibre plugs or plastic plugs, etc., and round-head 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.

9. FUTURE EXTENSIONS

9.1 OPEN ROOF SPACES

Conduits intended for future switches and socket outlets, shall terminate 40 mm above the tie beams in roof spaces with more than 900 mm free space. The conduit ends shall be threaded and fitted with a coupling and brass plug.

9.2 CONCRETE SLABS

Conduit ends shall protrude 150 mm from the concrete to facilitate the installation of future extensions above, below or to the side of the concrete slabs. All these conduits shall be connected to a draw-box, which is cast into the concrete within 2 m of the end of the concrete. Conduit ends shall be threaded and fitted with a coupling and brass plug. In cases where holes cannot be drilled through the shuttering to accommodate the conduit end, a deep draw-box with rear entry may be placed over the conduit end.

9.3 COVER PLATES

Unused boxes for switches and socket-outlets shall be covered with metal cover plates. Unused boxes for luminaries shall be covered with round galvanised metal cover plates, which fit tightly against the finished surface. The cover plate shall overlap the outlet box and recess.

9.4 GALVANISED CONDUIT

Galvanised conduit shall be installed at all free ends intended for future extensions. The conduit shall be treated with a paint, which will prevent corrosion and white rust.

10. EXPANSION JOINTS

10.1 Where conduits cross expansion joints in the structure, approved draw-boxes which provide a flexible connection in the conduit installation shall be installed. Refer to the Engineer's standard drawing No EE3/136/139.

10.2 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

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 by means of locknuts.

10.3 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 'Pratley Tic-Tac' or equal 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 2,5mm² bare copper earth wire and a brass bolt and nut.

10.4 The end of the other circuit conduit shall be secured to the draw-box by means of locknuts and a brass bush in the case of screwed metallic conduit or a standard bushed adaptor for other conduit types.

10.5 In the case of metallic conduit, a 2,5mm² bare copper wire shall be installed between the first conduit boxes on either side of the joint, in addition to an earth wire, which may be specified for the circuit. 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.

10.6 Suitable steel cover plates shall be screwed to draw-boxes installed along the expansion joint. The cover plates shall be installed before the ceilings are painted.

10.7 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.

11. CHASES AND BUILDER'S WORK

11.1 Except where otherwise specified the Builder or Main Contractor shall be responsible for the builder's work related to the installation of conduits, outlet boxes, switchboard trays, bonding trays and other wall outlet boxes and will undertake the necessary chasing and cutting of walls and the provision of openings in ceilings and floors for luminaries and other electrical outlets. The Contractor shall notify the Builder or Main Contractor of his requirements and the responsibility lies with the Contractor to ensure that all builder's work is clearly indicated or marked in accordance with his requirements.

11.2 Electrical materials to be built in must be supplied, placed and fixed in position by the Contractor when required to do so by the Builder or Main Contractor. The Contractor shall also ensure that these materials are installed in the correct positions.

11.3 Where no Builder or Main Contractor is available, the Contractor must provide all chases and is required to cover conduits installed in chases by a layer of 4:1 mixture of coarse sand and cement, finished 6 mm below the face of the plaster and roughened. Chases shall be deep enough to ensure that the top of conduits are at least 12 mm below the finished surface of the plaster.

11.4 Where the Contractor is responsible for the cutting of chases or the building in of conduits and other equipment, he will be held responsible for all damage as a result of this work and will be required to make good to the satisfaction of the Engineer.

This ruling is particularly applicable but not exclusively to the rewiring and renewal of existing installations. Chases shall be made by means of a cutting machine.

11.5 Under no circumstances shall face brick walls or finished surfaces be chased or cut without the written permission of the Engineer. Where it is necessary to cut or drill holes in the concrete structure, the prior permission of the Engineer shall be obtained.

SECTION B2

B2. INSTALLATION OF WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING

1. RESPONSIBILITY OF THE CONTRACTOR

The Contractor shall supply and install all wiring channels, underfloor ducting and power skirting as specified or as required for the cable, socket outlet and wiring installation including the necessary supports, hangers, fixing materials, bends, angles, junctions, T-pieces, etc. He shall further liaise with the Main contractor to verify the position of holes and access routes through the structure and finishes.

(Refer to the Engineer's quality specification for "WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING", Section C2 to determine which types are acceptable).

2. WIRING CHANNELS

2.1 FIXING

The Contractor shall supply and install all hangers, supports or fixings for the channels. Channels up to and including 76 x 76 mm shall be supported at maximum intervals of 600 mm and larger channels at maximum intervals of 1 m. Channel runs shall be carefully planned to avoid clashes with other services and to ensure that all covers can be removed after completion of the entire installation. Purpose made clamps, hangers, etc. shall be used as required. Where it is not possible to support the channels at the specified intervals, they shall be supported in a sound manner to the satisfaction of the Engineer.

2.2 INSTALLATION IN CONCRETE

Where channels are cast into concrete, the insert type shall be used. Additional spacer blocks shall be used where necessary to prevent ducts from being deformed while the concrete is cast. Channels shall be filled with polystyrene or other suitable fillers to prevent the ingress of concrete and shall be securely fixed in position to the shuttering.

2.3 COVER PLATES

All channels up to and including 127mm width shall have snap-in cover plates of metal or PVC. Cover plates for wider channels shall be of metal and shall be fixed by means of screws at suitable intervals to prevent warping. Cover plates shall be installed over the full length of the channels. Flush mounted wiring channels shall be fitted with overlapping metal cover plates with plastic edge trim to cover irregularities in the wall recess.

2.4 JOINTS

Adjoining lengths shall be aligned and securely joined by means of fishplates fixed by mushroom bolts, washers and nuts or connection pieces that are pop-riveted to both adjoining sections. All adjoining sections shall be rectangular and shall butt tightly. Covers shall fit tightly across the joints.

Where channels cross expansion joints in the structure, suitable expansion joints shall be provided in the channels by means of fishplates pop-riveted or screwed to the channel on one side of the expansion joint and floating freely in the channel on the other side of the expansion joint.

2.5 SUPPORT FOR CONDUCTORS

All conductors in inverted cable channels shall be retained by means of metal clips or metal spacer bars at not more than 1m centres. Where vertical duct lengths exceed 5m, conductors installed in the channels shall be secured at intervals not exceeding 5m to support the weight of the conductors. Clamps shall be provided in suitable draw-boxes for this purpose.

2.6 CONDUIT CONNECTIONS

Conduit connections shall be terminated by means of two locknuts and a brass female bush. Where the channel is wide enough, conduit connections may be made by means of a conduit box and hole through the back or side of the channel. All holes through which conductors pass shall be fitted with bushes or grommets or shall be sleeved.

2.7 INTERNAL FINISHES

Bends and T-joints shall be constructed to ensure compliance with the allowable bending radii specified in SANS 10142, Appendix D in the case of PVC-insulated cables and conductors and shall comply with the relevant specification in the case of other cables. Burrs and sharp edges shall be removed and the inside edges of the joints shall be lined with rubber cement or other suitable rubberised or plastic compound to prevent laceration of the conductor insulation.

2.8 VERMIN PROOFING

All cable channels shall be vermin proofed after installation. Holes shall be covered by means of screwed metal plugs or by means of metal strips, which are bolted, or pop-riveted to the channel. Wooden or other plugs which are driven into holes or other temporary plugs or covers are not acceptable.

2.9 SERVICES

Multiple duct runs or internal metal partitions shall be used where conductors for power, control, communication and other services are present.

3. UNDERFLOOR DUCTING

3.1 GENERAL

3.1.1 Two or three compartment underfloor ducting as specified shall be supplied and installed in the positions and according to the layouts indicated on the drawings.

3.1.2 Three compartment ducting shall have a cross-section of approximately 200 x 32mm, subdivided into three approximately equal compartments, of which the centre compartment shall be used for electrical power distribution with the two outer compartments for telephone and other light current services respectively.

3.1.3 Unless specified to the contrary in the Detail Technical Specification or on the drawings, each compartment shall be provided with openings (occurring in line) at 1,5 m centres to permit installation of pedestals or recessed outlets in accordance with the design of the system. The openings shall have removable, flush, cover plates and shall have prepared fixing holes for future installation of pedestals or recessed outlets. The centre of the openings shall be offset a distance of 200 mm from the building nodule lines.

3.2 JUNCTIONS

The underfloor ducting installation shall be provided with flush cross-over, T-junction and right angle bend draw-boxes installed in the runs of ducting, generally as indicated on the drawings. The junction boxes shall be complete with cross-over of services. The junction boxes shall have nominal 300 x 300mm removable cover plates secured by means of four countersunk screws.

3.3 PEDESTAL UNITS

Where the system accommodates floor pedestal units, these shall consist of pressed steel or die cast aluminium units, suitable for either two or three services, as specified in the Detail Technical Specification.

Where the pedestals are installed on vinyl tiled or similar floors which will be subject to washing, a matching waterproofing gasket shall be supplied below each pedestal to render the junction waterproof.

3.4 INSTALLATION

The underfloor ducting, junction boxes, pedestals, outlets and other accessories shall be installed strictly in accordance with the manufacturer's instructions and according to the following procedure:

a) The underfloor ducting shall be installed on a mortar bed, provided by the Plasterer for purposes of levelling the channel to the final floor screed level. The Contractor shall assist the Plasterer in marking out the layout of the ducting to enable the mortar bed to be laid. Final height of the underfloor ducting shall be determined in close liaison with the Builder.

b) After installation of the mortar bed, the components of the underfloor ducting shall be assembled and installed by the Contractor, following which the screeding will be completed.

3.5 TERMINATIONS

Up bends manufactured by the supplier of the underfloor ducting shall be supplied and installed wherever the ducting is terminated at a switchboard, telephone duct or telephone distribution box or where the ducting terminates behind power skirting.

3.6 WIRING

3.6.1 Power circuit wiring shall be installed in the centre compartment of the underfloor ducting. Sufficient slack shall be provided to allow for the installation of a floor pedestal outlet at each opening in the ducting, whether an outlet is specified at that position or not. This provision shall take the form of loops in the wiring, including the earth wire, wherever the openings occur. The loops shall be pushed back into the channel and the cover plates replaced. In the instances where pedestals/outlets are not installed, these provisions shall of necessity only be made for the area covered by the circuit and not for the run from the switchboard.

3.6.2 The entire underfloor ducting installation shall be effectively earthed and bonded together.

3.6.3 Galvanised draw-wires shall be supplied and installed along the entire length of the telephone and light current service compartments of the underfloor ducting. The draw-wires shall be interrupted at the junction boxes, with enough slack left coiled up to facilitate the drawing in of cables by others.

3.7 EXPANSION JOINTS

Where expansion joints in the buildings are crossed by underfloor ducting, expansion joints shall be provided as detailed in par. 2.4 of this section.

4. POWER SKIRTING

4.1 GENERAL

4.1.1 Two or three compartment power skirting as specified shall be supplied and installed in the positions and according to the layouts indicated on the drawings.

4.1.2 The top compartment shall be used for power wiring and switched socket outlets, whilst the bottom compartments shall be for telephone and other light current services.

4.2 MODULE

4.2.1 The power skirting shall be manufactured from 1mm (minimum) thick sheet steel or aluminium (as specified) in approximately 2,5m lengths.

4.2.2 The covers shall be manufactured in modular lengths, as specified in the Detail Technical Specification or otherwise in 1 m lengths and shall be secured to the wall channel by means of toggle or swivel nuts. Snap-in covers are also acceptable.

4.2.3 At the building module lines, covers of specified length or otherwise in 250 mm lengths shall be installed, against which partition walls may be installed, thereby trapping these covers. The removable modular covers shall be installed between these "fixed" covers.

4.2.4 Each modular cover associated with the power compartment shall be punched and prepared for the installation of either a 13A or a 16A, 3-pin standard flush switched socket outlet, whether any is specified or indicated for that module or not. Where socket outlets are not installed, the punched holes shall be blanked off with a metal blanking plate, painted the same colour as the power skirting and installed at the back of the covers. These blanking plates shall be easily removable to permit future installation of socket outlets.

4.2.5 Unless otherwise specified, no provision shall be made on the covers of the telephone or light current services compartments for the installation of sockets.

4.2.6 Factory-made end covers shall be installed at the ends of all runs of power skirting. All internal and external bends or offsets shall be factory-made and shall be installed to provide a neat and workmanlike appearance.

4.3 PAINTING

The power skirting shall be painted in a colour as specified in the Detail Technical Specification. The painting of steel power skirting shall comply with the Engineer's "STANDARD PAINT SPECIFICATION", Section C39. Aluminium power skirting shall be anodised. The power skirting channels and covers shall be individually wrapped or packed to protect them against damage in transit and before installation.

4.4 SOCKET-OUTLETS

4.4.1 Standard 13 A or 16 A, 3-pin flush switched socket outlets (100 x 50 mm nominal size) shall be supplied and installed in the positions indicated on the drawings and as specified in the Detail Technical Specification.

4.4.2 The switched socket outlets shall be secured to the channel by means of suitable brackets.

4.4.3 After installation of the modular front covers, they shall be screwed to the socket outlets to ensure proper alignment between the two components. Separate standard covers need not be provided for the socket outlets.

4.5 CONDUIT FEEDERS

4.5.1 Conduits for the circuit wiring to the power skirting shall be installed in the floor slab and shall terminate in flush conduit or boxes, behind the power skirting and installed to match the height of the power, telephone and light current services compartments of the skirting.

4.5.2 The wiring/cables shall pass through large diameter holes cut in the rear of the power skirting. The holes shall be suitably bushed or trimmed to prevent damage to the wiring or cables.

4.5.3 Alternatively conduits feeding to the telephone compartment may be terminated in boxes facing upwards in the floor slab immediately below the power skirting, with suitable bushed or trimmed openings being provided through the bottom of the power skirting duct for the cables to pass through. (Applicable only where the power skirting occurs at floor level).

4.6 POWER SKIRTING AT DOORWAYS

Where a section of power skirting is interrupted by a doorway, bridging conduits shall be installed to interconnect the power skirting sections. Where conduits are not specifically indicated, a minimum of 1 x 32mm bridging conduit shall be installed for each of the power, light current and telephone compartments.

4.7 CLEANING

Prior to fitting front covers, the power skirting shall be thoroughly cleaned to remove all dust and rubble and damage to paintwork where this has occurred, shall be repaired.

SECTION B3

B.3 INSTALLATION OF CABLE TRAYS AND LADDERS

1. GENERAL

Cable trays and cable ladders complying with the Engineer's standard specification for "CABLE TRAYS AND LADDERS", Section C3 shall be supplied and installed where specified and/or where generally suitable for cable distribution.

2. RESPONSIBILITY OF THE CONTRACTOR

The Contractor shall supply and install all cable trays and/or ladders as specified or as required by the cable routes including the necessary supports, clamps, hangers, fixing materials, bends, angles, junctions, reducers, T-pieces etc. He shall further liaise with the Main Contractor for the provision of holes and access through the structure and finishes.

3. SUPPORTS

Cable tray supports shall consist of two steel hangar rods, at least 8mm in diameter, on both sides of the tray with a substantial steel cross-member on the underside of the tray and bolted to the rods. Alternatively, cable trays may be cantilevered from walls on suitable brackets.

4. SPACING OF HORIZONTAL SUPPORTS

4.1 Horizontal trays shall be supported at the following maximum intervals:

(a) 1,2 mm to 1,6 mm thick metal with 12mm to 19 mm return trays. 1m maximum spacing

(b) 2,5 mm thick metal trays with 76 mm return 1,5m spacing.

(c) Cable ladders with 76mm side rail of 2mm thickness and with crossrungs. 1,5m spacing

(d) Metal cable ladders other than c) above, including site manufactured angle iron types 1m spacing

(e) 3 mm thick PVC trays with 40mm return. 1m maximum spacing

(f) 4 mm thick PVC trays with 60mm return 1,5m maximum spacing

4.2 In addition to the above spacing on the longitudinal run, trays and ladders shall be supported at each bend, offset and T-junction.

5. JOINTS

5.1 Joints shall be smooth and without projections or rough edges that may damage the cables. The Contractor will be required to cover joints with rubber cement or other non-hardening rubberised or plastic compounds if in the opinion of the Engineer joints may damage cables.

5.2 Joints shall as far as possible be arranged to fall on supports. Where joints do not coincide with supports, joints shall be made by means of wrap-around splices of the same material as the tray and at least 450mm long. The two cable tray ends shall butt tightly at the centre of the splice and the splice shall be bolted to each cable tray be means of at least 8 round head bolts, nuts and washers. Splices shall have the same finish as the rest of the tray.

5.3 Splices as described above shall be provided at joints, which do coincide with supports if the loaded tray sags adjacent to the joint due to the interruption of the bending moment in the tray.

6. FIXING TO SUPPORTS

Trays shall be bolted to supports by at least two round head bolts per support. Bolts shall be securely tightened against the tray surface to avoid projections which might damage cables during installation.

7. FIXING TO THE STRUCTURE

7.1 Where installed on concrete or brick, the supports for cable trays and ladders shall be securely fixed by means of at least 2 heavy duty, expansion type anchor bolts. Cantilevered trays shall be supported by a minimum of two 6mm diameter expansion bolts per support.

7.2 It is the responsibility of the Contractor to ensure that adequate fixing is provided since cable trays and ladders that work loose shall be rectified at his expense. The fixing shall take into account site conditions that prevail during installation.

7.3 Where installed on vertical steelwork, cable trays and ladders shall be fixed by means of 6mm diameter bolts and nuts.

7.4 On horizontal steelwork, use may alternatively be made of "CADDY" type fasteners.

7.5 Horizontal trays and ladders shall in general be installed 450 mm below slabs, ceilings, etc. to facilitate access during installation of cables.

7.6 Multiple runs shall be spaced at least 300 mm apart unless a different spacing is specified in the Detail Technical Specification.

8. INSTALLATION OF CABLES

Cables shall be installed adjacent and parallel to each other on the trays with spacings as specified in the Engineer's standard specification for "INSTALLATION OF CABLES", Section B6, and snaked slightly to allow for expansion. Cables shall present a neat appearance and shall under no circumstances be bunched. Cables shall be clamped at maximum intervals of 3 m when installed on horizontal trays and at maximum intervals of 600 mm when installed on vertical trays.

9. EARTHING

Metal trays and ladders shall be bonded to the earth bar of the switchboard to which the cables are connected. Additional bare copper stranded conductors or copper tape shall be bolted to the tray or ladder where the electrical continuity cannot be guaranteed. These additional conductors or tapes shall always be installed in outdoor applications and in coastal regions.

10. CORROSION

PVC trays shall be used in corrosive atmospheres. All supports shall be adequately protected against corrosion, preferably with a powder coated paint finish in accordance with the Engineer's "STANDARD PAINT SPECIFICATION", Section C39.

SECTION B4

B.4 FIXING MATERIALS

1. RESPONSIBILITY

It is the responsibility of the Contractor to position and securely fix conduits, ducts, cables and cable channels, switchboards, fittings and all other equipment or accessories as required for the Installation. The Contractor shall provide and fix all supports, clamps, brackets, hangers and other fixing materials.

2. FINISHING

All unpainted supporting steelwork installed by the Contractor shall be wire brushed and given one coat of rust-resisting primer, followed by one coat of high quality enamel paint before any other equipment is fixed.

3. STRUCTURAL STEEL

Supports, brackets, hangers, etc. may only be welded to structural steel members where prior permission of the Engineer has been obtained. "CADDY" or similar fasteners may be used to fix equipment to structural steel members.

4. SCREWS AND BOLTS

Where holes exist in equipment to be fixed, bolts and fixing screws as specified shall be used. Where sizes are not specified, the largest bolt or screw that will fit into the hole shall be used.

5. WALL PLUGS

Where the fixing holes in brick or concrete walls are smaller than 10mm dia. and where the mass of the equipment is less than 10kg, wall plugs may be used to fix conduits, cables and other equipment. Fibre or plastic plugs shall be used. Wooden Plugs are not acceptable. Aluminium plugs may be used in face bricks. Plugs installed in joints between bricks are not acceptable. A masonry drill of the correct size shall be used to drill holes for plugs. Round-headed screws of the correct diameter to match the specific plug shall be used throughout.

6. ANCHOR BOLTS

Where the fixing holes are 10mm and larger or where the mass of the equipment is 10kg, equipment shall be fixed by means of expanding anchor bolts or by means of bolts cast into the concrete or built into walls.

7. GALVANISED EQUIPMENT

Brass screws bolts and nuts shall be used to fix galvanised equipment.

8. SHOT-FIRED FIXING

8.1 Materials such as metal cable ducts or channels may be fixed against walls and concrete slabs by means of the shot-fired fixings.

8.2 The Contractor shall ascertain whether this method of fixing will carry the weight of the material including conductors, cables and other items of equipment to be installed later. Should it be found that the method of fixing is inadequate and supports tend to loosen, the Contractor will be required to fix the material by an alternative method to the satisfaction of the Engineer.

8.3 Where the shot-fired method is used, warning signs shall be placed at all entrances leading to the area where this work is in progress. The Contractor shall take all reasonable precautions to prevent accidents. Refer also to The Occupational Health and Safety Act.

8.4 Nails and explosive charges recommended by the manufacturer shall be used throughout.

9. CLAMPS AND BRACKETS

Clamps and brackets used to fix or support equipment such as cable trays, ducts, etc. shall be of a purpose-made type suitable for the specific application. Refer also to the Engineer's standard specification for "CABLE TRAYS AND LADDERS", Section B3 and "INSTALLATION OF WIRING CHANNELS", Section B2.

SECTION B5

B.5 WIRING

This section covers wiring in approved wire-ways for electrical installations in buildings or other structures under normal environmental conditions for 50 Hz systems not exceeding 600 V.

1. TYPE OF CONDUCTORS

PVC-insulated or equivalent, stranded copper conductors and bare stranded or green PVC-insulated copper earth conductors complying with the Engineer's quality specification for "PVC-INSULATED CABLES", Section C4, shall be used exclusively. Only where cables are specified or in instances where the exceptions stipulated in SANS 10142 are applicable, may the Contractor deviate from this requirement.

2. WIRE-WAYS

2.1 All unarmoured conductors shall be installed in conduits, cable channels (trunking) or power skirting and shall under no circumstances be exposed. Cable channels and power skirting shall be of metal construction unless specifically approved to the contrary.

2.2 Tenderers must note that common wire-ways will only be permitted for relatively light current-carrying conductors such as lighting and socket-outlet circuits. Refer also to par. 4 below. Heavy current-carrying conductors such as feeders to distribution boards and large power points, must be installed in separate conduits or wire-ways.

3. ORDER OF WORK

Wiring shall only be carried out after the wire-way installation has been completed, but before painting has commenced. Debris and moisture shall be removed from the wireways prior to the installation of the conductors.

4. CIRCUITS

Conductors that are connected to different switchboards, shall not be installed in the same wireway. The wiring of one circuit only will be allowed in a 20 mm dia. conduit with the exception of the wiring from switchboards to fabricated sheet metal boxes 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.

5. 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 heat-shrink sleeves. The use of PVC insulation tape is not acceptable.

6. 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 earth conductor) shall be taped at intervals of 1m with PVC insulation tape. The conductors of different circuits shall however remain separate in order that any given circuit can be withdrawn. Conductors entering switchboards or control boards shall be grouped and bound by means of plastic or metal bands (not tape).

7. CABLE TRAYS

Conductors may only be installed directly on cable trays if specifically approved by the Engineer. In these cases cable trays shall be at least 2m above walkways or working areas. Conductors of the same circuit shall be grouped in the same manner as described in the previous paragraph. All the conductors on the cable tray shall then be tied down securely to the cable tray at intervals of 2m or less by means of plastic or metal bands (not tape).

8. DRAWING-IN OF CONDUCTORS

When conductors are drawn through conduit, care shall be taken that they are not kinked or twisted. Care shall also be taken that the conductors do not come into contact with materials or surfaces that may damage or otherwise adversely affect the durability of the conductor.

9. THREE-PHASE OUTLETS

9.1 With the exception of three-phase outlets, 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 to indicate the presence of three phase voltages.

9.2 A neutral conductor shall be installed to all three phase outlets intended for equipment connection, whether sockets or isolators, irrespective of whether the particular equipment normally requires a neutral or not.

10. VERTICAL CONDUIT INSTALLATION

Conductors installed in vertical wire-ways shall be secured at intervals not exceeding 5m to support the weight of the conductors. Clamps shall be provided in suitable drawboxes for this purpose.

11. 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 strands be cut off.

12. EARTHING CONDUCTORS

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

12.2 The installation shall be earthed to comply with SANS 10142.

12.3 The installation shall be bonded to comply with SANS 10142.

13. COLOURS

The colours of conductor 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 wiring to two-way and intermediate switches shall preferably differ from the colour of phase conductors.

14. SINGLE-POLE SWITCHES

Single-pole switches shall be connected to the phase conductor and not to the neutral conductor.

15. SIZE OF CONDUCTORS

Where conductor sizes are not specified, the following <u>minimum</u> conductor sizes shall be used:

Lighting circuits: 1,5mm² and 2.5mm² copper earth conductor

Socket-outlet circuits: 2,5mm² and 2,5mm² copper earth conductor.

Bell circuits: 1,5mm²

Stove circuits: 10mm² and 6mm² copper earth conductor

Clock circuits: 1,5mm²

16. PARTITIONS

16.1 When wiring is installed in removable partitions, the vertical and/or horizontal metal supports of the walls may be utilised for wiring on condition that:

(a) the conductors are not exposed,

(b) the metal supports are properly earthed,

(c) a separate bare earth continuity conductor is drawn in together with the current carrying conductors and is earthed to the metal parts of the switches and/or the socket-outlets, and

(d) conductors are installed in the metal and non-inflammable sections of the partitions.

16.2 Conductors enclosed in a copper braiding (harness wiring) may be installed in removable partitions. The braiding can be used as earth continuity conductor. The wiring shall be joined to the conduit (or cable) installation by interconnecting the conductor and the earth conductors in a draw-box using suitable ferrules and heat-shrink sleeves or screwed terminals.

SECTION B6

B.6 INSTALLATION OF CABLES

This section covers the installation of cables for the distribution of power in buildings, other structures and in ground for system voltages up to 11 kV, 50 Hz.

1. GENERAL

1.1 CABLE TYPES

(a) All cables and jointing and termination accessories used for power distribution shall comply with the Engineer's Quality Specifications, Section C.

(b) Cables with copper conductors shall be used throughout unless otherwise specified or approved.

(c) All unarmoured cables shall be installed in metal trunking, sleeves or conduit unless clearly specified to the contrary.

(d) XLPE Cables shall only be used in exceptional circumstances with the written permission of the Engineer.

1.2. COMPETENCE OF PERSONNEL

It is a definite requirement that the Contractor shall only employ personnel fully conversant with cable manufacturer's recommendations for joining and terminating cables.

2. IDENTIFICATION OF CABLES

2.1 Cables shall be identified at all terminations by means of punched metallic bands or marked with labels or tags. (Refer also to SANS 10142).

2.2 The use of PVC tape with punched characters is not acceptable.

2.3 The identification numbers of cables shall be shown on "as built" drawings of the Installation.

3. TRENCHING

3.1 GENERAL

3.1.1 The Contractor shall be responsible for all trenching excavations unless specified to the contrary.

3.1.2 The Contractor shall, before trenching commences, familiarise himself with the routes and site conditions and the procedure and order of doing the work shall be planned in conjunction with the general construction programme for other services and building requirements.

3.1.3 The Contractor shall acquaint himself with the position of all the existing services such as stormwater pipes, water mains, sewer mains, gas pipes, telephone cables, etc. before any excavations are commenced. For this purpose he shall approach this Engineer's representative, the local municipal authority and any other authority which may be involved, in writing.

3.1.4 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.

3.1.5 The Contractor shall take all the necessary precautions and provide the necessary warning signs and/or lights to ensure that the public and/or employees on site are not endangered.

3.1.6 The Contractor shall ensure that the excavations will not endanger existing structures, roads, railways, other site constructions or other property.

3.2 MECHANICAL EXCAVATORS

3.2.1 Power driven mechanical excavators may be used for trenching operations provided that they are not used in close proximity to other plant, services or other installations likely to be damaged by the use of such machinery.

3.2.2 The use of power driven mechanical excavators shall be subject to the approval of the Engineer. Should the excavator produce trenches that exceed the required dimensions, payment based on volumetric excavation rates will be calculated on the required dimensions only.

3.3 BLASTING

3.3.1 No guarantee is given or implied that blasting will not be required.

3.3.2 Should blasting be necessary and approved by the Engineer, the Contractor shall obtain the necessary authority from the relevant Government Engineers and Local Authorities. The Contractor shall take full responsibility and observe all conditions and regulations set forth by the above authorities.

3.4 ROUTES

3.4.1 Trenches shall connect the points shown on the drawings in a straight line. Any deviations due to obstructions or existing services shall be approved by the Engineer beforehand. Refer also to par. 10.4.

3.4.2 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.

3.4.3 The removal of obstructions along the cable routes shall be subject to the approval of the Engineer.

3.5 SHORING AND WATERLOGGING

3.5.1 The Contractor shall provide shoring for use in locations where there is a danger of the sides of the trench collapsing due to waterlogging or other ground conditions. Refer to the The Occupational Health and Safety Act.

3.5.2 The strength of shoring must be adequate for site conditions prevailing and the shoring must be braced across the trench.

3.5.3 The Contractor shall provide all pumps and equipment required to remove accumulated water from trenches. Water or any other liquid removed shall be disposed of without any nuisance or hazard.

3.6 TRENCHING

3.6.1 Trenching shall be programmed in advance and the approved programme shall not be departed from except with the consent of the Engineer.

3.6.2 Trenches shall be as straight as possible and shall be excavated to the dimensions indicated in this specification.

3.6.3 The bottom of the trench shall be of smooth contour, and shall have no sharp dips or rises which may cause tensile forces in the cable during backfilling.

3.6.4 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 backfilling on completion of cable laying.

3.6.5 Surplus material shall be removed from site and disposed of at the cost of the Contractor.

3.6.6 Trenches across roads, access ways or footpaths shall not be left open. If cables cannot be laid immediately the Contractor shall install temporary "bridges" or cover plates of sufficient strength to accommodate the traffic concerned.

3.6.7 In the event of damage to other services or structures during trenching operations the Contractor shall immediately notify the Engineer and institute repairs. (Refer to par. 3.1.3 and 3.1.4)

3.6.8 Prior to cable laying the trench shall be inspected thoroughly and all objects likely to cause damage to the cables either during or after laying shall be removed.

3.6.9 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.

3.6.10 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, they shall be replaced by a person qualified to do so.

3.7 DIMENSIONS OF TRENCHES

3.7.1 Cable trenches for one or two cables shall not be less than 300 mm wide and need not be more than 450 mm wide. This dimension shall be valid for the total trench depth.

3.7.2 The width shall be increased where more cables are installed to allow for the spacings stipulated in par. 4.2.

3.7.3 Where trenches change direction or where cable slack is to be accommodated, the Contractor shall ensure that the requirements of the relevant SANS Specification regarding the bending radii of cables are met when determining trench widths.

3.7.4 Trench depths shall be determined in accordance with cable laying depths and bedding thickness.

3.7.5 Payment will be made on a volumetric excavation rate calculated on the basis of the given maximum dimensions or the actual dimensions, whichever is the lesser. Refer also to par. 3.2.2 and 3.7.1 above.

3.8 JOINT HOLES

Where cable joints are required to be made in the course of a cable run, a joint hole shall be excavated of sufficient size to enable the cable jointer to work efficiently and unimpeded.

3.9 BEDDING

3.9.1 The bottom of the trench shall be filled across the full width with a 75mm layer of suitable soil sifted through a 6mm mesh and levelled off.

3.9.2 Only sandy clay or loam soil with a satisfactory thermal resistivity (not exceeding 1,5°C m/W) may be used for this purpose. Sea or river sand, ash, chalk, peat, clinker or clayey soil shall not be used. The use of crusher sand is acceptable.

3.9.3 Where no suitable soil is available on site, the Contractor shall import fill from elsewhere and make all the necessary arrangements to do so. The cost of importing soil for bedding purposes shall be included in the unit rates for excavations.

3.9.4 After cable laying a further layer of bedding shall be provided to extend to 75 mm above the cables.

3.9.5 The bedding under joints shall be fully consolidated to prevent subsequent settling.

3.10 CABLE SLEEVES

3.10.1 Where cables cross under roads, railway tracks, other service areas, etc. and where cables enter buildings, the cables shall be installed in Polyethylene (6mm thickness), asbestos cement pipes or earthenware pipes. Pitch fibre and PVC pipes are not acceptable because of the adhesion that occurs after a period of time between the pipe and the sheathing or outer serving of the cables.

3.10.2 Pipes shall be joined in accordance with the manufacturer's instructions.

3.10.3 Sleeves shall cross roads and railway tracks at right angles.

3.10.4 Sleeves shall have a minimum diameter of 100mm. They shall extend at least 2m beyond the tracks of a railway line or of the outermost tracks where there is more than one line. In the case of roads, the sleeves shall extend at least 1m beyond the road edge or kerb on both sides of the road.

3.10.5 All sleeves shall be graded 1:400 for water drainage.

3.10.6 Cable sleeves shall be installed to the spacings and depths stated in paragraph 4 below.

3.10.7 Galvanised metallic sleeves up to and including 76mm dia. shall be supplied and installed by the contractor.

3.10.8 The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

3.11 BACKFILLING

3.11.1 The Contractor shall not commence with the backfilling of trenches without prior notification to the Engineer so that the cable installation may be inspected. Should the Contractor fail to give a timeous notification, the trenches shall be re-opened at the Contractor's cost. Such an inspection will not be unreasonably delayed.

3.11.2 For high voltage cables (1 kV to 11 kV) a coloured plastic marking tape shall be installed 400 mm above the cable. The tape shall be yellow, marked with the words "ELECTRIC CABLE/ELEKTRIESE KABEL" in red. These markings shall not be more than 1m apart from centre to centre.

3.11.3 Backfilling shall be undertaken with soil suitable to ensure settling without voids. The maximum allowable diameter of stones present in the backfill material, is 75mm.

3.11.4 The Contractor shall have allowed in his tender for the importation of suitable backfill material if required.

3.11.5 The backfill shall be compacted in layers of 150mm 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. Surplus material shall be removed from site and suitably disposed of.

3.11.6 On completion, the surface shall be made good to match the surrounding area.

3.11.7 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.

3.12 CABLE MARKERS (FOR HV CABLES ONLY, EXCEPT WHERE OTHERWISE SPECIFIED)

3.12.1 Cable markers shall be provided along all HV cable routes but need only be provided along LV cable routes where specified.

3.12.2 Cable markers shall consist of concrete blocks in the shape of truncated pyramids, approx. 300mm high, 150 x 150mm at the top and 250 x 250mm at the bottom.

3.12.3 Brass plates shall be cast into the tops of the blocks in such a manner that they cannot be prised loose. The wording "ELECTRIC CABLE/ELEKTRIESE KABEL" shall be stamped on the brass plates as well as direction arrows and the cable voltage rating.

3.12.4 Cable markers shall be installed on the surface along all the underground routes and shall project 35 mm above normal ground level unless the projected markers could be a hazard to pedestrian or other traffic in which case they shall be installed flush with the surface.

3.12.5 Cable markers shall be installed at the beginning and end of a cable run (e.g. where a cable enters a substation or building), at all changes of direction, above all joints, above cable pipe entries and exits and at intervals not exceeding 50 m along the cable route.

3.12.6 The position of cable markers shall be indicated on the "as built" drawings.

3.13 TRANSNET, PROVINCIAL ADMINISTRATION OR NATIONAL ROAD CROSSINGS

3.13.1 The Contractor shall not trench beneath any railway tracks without the TRANSNET Administration's supervision. The Contractor shall request the Engineer timeously to arrange for the necessary supervision. The cost of such supervision will be paid for by the Engineer.

3.13.2 The Engineer will arrange for the necessary wayleave and permission to cross TRANSNET property and railway tracks, or Provincial or National road reserves and TELKOM Authority approval of proposed cable routes.

3.13.3 The Contractor shall carry out the crossing installation in strict accordance with the TRANSNET and Provincial Administration's requirements and stipulations. Where these requirements are in contradiction with this specification, the Engineer's ruling shall be sought.

3.13.4 The Contractor shall ensure that he will comply with the various Administration's requirements regarding crossing of Provincial and National roads, especially with regard to the safeguarding of the public. The Contractor shall also provide proof of adequate insurance cover against any claim from any accident as a result of work done by the Contractor during the crossing operation. The Engineer shall also be indemnified from all liability in this regard.

3.13.5 The Contractor shall liaise with the various Administrations well in advance regarding the intended dates, times and expected duration of the crossing operations and obtain their approval of the programme and method of operation before commencing with the work.

4. INSTALLATION OF UNDERGROUND CABLES

4.1 INSTALLATION DEPTHS

4.1.1 Cables shall be installed at the following minimum depths below final ground level :

Up to 11kV : 8OOmm

4.1.2 All cable depth measurements shall be made to the top of the cable when laid directly in ground or to the top of the duct or sleeve where these are provided.

4.1.3 The above depths shall apply to the top layer where cables are installed in layers.

4.1.4 The Contractor may only deviate from the above depths provided prior authority in writing has been obtained from the Engineer. In this event the cables shall be protected with a suitable concrete covering.

4.1.5 The depth of cable pipes or ducts beneath railway lines or roads shall be not less than 1,1 m below the formation level.

4.2 CABLE SPACINGS

4.2.1 Cables installed in the same trench shall be laid parallel to each other with the following spacings between cables (LV: up to 1 kV; HV: 1 kV to 11 kV):

LV/LV	:	2 cable diameters
LV/HV	:	150mm minimum
HV/HV	:	150mm minimum
LV/HV/PILOT	:	1 cable diameter

4.2.2 Where HV and LV cables have to be installed in the same trench, both shall be laid at a depth of 800 mm and then covered with 200mm of soil. The soil shall then be compacted, and then backfilled layer by layer and compacted until the trench is completely backfilled.

4.2.3 Cables for telephones, communication systems and other low voltage systems (less than 50 V) shall be separated from power cables by at least 1m. All control or pilot cables without a lead sheath and steel armouring shall be laid at least 300mm from power cables.

4.2.4 Cables shall not be buried on top of each other unless layers are specified. The minimum spacing between layers shall be 200mm.

4.3 CABLE LAYING

4.3.1 Except where ducts, tunnels or pipes are provided, cables shall be laid directly in the ground.

4.3.2 The cable shall be removed from the drum in such a manner that the cable is not subjected to twisting or tension exceeding that stipulated by the cable manufacturer.

4.3.3 Cable rollers shall be used as far as possible to run out cables. Rollers shall be spaced so that the length of cable in the trench will be totally suspended during the laying operation and sufficiently close to prevent undue sagging and the cable from touching the ground. Rollers shall also be placed in the trench in such a manner that they will not readily capsize.

4.3.4 Cable rollers shall have no sharp projecting parts liable to damage the cables.

4.3.5 Where cables have to be drawn around corners, well-lubricated skid plates shall be used. The skid plates shall be securely fixed between rollers and shall constantly be examined during cable laying operations.

4.3.6 Where cables have to be drawn through pipes or ducts, a suitable cable sock shall be used and particular care shall be exercised to avoid abrasion, elongation or distortion of any kind. In the case of oil filled cables, a cable sock may never be used. Special eyes giving access to the interior of the cable, must be utilised.

4.3.7 The maximum allowable tension when pulling a cable, is 70 N/mm2 of conductor area.

4.3.8 It will be assumed that the price or rates contained in the tender includes for the installation of cables in pipes and ducts or below existing or newly installed services.

4.3.9 The Engineer shall be informed timeously of the intention to carry out all cable laying operations to allow an inspection of the works by the Engineer if so required.

5. INSTALLATION OF CABLES IN CONCRETE TRENCHES

5.1 GENERAL

This paragraph covers the installation of cables in building trenches, service ducts, etc. The trenches, ducts, etc. inside buildings will be constructed and installed by others.

5.2 INSTALLATION

Cables shall be installed in one of the following ways:

(a) On horizontal cable trays.

(b) On horizontal metal supports with suitable clamps.

(c) On vertical cable trays or metal. supports fixed to the side of the trench. The cables shall be clamped in position.

Cables shall not be bunched and laid on the floor of the building trenches.

5.3 COVERS

5.3.1 The covering of concrete trenches shall as a rule fall outside the scope of the electrical installation. The Contractor shall however be responsible for the cutting or drilling and smoothing of holes for cables through chequer plates, concrete or other coverings as required.

5.3.2 Cables shall enter and exit the trench through sleeves protruding 300mm beyond the covering. The sleeves shall be permanently secured in position and the open space between the cable and sleeves shall be sealed with a non-hardening, watertight compound.

5.4 FILLED TRENCHES

5.4.1 Where specified, floor trenches shall be filled with fine crusher sand (no river or see sand).

5.4.2 If a sand filling is specified, the cables shall be fixed to non-corroding supports.

5.4.3 Sand-filled trenches other than in substations shall be covered in one of the following ways:

(a) Reinforced concrete covers.

(b) Sand and cement screed.

(c) Removable chequer plates.

5.4.4 Method (a) above shall be used where vehicular traffic may be encountered over trenches. Unless otherwise specified allowance for a mass of 2 tons shall be made.

5.4.5 Cable trenches in substations, switch rooms and generator rooms shall be covered in accordance with the Engineer's standard specification for "COVERING AND SEALING OF CABLE TRENCHES", Par. 9 of Section B13.

6. FIXING OF CABLES TO TRAYS OR STRUCTURES

6.1 INSTALLATION

Cables may be installed in one of the following ways:

(a) On horizontal cable trays.
(b) Against vertical cable trays with suitable clamps.
(c) Against horizontal or vertical metal supports or brackets with suitable clamps.
(d) On clamps which are fixed to the structure.

6.2 CLAMPS

Suitable clamps (cleats) which will secure cables without damage shall be used. Metal clamps or drilled hard wood blocks shall be used. Clamps shall consist of adjustable metal wings which clamp to a metal support, or consist of two halves that are bolted together. The correct clamp size to fit the cable shall be used. Cables of different sizes nay only be fixed by a common clamp when the clamp is specially made to accommodate the various cables.

6.3 SPACING OF SUPPORTS

Two methods of supporting cables are found in practice. The most generally known method is the restrained installation where the distance between supports is small enough to prevent any noticeable sag in the cable. The alternative method is the unrestrained installation where the distance between supports should be great enough to ensure that there will be obvious sag in each span between supports.

6.4 SPACING OF SUPPORTS OF UNRESTRAINED CABLES

Large single core cables shall always be installed according to this method. Generally, single core cables with conductors exceeding a cross sectional area of 185mm² should be supported at spacings in excess of 2m since the sag between supports will safely accommodate any thermal expansion.

Reducing the spacing between the supports to 1,5m or less shall be avoided at all costs, as expansion cannot be taken up by a change of sag and chances of sheath failure become considerable.

6.5 SPACING OF SUPPORTS OF RESTRAINED CABLES

Additional cleats shall be installed at each bend or offset in the cable run. The maximum distance between supports or cleats for multi-core control cables shall be 20 times the outside diameter of the cable with a maximum spacing of 550mm for unarmoured cables and 30 times the outside diameter of the cable with a maximum spacing of 900mm for armoured cables. Spacing of supports for cables for high voltage lighting shall be in accordance with Table 8 of SANS 10142. A minimum of 20mm ventilation clearance shall be maintained between cables and the wall to which they are cleated.

7. GROUPING AND SPACING OF CABLES IN BUILDINGS AND STRUCTURES

7.1 SPACING CORRECTION FACTORS

Cables shall as a rule be spaced two cable diameters apart, for which no grouping correction factor need be applied.

7.2 CABLES ON DIFFERENT LEVELS

Where parallel cable runs are installed at different levels (e.g. on parallel cable trays) and where the spacing of the layers is not specified, a minimum spacing of 300mm shall be maintained.

7.3 SINGLE CORE CABLES

Where single core cables are installed along a three-phase circuit, the cables shall be installed in trefoil formation and bound together at 300mm intervals.

7.4 HIGH VOLTAGE CABLES

High voltage cables shall be separated from other cables and services throughout the installation and shall as far as possible be installed in separate floor trenches, pipes or metal channels. Where this is not feasible a minimum spacing of 500 mm shall be maintained.

7.5 CABLES FOR OTHER SERVICES

Cables for telephones, communication systems and other low voltage systems (less than 50 V) shall be separated from power cables. In building ducts a physical barrier shall be provided between power cables and cables for other services. Where armoured cables are used for such other services, they shall be installed on separate cable trays or shall otherwise be at least 1m away from power cables. Where unarmoured cables are used for these other services, they shall be installed in separate conduits or metal channels.

TABLE B6.1

Cross-Sectional Area of Cable Conductors (mm^2)	MAXIMUM SPACING OF SUPPORTS (CLEATS) (mm) FOR RESTRAINED CABLES			
	Wire Armoured Cables		Other than Wire Armoured Cables and Unarmoured Cables	
	Horizontal Cable Routes	Vertical Cable Routes	Horizontal Cable Routes	Vertical Cable Routes
1,5	450	750	300	400
2,5	450	750	300	400
4,0	600	750	300	400
6,0	600	750	300	400
10,0	750	900	400	450
16,0	750	1000	400	550
25,0	900	1000	450	550
35,0	900	1000	450	550
Bigger than 35,0	900	1000	450	550

For larger cables the spacing shall be 10 x outside diameter of the cable.

8. TERMINATION AND JOINTING OF CABLES

8.1 GENERAL

8.1.1 Cable ends shall be terminated with glands or in cable boxes with the associated accessories such as clamps, shrouds, etc. complying in all respects with the Engineer's quality specifications, Section C.

8.1.2 Connection of cables to switchgear shall always be effected in such a way that the various phases, seen from the front of the switchgear will be in the following positions:

No. 1 conductor : left (red) (A)
No. 2 conductor : centre (white) (B)
No. 3 conductor : right (blue) (C)

8.1.3 Exposed armouring shall be covered with bitumen-base paint.

8.1.4 All cable ends shall be supplied with the necessary earth connection.

8.1.5 A channel or other approved means of support shall be provided to remove mechanical stress from the glands.

8.1.6 Cable cores shall be marked with heat-shrunk sleeves where necessary to identify the phases. Refer to SANS 10142.

8.1.7 The current-carrying capacity and breakdown voltage of the cable end shall be the same as for the complete cable.

8.1.8 Cables shall be terminated in accordance with the recommendations laid down by the manufacturers of the cables and glands employed.

8.2 TERMINATION OF PAPER-INSULATED CABLES

8.2.1 The ends shall be terminated in cable end boxes filled with bituminous, cold filling or resin oil semi-fluid compound or heat-shrinkable terminations in accordance with the Engineer's standard specification for "CABLE END BOXES AND COMPOUND", Section C8 or "CABLE TERMINATIONS AND JOINTS", Section C6.

8.2.2 Heat-shrinkable materials shall only be used in exceptional circumstances with the written permission of the Engineer.

8.2.3 Before terminating or jointing paper-insulated cables, a test to establish the presence of moisture must be carried out.

The following procedure may be followed:

(a) Place an adequate quantity of cable impregnating oil in a suitable container and heat up to 130 C ± 5 C.

(b) Cut a small length (± 300mm) of the cable concerned and remove the armouring and sheath, taking care not to handle the dielectric in any way.

(c) Dip a section of the outer insulating impregnated paper (belt paper) in the heated oil, taking care not to contaminate the tapes with moisture from the hands. If frothing appears on the surface of the oil, this is a clear indication of the presence of moisture in the paper.

(d) The same procedure should then be repeated on the insulating impregnated paper around the conductors (especially those layers closest to the conductors). Frothing will also indicate the presence of moisture.

(e) Should only a small number of bubbles appear on the surface of the oil, this is an indication of air bubbles on the paper and not moisture since the presence of moisture will result in a series of bubbles rising to the surface of the oil for a number of seconds, until all moisture has been removed.

8.2.4 The armouring shall be bonded to the main earth bar of the switchgear or transformer, but the bond shall be easily removable for testing purposes.

8.2.5 The lead sheath shall be wiped against the conical wiping gland.

8.2.6 All cut cable ends which will be exposed to the atmosphere for more than two hours shall be sealed and wiped to prevent penetration of moisture.

8.3 TERMINATION OF XLPE CABLES

8.3.1 These cables shall only be used in exceptional circumstances and only with the written permission of the Engineer.

8.3.2 Cross-linked polyethylene cables (XLPE) shall be terminated in accordance with the Engineer's standard specification for "CABLE TERMINATIONS AND JOINTS", Section C6 unless a pre-fabricated system based on pre-moulded slip-on EPR stress cones is used.

8.3.3 The copper tapes of the earth screen on the cable shall be bonded to the main earth bar of the switchgear or transformer, but the bond shall be easily removable for testing purposes.

8.3.4 The cable shall be firmly secured on the switchgear by means of a clamp to prevent mechanical stress on the cable and terminations.

8.4 TERMINATION OF PVC-INSULATED CABLES

8.4.1 Cable ends shall be terminated by means of adjustable glands in accordance with the Engineer's standard specification for "GLANDS FOR PVC-INSULATED CABLES", Section C5.

8.4.2 The glands shall be fitted in accordance with the cable and gland manufacturers instructions.

8.4.3 The correct size and type of gland shall be used for the particular cable and application.

8.5 CONNECTION OF CABLE CONDUCTORS

8.5.1 Suitable lugs shall be used, preferably solidly sweated to the cable conductor ends. Lugs may be crimped, using mechanical or pneumatic tools designed for this purpose, on condition that evidence is submitted that the method used complies with the performance requirements of BS 4579, Part 1 : "COMPRESSION JOINTS IN COPPER".

8.5.2 Contact surfaces shall be thoroughly cleaned and smoothed and fixing bolts shall match the hole size of the lug.

8.5.3 Cables that are connected to clamp type terminals where the clamping screws are not in direct contact with the conductor, need not be lugged but the correct terminal size shall be used.

8.5.4 Ferrules shall be used as far as possible where cable conductors are connected directly to equipment with screws against the conductor strands.

8.5.5 When cutting away insulation from cable conductors to fit into lugs, care shall be taken that no strands are left exposed. Under no circumstances may any of the conductor strands be cut away to fit into lugs.

8.6 JOINTS

8.6.1 Joints in cable runs will not be allowed unless specified in the Detail Technical Specification or authorised by the Engineer.

8.6.2 Jointing shall be carried out strictly in accordance with the manufacturer's instructions and by personnel competent in jointing the types of cables used.

8.6.3 During outdoor jointing operations, the joint bays shall be adequately covered by tents of waterproof material suitably supported. Where necessary a trench shall be excavated around the bay to prevent the ingress of moisture. The sides of the hole shall be draped with small tarpaulin or plastic sheeting to prevent loose earth from falling in during jointing operations.

8.6.4 The joint shall not impair the anti-electrolysis characteristics of the cable.

8.6.5 The Contractor shall notify the Engineer timeously of the day on which jointing is to be carried out in order than an 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 at the cost of the contractor.

8.6.6 HV cable joints on paper insulated cables shall be of the compound cast type and the compound used shall comply with the Engineer's standard specification for "CABLE END BOX FILLING COMPOUND", par. 2 of Section C8.

8.6.7 HV cable joints on XLPE-insulated cables shall be of the heat shrinkable type and shall comply with the Engineer's standard specification for "CABLE TERMINATIONS AND JOINTS" Section C6, or shall be based on a prefabricated system utilising pre-moulded slip-on stress cones.

8.6.8 LV cable joints shall be of the epoxy-resin type.

8.6.9 Joints shall be fully water and air tight and shall be free of voids and air pockets.

8.6.10 The crossing of cores in joints will not be permitted under any circumstances.

9. TESTING

9.1 Each cable shall be tested after installation in accordance SANS 1507 (up to 1 kV) and SANS 97 (up to 11 kV) as well as the requirements of the Local and Supply Authorities.

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

TABLE B6.2

Cable Rating (kV)	TEST VOLTAGE (Applied for 15 minutes) (kV)				
	Paper-insulated cables				XLPE-insulated cables
6,6 11	Between conductors		Conductors to sheath		Conductors to screen
	AC (r.m.s)	DC	AC (r.m.s)	DC	DC
	12 20	18 30	12 20	18 30	11 18

* High Voltage test with DC to 2kV for 1 minute only. Discharge cable slowly via discharge stick (1 minute). Clamp all conductors to earth for 24 hours.

9.3 HV Cables shall be high voltage tested in accordance with Table B6.2 and the exact leakage current shall be tabulated and certified.

9.4 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.

9.5 The Contractor shall notify the Engineer timeously so that a representative of the Engineer may witness the tests.

9.6 On completion of the tests on any cable, the Contractor shall without delay, submit three copies of the certified Test Reports to the Engineer.

10. MEASUREMENTS

10.1 All measurements for payments shall be made jointly by the representatives of the Engineer and the Contractor and the Contractor shall obtain the signature of the Engineer's representative including approval of such measurements.

10.2 No allowance shall be made for the breaking away of the trench sides, other earth movements or for trenches excavated in excess of the stipulated dimensions. Refer also to par. 3.7.5 above.

10.3 The classification shall be as follows:

Very hard rock shall mean rock that can only be excavated by means of explosives.

Hard rock shall mean granite, quartzitic sandstone, slate and rock of similar or greater hardness, solid shale and boulders in general requiring the use of jack hammers and other mechanical means of excavations.

Soft rock and earth shall mean rock and earth that can be loosened and removed by hand-pick and shovel.

10.4 Where very hard rock and hard rock are encountered, the prior approval of the Engineer shall be obtained before proceeding with the excavation. This requirement is stipulated in order to afford the Engineer the opportunity to determine whether an alternative cable route is justified.

10.5 All cable lengths indicated in the Detail Technical Specification and/or shown in the cable route drawings shall be regarded as estimates and are given for tendering purposes only. The successful tenderer shall measure actual cable lengths on site before ordering.

10.6 The final price for the supply and installation of all cables will be adjusted, on the basis of the actual lengths of installed cables, in accordance with the unit rates quoted at the time of tendering. Cable lengths shall be measured on site to the nearest 500mm for this purpose and surplus cable will not be paid for.

11. COMPLETION

11.1 The Engineer reserves the right to inspect the installation at any stage during the course of construction. Such inspections will however not deem the portions inspected as being complete or accepted and the Contractor shall remain responsible for completing the installation fully in accordance with the Contract Documents.

11.2 The Contractor shall carry out a final "as built" survey of the cable routes and present to the Engineer "as built" route plans of the complete installation. The following information shall be reflected on the plans or submitted as separate schedules with the plans :

(a) Overall length of each cable.

(b) Locations of all joints (if any) in relation to permanent reference points. Dimensions shall be shown and the method of triangulation i.e. two dimensions to each joint, shall be used.

(c) Identification of each cable.

11.3 The works will be deemed to be incomplete until all tests have been conducted successfully and all "as built" drawings and schedules have been handed to the Engineer.

SECTION B7

B.7 INSTALLATION OF LIGHT SWITCHES AND SOCKET-OUTLETS

1. GENERAL

1.1 STANDARDS

Light switches and socket-outlets shall comply with the Engineer's quality specification for "LIGHT SWITCHES", Section C10 and UNSWITCHED AND SWITCHED SOCKET-OUTLETS", Section C11. Surface or flush mounted boxes and cover plates, complying with the Engineer's quality specification for "CONDUIT AND CONDUIT ACCESSORIES", Section C1, shall be provided.

1.2 POSITION OF OUTLETS

Switches and socket-outlets shall be accurately positioned in accordance with the drawings. It is the Contractor's responsibility to ensure that all outlets are installed level and square, at the correct height from the floor and at the correct position relative to building lines and equipment positions as specified. It is the Contractor's responsibility to determine the correct final floor level and ceiling level in conjunction with the Main Contractor.

1.3 COVER PLATES

All switches and socket-outlets shall be fitted with standard metal cover plates. The colour of cover plates shall be as specified or shall otherwise match the surrounding finishes as closely as possible. Unless specified to the contrary, ivory cover plates shall be installed on painted walls. Cover plates in the same area shall have the same colour. Flush mounted cover plates shall overlap the draw-box and edges of the recess. Cover plates shall under no circumstances be cut unless authorised by the Engineer.

1.4 ESCUTCHEON PLATES

Where flush mounted switches or socket-outlets are installed in special wall finishes e.g. wood or board panels, acoustic tiles or other cladding, etc. and where the wall finishes must be cut to accommodate the switch, it may be necessary to fix an escutcheon plate to the wall to cover the cut-outs. The escutcheon plate shall fit closely around the outlet boxes and shall be fixed independently of the boxes and cover plates. Bevelled cover plates shall be fixed to the outlet boxes and shall fit firmly against the escutcheon plate.

1.5 APPEARANCE

The sides of adjacent switches, plugs, push-buttons etc. shall be parallel or perpendicular to each other and uniformly spaced. A common escutcheon plate shall be placed around flush mounted outlets and accessories where the standard cover plates do not cover the cut-outs in the finishes.

1.6 DEEP BOXES

Where switch or socket-outlet boxes have been set deep, spiral type steel wire spacers shall be used to fix the yoke of the switch or socket.

2. INSTALLATION OF SOCKET-OUTLETS

2.1 MOUNTING HEIGHT

Unless specified to the contrary, socket-outlets shall be installed at the following heights above finished floor level, measured to the centre of the outlet:

Flush mounted in general: 300mm

Showrooms, shops, servants quarters:	1,4m
Domestic kitchens, tea kitchens:	1,05m
Commercial kitchens:	1,4m
Factories, workshops, garages:	1,4m

2.2 WALLS

In cases where socket-outlets must be mounted at a nominal height of 300mm and where the lower portion of the wall consists of face bricks and the upper portion is plastered, the outlets shall be installed in the plastered portion of the wall. If however the plastered portion of the wall commences 500mm or more above floor level the outlets shall be installed in the face bricks. Where a wall has different surface finishes the outlets shall be installed within the same finish and not in the dividing lines between the different wall finishes. All outlets shall be installed at least 150mm away from door frames.

3. INSTALLATION OF LIGHT SWITCHES

3.1 MOUNTING

Light switches shall be installed 1,4m above finished floor level unless specified to the contrary. Mounting heights given shall be measured from the finished floor level to the centre of the switch. All single switches shall be installed with the long side of the toggle vertical.

3.2 DOORS

Unless specified to the contrary, switches adjacent to doors shall be installed on the side containing the lock. If the position of the lock is not shown on the drawings, the position shall be verified before the switch-box is installed. Switch boxes in brick or concrete walls shall be installed 150mm from the door frame. Light switches installed in partitions or door frames shall be of the type designed for that purpose.

3.3 WALLS

Where the lower portion of a wall is face brick and the upper portion plastered, light switches shall be installed wholly in the plaster provided that the lower edge of the plaster is not higher than 1,6m above the finished floor level. In general where different wall finishes are used in the same area. Switches shall be installed within the same finish and not on the dividing lines between finishes.

3.4 PARTITIONS

Light switches installed in partitions shall preferably be of the type designed to be accommodated in the partition construction. Switches installed in the metal supports do not require switch boxes. Switches may not be flush mounted in partition walls without switch boxes.

3.5 WATERTIGHT SWITCHES

Switches that are exposed to the weather or are installed in damp areas, shall be of the watertight type complying with the Engineer's quality specification for "WATERTIGHT SWITCHES", par. 3 of Section C1O.

3.6 MULTIPLE SWITCHES

Where several switches are required in one position, multi-lever switches in a common switch box shall be provided wherever possible. All circuits wired into this box shall be on the same phase in order that voltages in excess of 250 V are not present in the box. Where it is not possible or practical to do this, barriers shall be installed and a label shall be prominently displayed within the box stating that voltages in excess of 250 V are present.

SECTION B8

B.8 PHOTO-ELECTRIC DAYLIGHT SENSITIVE SWITCH FOR OUTSIDE LIGHTING

1. INSTALLATION

1.1 The outside lighting of each individual building i.e. light circuits marked "T" on the drawings, shall be controlled by photo-electric daylight sensitive switches.

1.2 The positions of the switches as indicated on the drawings are provisional and the exact positions shall be confirmed with the representative of the Engineer on site.

1.3 Individual outside lighting circuits on a building may be connected directly to the daylight sensitive switch.

1.4 Where two or more lighting circuits are to be controlled by a single daylight sensitive switch, a contactor actuated by the unit shall be provided in the switchboard.

1.5 A by-pass switch enabling the lights to be turned on at any time, shall be provided.

1.6 Standard control circuits are indicated in fig. B8.1 and B8.2.

2. CONSTRUCTION

2.1 The unit shall comprise a photo cell, thermal actuator and change-over switch. The cover of the unit shall be manufactured from a tough, durable material providing protection against tampering. The cover shall have good weathering properties. It shall be ultraviolet-resistant and shall not deteriorate when exposed to sunlight for prolonged periods.

2.2 The unit shall be of the wall mounting type and shall be supplied complete with a suitable bracket.

2.3 The operational level shall be factory preset for "ON" at a light level of approximately 54 lux and "OFF" at approximately 108 lux. Voltage variations shall not materially affect the operational levels.

2.4 A time delay of not less than 15 seconds shall be provided to prevent the unit from functioning due to short period changes in illumination.

2.5 The unit shall be effectively safeguarded against voltage surges by means of a suitable surge protector which shall preferably form an integral part of the unit.

SECTION B9

B.9 INSTALLATION OF LUMINAIRES

1. POSITIONS

The mounting positions of luminaries shall be verified on site. All luminaries shall be placed symmetrically with respect to ceiling panels, battens, beams, columns or other architectural features of the space unless otherwise indicated. The layout as shown in the Documents shall generally be adhered to but any discrepancies or clashes with structural or other features must be referred to the Engineer, before commencing erection of the installation.

2. COVER PLATES

Cover plates shall be fitted over all draw-boxes and outlets intended for luminaries that are not covered by the luminaries canopy, lamp-holder, ceiling rose or similar accessories.

3. FIXING TO DRAW-BOXES

Where an outlet box or draw-box provides the necessary support for a luminaries, all luminaries with the exception of fluorescent luminaries mounted against ceilings, shall be fixed directly to the box. Fluorescent luminaries and luminaries with a mass in excess of 10kg shall however be suspended independently of the outlet box.

4. HANGERS AND SUPPORTS

Where provision has not been made for the fixing of luminaries, the Contractor shall supply the necessary supports, hangers, conduit extensions, angle brackets or any other fixing method approved by the Engineer.

5. SUSPENDED LUMINAIRES

The necessary hangers shall be provided where luminaries which are of the non-suspension type have to be fixed below false ceilings or roof slabs. The use of 20mm conduits fixed to the roof slab or ceiling is preferred. Provision shall be made for adjustments to enable the levelling of luminaries. Suspended conduits shall be fixed to the ceiling by means of screwed dome lids, bolts and nuts. Ball-and-spigot type domelids shall be used where conduit lengths exceed 600mm. Wiring shall be installed in the conduit hangers.

6. SUSPENDED WIRING CHANNELS

Luminaries (especially fluorescent luminaries) may also be suspended from ceilings by means of suspended metal channels. The metal channel may be supported by conduits or threaded rods. Should metal rods be utilised, these shall be screwed to anchor bolts fixed in the roof slab. Wiring shall either be installed in conduits fixed to the metal channel or in the metal channels and covered with a suitable cover plate. Purpose-made clamps shall be used to fix the luminaries to the cable channel.

7. CEILING BATTENS

Where wooden blocks are used to suspend luminaries, ceiling battens shall not be cut. The wooden blocks shall be cut to fit around battens and shall be screwed to the ceiling. Battens may however be cut where fluorescent or incandescent luminaries with metal canopies have to be installed against a false ceiling.

8. GLASS-BOWL LUMINAIRES

Unless specified to the contrary, suspended glass-bowl luminaries shall be installed with the underside at least 2,1 m above finished floor level.

9. FLUORESCENT LUMINAIRES FIXED TO CONCRETE SLABS

Fluorescent luminaries to be installed directly against concrete slabs or walls shall be securely fixed to the outlet box and at two additional points. Shot-fired fixings are not acceptable. Where approved, fluorescent luminaries may be installed against metal wiring channels in which the wiring is housed. The channel fixing may in this case be shot-fired. Purpose-made fluorescent fixing adaptors shall be used to fix luminaries to cable channels.

10. FLUORESCENT LUMINAIRES FIXED TO CEILINGS

10.1 In all cases where luminaries are fixed to false ceilings, the Contractor shall ensure that the ceiling is capable of carrying the weight of the luminaries before commencing installation. Should any doubt exist in this regard, the matter shall be referred to the Engineer.

10.2 In cases where the weight of the luminaire is not carried by the ceiling but by a support or other suspension method, provision shall be made to prevent relative movement between the ceiling and luminaire, ceiling rose or connection point.

10.3 Surface mounted fluorescent luminaries shall fit firmly against the ceiling brandering without leaving gaps between luminaire and ceiling. The luminaire shall be fixed directly to the ceiling by means of brass plated round-head wood screws and washers.

10.4 In the case of tiled ceilings with exposed or concealed T-section supports, surface mounted luminaries shall be fixed only to the tiles by means of butterfly screws or bolts with nuts and washers. The tiles shall be suitably reinforced.

10.5 Luminaries may alternatively be fixed to metal cross-pieces resting in the ceiling tees.

10.6 Drilling of holes in ceiling tees to support luminaries will not be allowed.

10.7 Luminaries shall be fixed in neat relation to the ceiling lay-out.

11. CONTINUOUS ROWS OF LUMINAIRES

In cases where fluorescent luminaries are installed in tandem, only one connection outlet need be supplied per circuit. All luminaries shall be coupled to one another by means of nipples or brass bushes and locknuts to ensure that wiring is not exposed and that earth continuity is maintained. Luminaries on the same circuit may be wired through the channel formed by the luminaire bodies. In this case silicon-rubber insulated conductors shall be used and internal connections shall be made at porcelain terminal blocks. "SCREW-IT" or similar connectors may only be used if prior permission is obtained from the Engineer. The wiring for any other circuits or outlets, even though these may be in the same row, may not be installed through the luminaire bodies. The Contractor shall ensure that continuous rows are straight and parallel to the relevant building lines.

12. RECESSED LUMINAIRES

12.1 Where recessed luminaries are specified, the Contractor shall maintain close liaison with the ceiling Contractor. In the case of tiled ceilings, the luminaries shall preferably be installed while the metal supports are being installed and before the tiles are placed in position. The Electrical Contractor shall be responsible for the co-ordination of the cutting of ceiling tiles with the other contractors concerned.

12.2 All mounting rings and other accessories shall fit closely into cut-outs to ensure a proper finish.

12.3 In all false ceilings where wiring channels are used, recessed luminaries shall be connected to the wiring channels by means of unswitched 5 A socket-outlets.

12.4 The following requirements shall be adhered to:

(a) Socket-outlets used shall comply with the Engineer's quality specification for "UNSWITCHED AND SWITCHED SOCKET-OUTLETS", par. 4 of Section 11 and shall be of 5 A minimum rating.

(b) The connector cord attached to the luminaire may not exceed 3m in length and shall consist of 1,5mm² minimum, 3-core, PVC-insulated flexible cord.

(c) The 5A socket-outlets shall be positioned such that they are not more than 600mm above the false ceiling.

13. SPECIAL CEILINGS

In cases where special ceilings e.g. aluminium strips, decorative glass, metal leaves, etc. are to be installed, the Contractor and the Manufacturer of the ceiling shall agree upon the method of fixing of luminaries in the ceiling.

14. BULKHEAD LUMINAIRES

Surface mounted bulkhead luminaries shall not be screwed directly to conduit ends. The conduit shall terminate in a round draw-box at the top or rear of the luminaire. The PVC-insulated conductors shall terminate in a porcelain terminal strip in the draw-box. Silicon-rubber-insulated conductors shall be installed from the terminal strip to the luminaire lamp-holder. "SCREW-IT" or similar connectors may only be used if prior permission is obtained from the Engineer.

15. TYPE OF CONDUCTOR

PVC-insulated conductors, unless protected by an approved heat-resistant sheathing, shall not be used where the temperature of the insulation is likely to exceed 70°C. In unventilated luminaries or luminaries capable of housing incandescent lamps over 60W, the interconnecting wiring from the lamp-holder to the circuit wiring shall consist of silicon-rubber insulated conductors. Silicon-rubber insulated conductors shall be used exclusively in the case of high bay fittings. Refer also to the provisions of SANS 10142.

16. WIRING OF LAMPHOLDERS

The central terminal of Edison Screw (E.S.-type) LAMP-HOLDERS shall be connected to the phase conductor and the screwed housing to the neutral conductor.

17. HIGH BAY LUMINAIRES

17.1 High bay luminaries shall be securely suspended from the roof structure.

17.2 The luminaries nay be fixed to suspended wiring channels containing the wiring on condition that:

(a) rigid channels with a maximum width of 42 mm be used,

(b) the channels are supported at intervals that will prevent sag or warp and

(c) the channels are large enough to accommodate the wiring.

17.3 Luminaries may be suspended from metal roof trusses with the aid of "CADDY" or similar fasteners.

17.4 Luminaries shall preferably be connected to unswithed 5A socket outlets. Silicon-rubber insulated flexible cord shall be used exclusively to connect the luminaire to the outlet.

17.5 A safety chain to keep the luminaire from falling when loosened shall be provided.

SECTION B10

B.10 CONNECTIONS TO EQUIPMENT

1. GENERAL

This section covers the final electrical connections to switchboards and various equipment in general electrical installations under normal environmental conditions for system voltages up to 600 V. Refer also to the Engineer's standard specifications for "WIRING", Section B5 and "INSTALLATION OF CABLES", Section B6.

2. CONNECTIONS TO SWITCHBOARDS

2.1 CONDUIT ENTRIES

2.1.1 Where sufficient space for conduit entries as well as adequate space for future conduit entries is available, conduits may be terminated directly on the switchboard.

2.1.2 Alternatively, conduits connected to switchboards shall terminate in a common fabricated sheet steel draw-box installed in the vicinity of the switchboard. In open roof spaces this draw-box shall be placed in a roof space of not less than 900mm clearance.

2.1.3 Lighting and socket-outlet circuits may be separately grouped in common conduits or metal ducts (trunking) from the distribution board to the draw-box. The drawbox shall be of sheet steel with a minimum thickness of 1,6mm and shall be fitted with a removable cover plate.

2.2 FLUSH MOUNTED SWITCHBOARDS

Where flush mounted switchboards are required, the recessed switchboard tray shall be built into the brick or concrete wall. All conduits from the floor or roof shall be fully recessed and shall be bonded directly to the tray by means of locknuts on both sides and the ends of the conduits fitted with a brass bush.

2.3 SURFACE MOUNTED SWITCHBOARDS

Where surface mounted switchboards are specified but where the conduits can be fully recessed, the conduit shall be connected to a recessed connection box installed behind the switchboard. An opening with the same dimensions as the connection box shall be cut in the back of the switchboard and fitted with a suitable grommet.

2.4 SPARE CONDUITS

Where conduits from a switchboard run into a false ceiling space above the board, a minimum of two 25mm and two 20mm spare conduits shall be installed into the ceiling space immediately above the board.

2.5 CABLE CONNECTIONS

2.5.1 Where underground cables are to be connected to switchboards, it shall be the responsibility of the Contractor to ensure that metal, earthenware, asbestos-cement or other approved sleeves are built in correctly to enable installation and connection of the cable to the switchboard.

2.5.2 PVC or pitch fibre sleeves are not acceptable - refer to par. 3.10 of the Engineer's standard specification for "INSTALLATION OF CABLES", Section B6.

2.5.3 Sleeves shall tie installed with a fall from inside to outside of the building to facilitate drainage. The sleeves shall be sealed with a non-hardening compound after installation of the cables to render the installation vermin proof and waterproof.

2.5.4 A metal cable channel with removable metal cover plate shall be installed by the Contractor and shall extend from the switchboard to the floor or into the ceiling void as required. The channel shall coincide with the position of sleeves. The channel shall be flush mounted except in the case of surface mounted switchboards and then only with the permission of the Engineer's representative.

2.5.5 The cable channel shall be large enough to permit the installation of cable glands and future cables, particularly where spare sleeves have been provided.

2.5.6 The colour of the channel cover shall match that of the associated switchboard.

2.6 CABLE TRENCHES

Where cables in floor trenches have to be connected to wall mounted switchboards, approved sleeves or conduits shall be installed from the side of the trench to the bottom of the switchboard. These sleeves shall be positioned and fixed before the concrete is cast.

3. CONNECTIONS TO MOTOR DRIVEN EQUIPMENT.

3.1 An isolator or starter containing an isolator shall be installed within 2m of motor driven equipment. The requirements of SANS 10142 shall be met. If this isolator cannot be installed on a wall, switchboard or other suitable place, an approved free-standing pedestal shall be provided. The pedestal shall be 1m high and outside normal walkways, access routes, etc.

3.2 The connection to the equipment shall be carried out as follows:

(a) Metal reinforced plastic or PVC-covered flexible metal conduits with individual conductors or a multi-core PVC insulated cable and separate bare earth conductor installed inside the conduit may be used. The flexible conduit shall not exceed 600mm. Screwed conduit shall be used from the end of the flexible conduit to the isolator and/or starter. Refer to the Engineer's standard specification for "FLEXIBLE CONDUIT", Section B1, par. 5.

(b) Multi-core armoured PVC- or rubber-insulated cable and earth conductor. The installation and termination of the cables shall comply with the Engineer's specification for "INSTALLATION OF CABLES, Section B6.

(c) Cables and flexible conduits shall be provided with sufficient slack to allow positional adjustment of the equipment.

3.3 Supply cables to equipment may not be installed across floors which are for general use.

4. CONNECTIONS TO WATER HEATERS

4.1 Each water heater shall be connected to a separate circuit with a separate earth conductor.

4.2 The conduit from the switchboard to the water heater shall terminate in a draw-box within 1 m of the water heater terminals. The connection from the draw-box shall be conductors in conduit or PVC-insulated cable. Only in instances where heaters are mounted out of normal reach may flexible conduit and round boxes with dome lids be used for the final connection.

4.3 Three-phase supplies to fixed storage water heaters shall be in accordance with the wiring diagram, Fig. B10.1.

4.4 The mounting of the water heater and the provision of the water connections will be undertaken by others. The Contractor shall ensure that the elements and thermostats can easily be replaced.

4.5 Before testing a water heater, the Contractor shall confirm with the Plumbing Contractor that the unit is filled with water.

4.6 Unless otherwise specified in the Detail Technical Specification, the wiring of hot water heater circuits not exceeding 4 kW shall consist of 4mm² conductors and 2,5mm² earth conductor.

4.7 Unless it is specified that isolators for water heaters shall be provided in the switchboard, a local isolator shall be provided for each water heater. In the case of water heaters not exceeding 4 kW, a 30 A double-pole metal-clad isolator shall be surface mounted over the flush conduit outlet box.

5. CONNECTIONS TO HEATERS, FANS AND AIRCONDITIONING UNITS

5.1 ISOLATORS

A flush mounted suitably rated double-pole isolator shall be provided within 1m of the unit. Where the equipment is mounted out of reach, the isolator shall be installed at 1,5m above floor level. Only where units are mounted in easily accessible positions and where an isolating switch is incorporated in the unit, may this isolator be omitted. Where flush isolators are used, flush conduit shall be installed to link with the equipment outlet point. Flexible cords of sufficient rating may be used for the final connection to the equipment.

5.2 WIRING

The minimum conductor size to be used shall be 4 mm^2. Each fan, heater or air-conditioning unit shall be on a separate circuit.

5.3 FLUSH MOUNTED CONVECTION HEATERS

The heater frame or tray shall be built or cast into the wall at a height such that the underside of the heater is at 250mm above floor level. Conduits shall terminate on the frame near the terminals.

5.4 SURFACE MOUNTED EQUIPMENT

5.4.1 Connections to surface mounted equipment shall consist of a draw-box located in the vicinity of the terminals of the unit. In workshops and industrial areas the connections shall be made by means of flexible conduit connected to dome lids on the draw-box. Conductors shall be connected directly to the unit.

5.4.2 In non-industrial applications PVC-insulated 3-core flexible cables may be used for the connection.

5.4.3 Where flexible cables are used, a bush shall be provided at the rear of the unit for cable entry and a bush and clamp (or gripper gland) at the draw-box. The clamp shall tightly grip the outer insulation of the cable to prevent tension on the connections between cable and conductors in the draw-box.

5.4.4 Where heaters or air-conditioning units are situated above power skirting, the isolator shall be installed in the power skirting and the flexible cable or cord to the unit shall be installed in the power skirting through a gripper or compression gland. The cable shall be made as short as practical and shall be neatly saddled to the surface of the wall.

5.5 RADIANT HEATERS

The installation of radiant heaters and asbestos heaters, where specified, shall comply with the requirements of paragraph 5.4, with the exception that they shall be mounted on spacers, 25mm away from the mounting surface.

5.6 FAN HEATERS

5.6.1 The contractor shall allow for the supply, installation and electrical connection of the fan heaters as indicated on the drawings. The fan heaters shall be rated at 3 kW and shall be complete with control units.

5.6.2 The heaters shall be secured by means of approved expansion bolts at 2,4m above floor level in positions as shown, with the control units at 1,5m above floor level, directly below the unit.

5.6.3 The fan heater shall be installed on a box directly behind the unit.

5.6.4 Each connection shall be protected by means of a single-pole circuit-breaker on the associated switchboard.

5.6.5 Brass bushes shall be provided to protect the wiring at the rear cable entries to the control unit and fan connection box.

6. CONNECTIONS TO UNDERFLOOR HEATING

6.1 Where underfloor heating cable is specified, the Contractor shall supply the cable and thermostats which shall be purchased from a specialist supplier. The cable shall be laid by the specialist supplier and connected by the Contractor. The Contractor shall also be responsible for testing of the cables prior to their being covered by the screed and immediately thereafter. Details of circuit wiring and control of underfloor heating will be specified in the Detail Technical Specification.

6.2 PVC-insulated heating cable with a rating of not higher than 13 W per linear metre shall be used. Thermal insulation will be provided by the Builder.

6.3 The capacity of the heating cable shall he sufficient to give a 20°C temperature rise with an outside ambient temperature of 5°C.

6.4 The total heating load shall, however, not he more than 135 W/m².

7. CONNECTIONS TO INCINERATORS

7.1 GENERAL

This section covers connections to incinerators used for domestic purposes in buildings. Unless specified to the contrary, the supply and installation of incinerators will form part of the electrical installation and shall comply with the Engineer's quality specification, "INCINERATORS", SECTION C14.

7.2 FLUSH MOUNTED INCINERATORS

Where flush mounted incinerators have been specified, the Contractor shall supply the mounting tray to the Builder in good time for it to be built into the structure.

7.3 MOUNTING HEIGHT

Unless specified to the contrary, incinerators shall be installed with the bottom 1m above finished floor level.

7.4 ISOLATOR

A flush mounted 30 A double-pole isolator shall be installed approximately 1,5m above the finished floor level adjacent to each incinerator. The isolator cover plate shall wholly fall within either the tiled or plastered surface of the wall. Unless specified to the contrary, the cover plate shall be finished in white baked enamel. An engraved label shall be provided at each isolator marked as follows:

"SWITCH OFF TO CLEAN AND REMOVE ASH"
"SKAKEL AF VIR SKOONMAAK EN ASVERWYDERING"

7.5 FLUES

The Contractor shall supply flue pipes to the Builder for installation. Two bends and an "H" piece exhaust canopy shall be allowed for each flue pipe.

7.6 EXHAUST FANS

Where more than 5 incinerators are connected to the same flue or where more than two 90° bends are used in the flue, an exhaust fan shall be installed at the flue outlet. In addition a small fan must be provided at each incinerator.

7.7 WIRING

Single incinerators shall be connected by means of 2 x 4mm² PVC insulated conductors and a 2,5mm² bare copper earth conductor in a 20mm conduit. Each incinerator shall be connected to a separate circuit where a common exhaust fan is not used. Where a common exhaust fan is needed, the following applies:

(a) All fans and incinerators connected to the same flue shall be on the same circuit.

(b) The current rating of the circuit-breaker shall be sufficient to allow the simultaneous operation of all the fans and 50 % of the incinerators.

(c) A 30 A double-pole isolator shall be flush mounted adjacent to each incinerator as described in paragraph 7.4. However if the current rating of the circuit-breaker protecting the circuit is larger than 15A, a 15A fuse and fuse holder shall be installed at each incinerator in addition to the isolator. The draw-box and cover plate for the isolator shall be large enough to accommodate the isolator and fuse. Alternatively, a 15A circuit-breaker may be installed adjacent to each incinerator in lieu of the isolator and fuse.

(d) The circuitry shall be arranged to ensure that all the fans will operate when any one of the incinerators is switched on.

(e) Earth leakage protection shall be installed on all incinerator circuits.

8. CONNECTIONS TO COOKING APPLIANCES

8.1 Unless specified to the contrary, the circuit connection to each cooking appliance shall consist of:

(a) 2 x 10mm² PVC-insulated conductors and 6mm² bare copper earth conductor for single phase connections, or

(b) 4 x 4mm² PVC-insulated conductors and 2,5mm² bare copper earth conductor for three phase connections.

8.2 A 60A double pole or 30A triple pole micro-gap isolator flush mounted in a wall outlet box, shall be installed 1,5m above floor level to the left or right of the appliance in accordance with SANS 10142. A white baked enamel cover plate shall be provided, situated wholly on the tiled or plastered surface as applicable.

8.3 The conduit shall terminate 450mm above floor level behind the appliance position. The conduit end shall be approximately 75mm long and shall face downwards. Connections from the conduit end to the appliance shall be installed in accordance with SANS 10142. Sufficient slack shall be provided in the flexible connection to move the appliance 600mm away from its normal position for cleaning or maintenance.

8.4 Alternatively a 45A, 3-pin socket-outlet may be mounted on a round draw-box 450mm above floor level. The connection to the appliance shall consist of a plug and 10mm², rubber-insulated and sheathed cable in accordance with SANS 1520. The cable shall be long enough to enable the appliance to be moved 600mm from its normal position for cleaning or maintenance.

8.5 Crimped or soldered lugs shall be provided on all conductors intended for connection to cooking appliances.

8.6 Each appliance shall be connected to a separate circuit. A separate earth wire shall be provided for each appliance.

SECTION B11

B.11 EARTHING

This section covers the earthing of electrical installations in buildings or other structures. The total earthing system of any electrical installation shall be in complete accordance with SANS 10142.

1. GENERAL RECOMMENDATIONS ON THE PRACTICAL INSTALLATION OF EARTH ELECTRODES

1.1 REQUIREMENTS OF AN EFFECTIVE EARTH

1.1.1 An effective earth must prevent dangerous over voltages arising between metallic structures, frames, supports or enclosures of electrical equipment and the ground during fault conditions.

1.1.2 An effective earth must be able to permit fault currents of sufficient magnitude to flow so as to operate protective devices to isolate the fault before damage can occur.

1.1.3 The ohmic resistance of an effective earth must be low enough to ensure that the step potential on the ground in the vicinity of the earthing point is within safe limits under fault conditions i.e. a voltage gradient not exceeding 40 V/m for fault durations exceeding 1s.

1.2 TYPES OF EARTH ELECTRODES

Three types of earth electrodes are suitable:

1.2.1 Trench Earths

Trench earths comprise a bare copper or galvanised iron conductor laid at a minimum of 800mm below ground level, usually when underground cables are installed. This type of earth electrode provides a relatively large contact area between electrode and surrounding ground, makes contact with a variety of types of soil and soils of varying moisture content en route and is economical to install.

1.2.2 Spike Earths

Spike earths comprise rods of bare copper, copper-coated steel, stainless steel or galvanised steel designed for the purpose of penetrating ground to depths of up to several metres. A low resistance earth may sometimes be obtained by driving multiple spikes at some distance from each other in order to provide parallel paths.

In hard or rocky ground, it is usually necessary to drill holes into which earth spikes are inserted and then packed with soft soil.

1.2.3 Foundation Earths

Foundation earths comprise bare copper or galvanised iron conductors laid under the foundations of buildings, miniature substations, distribution pillars, bases of wooden, concrete or steel poles and structures. Because soil under foundations usually retains moisture, foundation earths are located to take advantage of this favourable condition. Furthermore, they are economical to install.

1.3 MATERIALS FOR EARTH ELECTRODES

1.3.1 Bare copper, either in stranded, strip or rod form, is considered the most suitable general purpose material for earth electrodes. Its main disadvantage is its cost and susceptibility to theft.

1.3.2 Bare galvanised iron and steel, either in stranded, strip or rod form, has a satisfactory record of survival in non-aggressive soils and is more economical than copper.

1.3.3 Bare aluminium is unsuitable as electrode material.

1.4 CORROSION

Because galvanised ferrous metals corrode sacrificially to copper, galvanised iron and steel electrodes should not be buried in close proximity to bare copper.

2. TECHNICAL REQUIREMENTS OF NEUTRAL EARTHING

The following relevant aspects have been extracted from the "AMEU CODE OF PRACTICE FOR THE APPLICATION OF NEUTRAL EARTHING ON LOW VOLTAGE DISTRIBUTION SYSTEMS."

2.1 DISTRIBUTION SYSTEMS

Multiple Earthed Neutral (MEN) and Protective Multiple Earthing (PME) systems.

Distribution equipment associated with transformer substations that are either ground mounted or pole mounted and fed by underground cable or overhead line, with or without an earth continuity conductor, (ECC), should be installed, connected and earthed in accordance with the following requirements:

(a) Where the resistance to earth of the HV equipment earth is 1 ohm or less, it is permissible to earth the LV neutral to the HV earth electrode.

(b) Where the HV equipment earth exceeds 1 ohm the LV neutral shall be earthed at a minimum distance of 6m from the HV equipment earth (i.e. 6m from the HV electrode/s and also from any earthed metalwork connected thereto).

(c) Notwithstanding the requirements of (a) above, where transformers are associated with HV overhead lines, it is considered good practice to separate the HV and LV earth electrodes. The minimum earth separation should be 6m or one LV span.

(d) The overall resistance to earth of the neutral of an LV distributor or distribution system must not exceed 10 ohms.

(e) The LV neutral may be connected to other supply neutrals, earth electrodes, cable sheaths and armouring and these connections used to obtain the required earthing value of 10 ohms or less specified in par. (d). above.

(f) The neutral of underground and overhead LV distributors must be earthed at the remote ends of each distributor.

(g) Where the overall resistance to earth of the neutral of the distribution system exceeds 10 OHMS, the neutral shall be earthed at intermediate positions on the distributor/s to reduce its resistance to earth to below this limit.

(h) The cross-sectional area of the neutral of all LV distributors must not be less than that of a phase conductor.

(i) No circuit-breakers, isolators, fuses, switches or removable links shall be installed in the neutral between the transformer star point and the remote end of any LV distributor or service connection.

(j) All metallic sheathing and armouring of cables and all metalwork associated with meter cabinets, fuse pillars, etc., supporting or enclosing LV cables shall be bonded to the distributor neutral conductor.

(k) Where a Separate Neutral Earth (SNE) cable is part of an MEN or PME system, the armouring and/or metallic sheath and any ECC shall be bonded to the neutral at the supply end of the cable.

(l) To ensure the integrity of the neutral, it is recommended that all connections and joints on or to overhead line conductors be made by compression fittings or, alternatively double bolted connectors.

(m) MEN or PME may be applied to any single LV distributor without alterations to other LV distributors supplied from the same transformer.

2.2 PROTECTIVE NEUTRAL BONDING (PNB) SYSTEM

Since the neutral is earthed at one point only, the question of multiple earthing does not arise and there is therefore no necessity to meet the MEN/PME technical requirements.

2.3 SERVICE CONNECTIONS

2.3.1 MEN System

The following conditions apply to consumers' service connections as well as service connections to traffic signals, road signs, street lighting and other power-consuming equipment installed in public places:

(a) All service connections must be by means of cable with an insulated phase, an insulated neutral conductor and an ECC.

(b) A single phase service connection comprises a live, a neutral and an ECC.

(c) A polyphase service connection comprises two or three phase conductors, a neutral and an ECC.

(d) The service neutral and ECC must be solidly and separately connected to the distributor neutral at the tee-off point.

(e) The consumer's earthing lead is connected to the Supply Authority's earth terminal which is in turn connected to the ECC in the service cable at the consumer's supply point.

(f) The neutral must not be connected to earth at the consumer's supply point.

(g) If required by the Supply Authority, and earth electrode must be installed at the consumer's supply point.

(h) In a service connection to traffic signals, street light and other power-consuming equipment installed in public places, such equipment is earthed to the ECC of the service connection.

2.3.2 PME System

(a) All service connections must be by means of a cable with an insulated phase and an insulated neutral conductor.

(b) A single phase service comprises a live conductor and a neutral.

(c) A polyphase service connection comprises two or three phase conductors and a neutral.

(d) The consumer’s earthing lead is connected to the supplier's neutral and to a mandatory earth electrode at the consumer's supply point.

(e) A label must be attached at the consumers supply point on his premises indicating that the installation is part of a PME system.

Note: It is not recommended that the PME system be applied to supply traffic signals, street signs or other power-consuming equipment installed in public places, because the PME system is inherently unsafe under "broken-neutral" conditions.

3. SUBSTATION EARTHING

In order to comply with the requirements of par. 1 and 2 above, an earth resistivity measurement shall be undertaken at the site of a new substation or miniature substation, preferably be a specialist firm. The contractor shall then submit to the Engineer details of a proposed substation earth indicating whether a trench earth, spike earth or foundation earth is intended and the proposed interconnections with the installation.

4. FENCES OF OUTDOOR SUBSTATIONS

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

(a) A 70mm² earth wire shall be installed 400mm below ground level and 500mm from the fence on the outside of the sub-station along the entire length of the fence. This earth wire shall be earthed at each corner by means of a 1,8m earth rod and the rod and earth wire bonded to the fence. The earth wire shall also be bonded, at least at two points, to the main earthing system.

(b) A 70mm² earth wire shall also be buried at a depth of 400mm around each transformer and switch and bonded to the main earthing system.

5. EARTHING OF A GENERAL ELECTRICAL INSTALLATION

5.1 GENERAL

All earth conductors shall be stranded copper with or without green PVC insulation. The conductors shall comply with the Engineer's quality specification for "PVC-INSULATED CABLES", Section C4. All earth conductor sizes shall be determined in accordance with SANS 10142, par. 4.6 where the earth does not form an integral part of the cable.

5.2 SWITCHBOARDS

A separate earth connection shall be supplied between the earth busbar of the main switchboard and the earth busbar of every sub-switchboard. These connections shall consist of 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.

5.3 SUB-CIRCUITS

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

5.4 RING MAINS

Common earth conductors may be used where various circuits are installed in the same wiring channel in accordance with SANS 10142. In such instances the sizes of earth conductors shall be specifically approved by the Engineer. Earth conductors for individual circuits branching from the ring main shall be connected to the common earth conductor with T-ferrules or soldered. The common earth shall not be broken.

5.5 CONNECTIONS

Under no circumstances shall 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 ends shall be tinned and lugged. Lugs may be crimped, using mechanical or pneumatic tools designed for this purpose, on condition that evidence is submitted that the method used complies with the performance requirements of BS 4579, Part 1: "COMPRESSION JOINTS IN COPPER."

5.6 NON-METALLIC CONDUIT

Where non-metallic conduit is specified or allowed, stranded copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaries, etc. The securing of earth conductors by means of self-threading screws will not be permitted.

5.7 FLEXIBLE CONDUIT

An earth conductor shall be installed in all non-metallic flexible conduit. This earth conductor shall not be installed external 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.

5.8 WATER PIPES

Metal cold water mains shall be bonded to the earth busbar in the Main Switchboard by solid 15 x 2mm copper strapping. All other hot and cold water pipes shall be connected by 12 x 0,8mm perforated or solid copper strapping (not conductors) to the nearest switchboard. The strapping shall be fixed to the pipe work by brass nuts and bolts and against walls be brass screws at 150mm centres. In all cases where metal water pipes, down pipes, flues, etc. are positioned within 1,6 m of switchboards, an earth connection consisting of copper strapping shall be installed between the pipe work and the board. In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each switchboard.

5.9 ROOFS

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10mm² copper conductor shall be installed over the full length of the ceiling void, fixed to the top purlin and connected to the main earth conductor of each switchboard. The roof and gutters shall be connected at 15m intervals to this conductor by means of 12 x 0,8mm copper strapping (not conductors) and galvanised bolts and nuts. Self-tapping screws are not acceptable. Where service connections consist of underground supplies, the above requirements are not applicable.

SECTION B12

B.12 PROVISION FOR TELEPHONE INSTALLATION

1. CONTRACTOR'S RESPONSIBILITY

The Contractor shall only supply and install outlet points, wiring channels and/or conduits for telephones. The telephone installation will be carried out by others.

2. REGULATIONS

All provisions for telephones in buildings shall comply with the latest issue of "FACILITIES FOR TELECOMMUNICATION SERVICES IN BUILDINGS" as issued by the Engineer of Posts and Telecommunications.

3. SEPARATION OF SERVICES

3.1 Cables or conductors for telephone services shall be separated from all other services by:

(a) providing separate metal channels or conduits, or

(b) installing power cables, conductors and accessories at a minimum distance of 300mm from routes reserved for telephone cables, or

(c) an earthed metal barrier installed in such a manner to ensure that the minimum distance through free air space between the telephone cables and other services is at least 300mm.

3.2 In cases where high voltage cable runs are parallel to telephone cable runs for more than 50m, the correct spacing shall be determined by conferring with the Engineer of Posts and Telecommunications.

3.3 Conduits or wiring channels provided for telephone services may not be used for any other purpose. Where non-metallic channels are used, the separation stated in par. 3.1 (b) shall he maintained throughout the installation.

4. MAIN TELEPHONE DISTRIBUTION BOARD

4.1 The size and position of the Main Telephone Distribution Board, where required, shall be in accordance with the requirements of the Detail Technical Specification.

4.2 The board shall consist of a metal tray, architrave frame and hinged doors and shall be flush mounted in the position shown on the drawing(s).

4.3 A 20mm thick soft wooden panel (fine grade pine to SANS 1359, without knots) shall be installed in the main telephone distribution board and shall cover the entire back of the board. Chipboard or similar materials are not acceptable.

4.4 All conduits and sleeves to telephone outlets or sub-distribution boards in the buildings or on the site as well as the main incoming sleeves, shall terminate at the main telephone distribution board as indicated on the drawing(s).

4.5 Where 100 x 100 x 50mm draw-boxes are specified as main or sub-distribution boards, the boxes shall be flush mounted and provided with a cover plate. A wooden panel need not be provided in these cases.

5. VERTICAL BUILDING (SERVICE) DUCTS

5.1 If the telephone cables are to be installed in the same duct as power cables the separation of services described in par. 3 shall be maintained.

5.2 Conduits and metal channels to and from building duct(s) shall be installed from the section containing the telephone cables to obviate telephone cables crossing power cables or other services in the duct.

5.3 Where more than one vertical building duct is provided in the structure, the ducts shall be interconnected by at least 2 x 32mm dia. conduits at each floor level unless otherwise specified or indicated on the drawings.

6. TELEPHONE OUTLETS

6.1 Blank cover plates shall be fitted to all telephone outlets.

6.2 Telephone outlets in walls shall consist of flush mounted 100 x 100 x 50mm draw-boxes.

6.3 Telephone outlets in floors shall be of the same type as floor outlets for power socket-outlets. These provisions also apply to underfloor ducting. If the type of floor outlet is not specified, 100 x 100 x 50mm flush mounted draw-boxes shall be provided in the floor at the positions indicated on the drawings. The cover plates for these draw-boxes shall be of the diecast type.

6.4 Where twin underfloor ducts are provided and where the one duct is intended for telephone cables, the separation between the ducts shall be maintained throughout the underfloor ducting installation.

6.5 Where power skirting is specified for telephone installations, the Contractor need only install the skirting with covers since the telephone socket will be fixed directly to the cover. Where multiple power skirting is provided containing other services, no other cables may be installed in the section intended for telephone cables and the separation between the sections shall be maintained throughout the installation.

6.6 Refer also to the Engineer's standard specification for the "INSTALLATION OF WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING", Section B2.

7. CONNECTION OF TELEPHONE OUTLETS

7.1 Telephone outlets shall be inter-connected and connected to the telephone distribution boards as shown on the drawings.

7.2 If the inter-connecting conduits are not specified, conduit sizes shall be determined as follows:

Inter-connection of 10 outlets maximum - 25mm dia. conduit.

Inter-connection of 20 outlets maximum - 32mm dia. conduit.

7.3 Metal channels or power skirting installed on the same floor level on opposite walls of the same area as well as parallel runs of underfloor ducting intended for the installation of telephone cables, shall be interconnected at intervals of 6m. Conduit may be used for these inter-connections.

7.4 All conduits and all ducts or channels which do not have removable covers, shall be provided with galvanised steel draw-wires.

7.5 Conduit connections to power skirting or surface mounted metal channels, shall consist of a 100 x 100 x 50mm draw-box which is flush mounted immediately behind the duct or channel in which the telephone cables are to be installed. A hole shall be cut in the back of the duct or channel, immediately opposite the draw-box. The edges of the hole shall be grommeted. The draw-box shall be accessible from the front when the cover is removed.

7.6 Purpose-made accessories for the connection of conduits to underfloor ducts shall be used. Where these are not available, a 100 x 100 x 50mm draw-box shall be installed below the underfloor duct opposite a floor telephone outlet. Inter-connecting conduits shall terminate at the draw-box. The edges of the hole shall be grommeted. The draw-box shall be accessible from the top via the floor outlet.

7.7 Exposed conduit ends intended for future extensions shall be terminated by means of a coupling and screwed brass plug. Only galvanised conduit shall be used in these instances.

SECTION B13

B.13 SUBSTATIONS SWITCH ROOMS AND GENERATOR ROOMS

This section covers the general building arrangement and special requirements for high and low voltage switch rooms, transformer rooms and generator rooms.

1. STANDARD BUILDINGS

The following list indicates the standard substation designs and corresponding standard Engineeral drawing number which are available.

1.1 High voltage room, transformer room for one transformer up to 800kVA, low voltage room and a generator room for one emergency generator set from 200 to 500kVA ..... EE/136/131A.

1.2 High voltage room, transformer room for one transformer up to 800kVA, low voltage room and a generator room for one emergency generator set from 80 to 200kVA ..... EE3/136/131B.

1.3 High voltage room, transformer room for one transformer up to 800kVA, low voltage room and a generator room for one emergency generator set up to 30kVA ..... EE3/136/131C.

1.4 High voltage room, transformer room for one transformer up to 800kVA and low voltage room ..... EE3/136/131D.

1.5 High voltage room, transformer room for one transformer up to 800kVA, low voltage room and a generator room for two emergency generators up to 200kVA each ..... EE3/136/131E.

1.6 Large high voltage room, transformer room for one transformer up to 800kVA and low voltage room..... EE3/136/131F.

1.7 High voltage room, transformer room for two transformers of up to 800kVA each, large low voltage room and a store room ..... EE3/136/131G.

1.8 Emergency generator buildings..... EE3/136/118.

2. OTHER BUILDINGS

If the standard buildings cannot accommodate the equipment required, suitable substation rooms complying with the following constructional details shall be provided:

2.1 The rooms shall have a ceiling height of at least 2,8 m above finished floor level.

2.2 A concrete roof slab shall be provided or alternatively a roof consisting of corrugated iron, or clay or cement tiles with an asbestos ceiling.

2.3 The rooms shall be waterproof, vermin proof and fireproof.

2.4 Door openings shall be 1,85 m wide by 2,5 m high with steel louvered ventilation openings over at least 60 % of the door area. Doors shall open outwards and it shall be possible to readily open them from the inside. Provision shall be made for a night latch and a padlock.

2.5 The floor and transformer base shall be on the same level. Each transformer base shall be able to support a mass of 5 tons on castors.

2.6 Vermin proof steel louvered ventilation openings shall be provided with an area of at least 20 % of the total floor area for transformer and generator rooms and 10 % for switch rooms if not specified to the contrary. 50 % of the ventilation openings shall be installed in the lower part of the walls, not more than 300 mm above floor level and the other 50 % of the ventilation openings shall be installed in the upper part of the walls, not more than 300 mm below ceiling level to achieve good cross and convection ventilation. Louver's contained in the doors can normally be considered to provide the 50 % required in one of the walls.

2.7 Where possible, windows with an area equal to 5 % of the floor area shall be included to provide natural lighting. It shall not be possible to open these windows. The windows shall be in the upper portion of the walls, as high as possible.

2.8 Corners of transformer bases and cable ducts shall be cut off at an angle of 45° with the splay at least 100mm wide.

2.9 Cable entrance openings shall be at least 600mm wide x 500mm deep and level with the bottom of the cable trenches. Alternatively a separate sleeve for each cable and at least one spare sleeve, shall be provided.

2.10 Cable trenches shall be 600mm wide and 800mm deep unless specified to the contrary.

2.11 The floors of cable trenches shall have a fall of 1:100 to make provision for the natural draining of water.

2.12 At least one light with a switch adjacent to the entrance and one standard 16A 3-pin earth leakage protected socket outlet shall be provided in each room. The illumination level in the substations shall not be less than 200 lux. If a battery supply is available one incandescent light per substation room shall be connected to this supply and the switch in the circuit marked "EMERGENCY LIGHT"/"NOODLIG".

2.13 The floors shall be floated to a smooth finish with a steel trowel.

2.14 Any one of the following interior wall finishes is acceptable:

(a) Plastered and painted white.

(b) Unpainted face brick (preferably light colour brick).

(c) Off-shutter concrete painted white.

3. NOTICES

The following notices in both official languages shall be exhibited at all entrances to and suitable places within premises in which are situated generating plant and transforming, switching or linking apparatus:

A notice showing the "Lightning" sign with the wording: Danger-Ingozi-Gevaar.

3.1 A notice prohibiting unauthorised persons from entering such premises.

3.2 A notice prohibiting any unauthorised persons from handling or interfering with electrical apparatus.

3.3 A notice detailing procedure in case of fire.

3.4 A notice containing directions for resuscitation of persons suffering from the effects of electric shock.

4. HIGH VOLTAGE SWITCH ROOMS (ABOVE 11 KV)

4.1 The equipment shall be installed and secured to the floor in accordance with the manufacturer's specification.

4.2 Sufficient space shall be provided between the switchboard and the walls of the switch room to allow for the installation, maintenance and operation of the switchboard.

4.3 In the case of switchboards with uninsulated conductors accessible from the back, a clear space of at least 1,2 m shall be provided between the back and sides of the board and the wall.

4.4 In the case of switchboards which are of a totally enclosed construction the minimum clear space between the back and sides of the board and the wall shall be at least 900mm.

4.5 A space of at least 1,2 m shall be provided in front of a switchboard for operating and maintenance personnel. If the circuit breakers are of the withdrawable carriage type this space shall be at least 900 mm when the breaker carriages are in the fully withdrawn position.

4.6 The access door into the room shall be in front of the switchboard.

4.7 The tools and earthing and operating devices for the switchgear shall be contained in a purpose-made sheet metal cupboard secured to the wall of the substation.

4.8 A reticulation diagram displaying sufficient detail to be able to assess problems and trace faults (both on the HV and LV sides of the system) shall be mounted against a wall in the HV switch room behind clear plastic.

5. LOW VOLTAGE SWITCH ROOMS (BELOW 11 KV)

5.1 The equipment shall be installed and secured firmly to the floor or wall of the switch room.

5.2 Sufficient space shall be provided between the switchboard and the walls of the switch room to allow for the installation, maintenance and operation of the switchgear. In general this space shall be 900mm at the back and sides of the board and 1,2 m in front of the switchboard.

5.3 In the case of switchboards with uninsulated conductors which are exposed and accessible from the back a clear space of at least 1,2 m shall be provided at the back.

5.4 A LV reticulation diagram displaying sufficient detail of at least the main LV reticulation in order to be able to assess problems shall be mounted against a wall in the LV switch room behind clear plastic.

6. TRANSFORMER ROOMS OTHER THAN IN STANDARD BUILDINGS

6.1 Transformer rooms shall be large enough to accommodate the transformer with a 900mm clear space between the walls and the transformer. The minimum dimensions of a transformer room shall in any case be not less than 3,5m wide and 4,0m long.

6.2 The dimensions of the room shall be determined by using the transformer dimensions of TABLE 2 of SANS 780.

6.3 Where natural cross ventilation of the transformer room is not possible, adequate forced ventilation shall be provided to dispose of the transformer's losses and to prevent the air temperature in the transformer room from exceeding 40 C.

6.4 The cable entrances to the transformer room shall be sealed off after the cables have been installed.

7. GENERATOR ROOMS OTHER THAN IN STANDARD BUILDINGS

7.1 The ventilation of generator rooms shall be sufficient to dispose of the heat radiated from the engine while delivering full power.

7.2 The heat from the radiator shall be released outside the building via a ventilation duct or an external heat exchanger.

7.3 The exhaust emission shall be released outside the building and shall comply with the local environmental control regulations.

7.4 The fuel storage tank shall be installed in compliance with SANS 10131 and the position shall be approved by the local Fire Engineer. When the storage tank must be located outdoors, it should be underground to insulate the fuel from severe temperature variations which may impede fuel flow.

7.5 An electrical schematic diagram indicating mains supply and change-over arrangement as well as all standby plant electrical control circuitry, shall be mounted on a wall behind clear plastic.

7.6 An emergency light with automatically rechargeable Nickel-Cadmium batteries shall be installed above the generator set to facilitate manual starting or fault tracing in the event that the set does not start during a power failure.

8. CABLES

8.1 Cables shall be installed in cable trenches which shall be provided for this purpose. The installation shall comply with the Engineer's standard specification for "INSTALLATION OF CABLES", par. 5 of Section B6.

8.2 Under normal circumstances cables shall not be installed directly on the floor.

9. COVERING AND SEALING OF CABLE TRENCHES

9.1 All the cable trenches shall be covered with steel chequer plate or a compound wood, bound with a water resistant binder, or an approved fibreglass grating. The following types of compound wood coverings are acceptable:

(a) Five ply marine ply, 12 mm thick.

(b) Exterior grade particle board, 22mm thick.

(c) Tempered hardboard, 12,7mm thick.

9.2 The trench coverings shall be ridged and shall not sag more than 5 mm with two normal persons standing on one section.

9.3 The trench covering shall be in sections not exceeding 1,25 m.

9.4 The trench coverings shall be provided with holes or recessed handles to make it possible to remove and replace the covers easily.

9.5 The trench coverings shall be neatly cut where necessary to accommodate cables.

9.6 The covers shall overlap the trench on both sides and shall be recessed to fit flush with the surface of the floor.

9.7 The cable entrances in the trenches of the switch rooms, transformer rooms and generator rooms shall be closed and sealed after the cables have been installed to prevent the backfill material and water from entering the trenches in the building.

9.8 The cable entrances shall be closed with bricks, without mortar, in such a way as to prevent the weight of the bricks from resting on the cables. These bricks shall be plastered on the inside with a 10:1 ratio of sand and cement.

9.9 If the cables enter the trenches via sleeves, these sleeves shall be plugged on both sides with weak mortar, an asbestos and cement mixture or a non-hardening compound.

SECTION B14

B.14 OVERHEAD ELECTRICAL TRANSMISSION LINES

1 GENERAL

1.1 This section covers the supply, delivery, erection and commissioning of overhead transmission lines up to 22 kV on wooden poles.

1.2 An overhead line shall comprise the wooden poles, cross-arms, stays, conductors, insulators, isolators, fuse-links, transformers, lightning arrestors and any other auxiliary equipment specified.

1.3 All materials and fittings used shall be new and of high quality.

1.4 Overhead lines shall be erected in accordance with the "CODE OF PRACTICE FOR OVERHEAD POWER LINES FOR CONDITIONS PREVAILING IN SOUTH AFRICA", issued by the S.A. Institute of Electrical Engineers.

2. STATUTORY REQUIREMENTS

2.1 Occupational Health and Safety act. (1993) Act 85 of 1993 and subsequent amendments and regulations issued thereunder.

2.2 The Post Office Act, No. 44 of 1958 and the Postmaster General's Requirements issued in terms of that Act.

2.3 The Mines and Works Act, No. 27 of 1956 and subsequent amendments and regulations issued thereunder.

2.4 The Electricity Act, (1994) Act 41 of 1984.

2.5 The Fencing Act, No. 31 of 1963.

2.6 The Forest Act, Article 34 of Act No. 72 of 1968.

2.7 The Advertising on Roads and Ribbon Development Act, No. 21 of 1940 and No. 16 of 1962.

2.8 The Air Navigation Regulations promulgated in terms of the Aviation Act, No. 74 of 1962.

2.9 Explosives Act, No. 26 of 1956.

2.10 The South African Transport Services Safety Regulations.

3. RELEVANT SANS SPECIFICATIONS

3.1 SANS 182 : Conductors for overhead electrical transmission lines.

PART3 : Aluminium Conductors, Steel Reinforced.

3.2 SANS 60383 : Ceramic and glass insulators for overhead lines of nominal voltage greater than 1000V.

3.3 SANS 61284 : Non-current-carrying line fittings for overhead power lines.

3.4 SANS 753 : Wooden power transmission poles and cross-arms.

3.5 SANS 470 : Concrete poles for telegraph, telephone, power and lighting purposes (reinforced and prestressed types).

3.6 SANS 61643 : Low voltage lightning arresters.

4. STANDARD ENGINEERAL SPECIFICATIONS

4.1 INSULATORS AND FITTINGS FOR OVERHEAD LINES, Section C38.

4.2 DISTRIBUTION TRANSFORMERS, Section C36.

4.3 INSTALLATION OF CABLES, par.3.13, Section B6.

4.4 EARTHING, Section B11.

5. NOTICES AND PRECAUTIONS

5.1 The Contractor shall issue all notices and make the necessary arrangements with Supply Authorities, the Postmaster-General (TELKOM), Transnet, S.A. Transport Services, Provincial or National Road Authorities and other authorities as may be required with respect to the installation of overhead lines.

5.2 The Contractor shall take all the necessary precautions and provide the necessary warning signs and/or lights to ensure that the public and/or employees are not endangered.

5.3 The Contractor shall acquaint himself with the position of all existing services and infrastructure prior to commencing the installation.

5.4 The Contractor will be held responsible for damage to any existing services brought to his attention by the relevant authorities and will be responsible for the cost of repairs.

6. PEGGING THE ROUTE

6.1 The Contractor shall peg out the route for the overhead line but shall maintain close liaison with the Engineer's representative.

6.2 Should the proposed position of poles appear unsatisfactory due to obstructions, poor soil conditions, rock, etc., the Engineer's representative shall be consulted and a ruling obtained.

6.3 The Engineer reserves the right to alter the line route at any time prior to the installation of the overhead wires. Payment in respect of any additional or wasted work involved shall be at the documented rates.

6.4 The removal of obstructions along the route shall be subject to the approval of the Engineer.

7. LINE IMPULSE LEVEL

The line Basic Impulse Level (B.I.L.) shall be maintained at the full voltage, namely:

Line Voltage (kV)	Impulse Voltage withstand level (kV)
Up to 6,6	75
11	95
22	150

8. LINE CONFIGURATION

8.1 Lines shall generally be configured as indicated in the drawings included in this specification, Fig. B14.1 - B14.7.

8.2 Alternate arrangements shall be submitted to the Engineer for approval.

9. POLES

9.1 The line configuration and support structure shall be suitable for the proposed route. Refer also to the Occupational Health and Safety Act.

9.2 Wooden poles shall normally be used and shall comply with SANS 753, Group strength "A" and shall bear the SANS mark of approval.

9.3 Preservatives of the poles shall comply with the requirements for Type Al of SANS 1290 and the impregnation shall be carried out in accordance with SANS 10005 using the empty-cell pressure process.

9.4 Poles shall be LOOP TENSION banded at both ends.

9.5 Concrete poles where specified shall comply with SANS 470 and the Detail Technical Specification.

9.6 If the spacing of poles is not more than 80m specified in the Detail Technical Specification, poles for 11 kV and 22 kV lines shall be spaced not more than 80m apart and poles for LV lines shall be spaced not more than 45m apart. The spacing of LV lines in suburban areas shall be arranged to suite the requirements of city blocks and street lighting.

9.7 All the poles shall be installed with the marking tags facing the roadside where applicable or shall face in the same direction where a road does not exist alongside the overhead line.

9.8 The pole minimum dimensions listed in the table below shall be used. Poles not complying with these dimensions shall be removed from site.

Length (m)	Minimum top dia (mm)
9,0	160
10,2	160
12,0	180
13,0	180
16,0	200

9.9 Templates shall be used for drilling holes required to fix cross-arms, brackets, insulators, etc. to the poles. After drilling, the holes shall be coated with a mixture of creosote and tar.

9.10 The poles shall be planted at the following minimum depths :

Length	Planting depth (m)
9,0	1,7
10,0	1,8
12,0	2,0
13,0	2,2
16,0	2,6

9.11 Kicking blocks shall be provided where ground with poor bearing qualities is encountered.

9.12 Poles shall be planted vertically plumb and in line and sufficiently stayed to maintain that position.

10. CROSS-ARMS

10.1 Cross-arms shall be of wood. Steel cross-arms shall only be used when clearly specified in the Detail Technical Specification. Wooden cross-arms are preferred due to their higher electrical resistance and better lightning performance of the line.

10.2 Steel cross-arms where specified shall be manufactured from standard steel sections complying with BS 4360.

10.3 Wooden cross-arms shall comply with SANS 753, Group Strength "A" and shall be straight in grain. Preservatives shall comply with par. 9.2. above. The minimum diameter of cross-arms shall be as follows:

Length (m)	Diameter (mm)	
	min.	Max.
2,4	140	160
3,0	140	160
3,6	160	185
4,5	160	185

10.4 Cross-arms shall be LOOP TENSION banded at both ends.

10.5 Tie straps shall be manufactured of mild steel to Grade 43 of BS 4360.

10.6 Cross-arms shall be long enough to accommodate the insulator spacing specified below.

10.7 Cross-arms and tie straps shall be bolted to poles using galvanised bolts, nuts and washers. Curved wood pole washers shall be fitted between bolt heads and the poles and between cross-arms and the poles. Back straps and U-bolts may be used to attach wooden cross-arms to the poles.

10.8 Curved wood pole washers shall be galvanised malleable cast iron or mild steel with a minimum thickness of 6 mm and shall have a minimum square outside dimension of 63 mm.

11. INSULATORS AND FITTINGS

11.1 Insulators shall be chosen to provide the mechanical strength and insulation level required by the line at every point in accordance with the Engineer's standard specification for "INSULATORS AND FITTINGS FOR OVERHEAD LINES", Section C38.

11.2 Insulators shall be spaced to provide the conductor clearance required.

11.3 Pin insulators and their pins complying with SANS 60383 shall be used in straight line intermediate positions only.

11.4 Disc insulators shall be used in all strain, tension or angle positions, Clevis-and-tongue or ball-and-socket type insulators complying with SANS 60383 shall be used. Disc insulators may be of glass or porcelain.

11.5 Curved wood pole washers shall be fitted between the collars of insulator pins and the cross-arm or pole and between the pin nut and the cross-arm or the pole, The washers shall comply with par. 10.8 above.

11.6 Insulator hooks shall be of an approved pattern and shall be manufactured from BS 4360 grade 43 mild steel or forged.

11.7 Terminating and yoke straps shall be manufactured from BS 4360 grade 43 steel or forged to a design approved by the Engineer.

11.8 All steel or ironwork i.e., fittings, cross-arms, bolts, nuts, washers, etc., shall be hot dip galvanised to SANS 32 & 121.

12. CONDUCTORS

12.1 Steel reinforced aluminium conductors to SANS 182, Part 3 shall be used for overhead lines. Should copper conductors be specified, they shall comply with SANS 182, Part 1. The cross-sectional area shall comply with the Detail Technical Specification.

12.2 The spacing between phase conductors shall be increased by 20 % over the spacing determined according to the formula in par. 4.7.5 of the "Code of Practice for Overhead Power times" to compensate for stay movement and other factors and to maintain the B.I.L. of par. 7 above.

The minimum conductor spacing are :

Pole Spacing (m)	SUPPLY VOLTAGE		
	Up to 6,6 kV	11 kV	22 kV
	CONDUCTOR SPACING (mm)		
60	575	635	790
70	635	700	850
80	700	750	910
90	750	810	975

12.3 Manufacturer's stringing and tensioning charts shall be used to erect conductors. Conductors shall not be tensioned to more than 25 % of the breaking strength of the conductor at -5,5"C with no wind.

12.4 Conductor running blocks shall be installed on all pole positions to run out the conductors. Conductors shall not be dragged along the ground. The three conductors shall be tensioned simultaneously using suitably rated chain-ratchet pullers and "come along" specially designed for the particular conductor.

12.5 The minimum conductor to ground clearances as stipulated in Occupational Health and Safety Act shall be closely observed. Allowance shall be made for conductor creepage and subsequent increased sag after a period.

12.6 Conductors shall be prestressed for not less than one hour before binding in.

12.7 Mid span joints shall be kept to a minimum and where unavoidable, shall be made with approved full tension line splices.

12.8 Conductor joints at non-tension points shall be made with two bolt parallel groove clamps of a type approved by the Engineer. The current carrying capacity of the clamps shall be at least equal to that of the conductor.

Non-oxidising conducting paste shall be liberally applied to the inside of these clamps.

12.9 Where aluminium to copper connections are made, suitable bimetal clamps shall be used.

13. CONDUCTOR TERMINATIONS

13.1 Cold compression, bolted snail clamps or preformed terminations shall be used. Suitable thimble clamps shall be used with the preformed terminations.

13.2 The conductor shall be bound in at pin insulators by a single stirrup and binding. A chafer tape of soft aluminium shall be wrapped around the conductor at the insulator contact area. The conductor shall be bound to the stirrup for a distance of 50mm on either side of the insulator. 5mm diameter hard drawn aluminium wire shall be used for binding.

13.3 Suitably sized preformed wrap lock ties with pads may be used as an alternative method to par. 13.2 above.

13.4 Trails and bridge wires must be neatly disposed and connected with clamps or line taps with a minimum of two per connection or by means of other approved mechanical connectors.

14. STAYS

14.1 The position of stays may or may not be indicated in the instructions for the service, but it is the responsibility of the Contractor to provide staying adequate to maintain correct tension of the line and the verticality of every pole in the line, with or without the additional use of kicking blocks as he may decide.

14.2 Wind stays must also be provided for straight lines in exposed positions. Struts shall not be used if this can be avoided by the use of aerial stays and pillar stays.

14.3 Stay wires shall be spliced and bound in, in the accepted manner. Approved preformed materials may also be used.

14.4 The angle between the stay and the pole must be between 35° and 45°. The stay must be made off on the pole, as near as practicable to the point of resultant stress, with one and a half complete turns around the pole, supported by a suitable clamp.

14.5 For terminal poles of vertical line arrangements, at least two stays shall be used to prevent deformation of the pole, with the stay plates buried at least 1,8 m apart.

14.6 Stay holes shall be vertical, not less than 1,5 m deep and no wider than necessary to accommodate the baseplate, with a narrow side channel cut to embed the rod at the correct angle.

The baseplate and portion of rod within the stay pole shall be firmly packed with hard material or concrete where necessary.

14.7 Stay pillars shall be concreted into the ground with top and bottom kicking blocks where required by the nature of the soil.

14.8 Porcelain stay insulators shall be installed in one stay wire as high as possible above ground level but far enough away from the structure to ensure that the portion of the stay below the insulator does not become alive.

14.9 Stay wire shall be of galvanised steel and the individual steel strands shall have a breaking stress of not less than 695 MPA and shall comply with BS 183 or SANS 182, Part 5. Stay wire make-offs shall be painted with bitumastic paint on completion.

14.10 Stay rods shall comply with BS Pattern 2 and shall be of circular section with tubular type turn buckles. Heavy duty construction, deep contoured type thimbles shall be used.

14.11 Galvanised steel stay plates shall be used.

14.12 Stay guards are required in the vicinity of public paths and roadways.

15. EARTHING OF STRUCTURES

15.1 Earthing requirements for service connections are specified in the Engineer's standard specification for "EARTHING", Section B11.

15.2 Protective overhead earth wires shall only be provided where specified in the Detail Technical Specification. In cases where overhead earth wires are specified, a low impedance earth as determined by the Basic Impulse Level of the line shall be provided at every pole along the line.

15.3 An earth connection is not required at every pole along a line with wooden poles and without overhead earth wires. Lines with metal poles shall be earthed at every pole.

15.4 Steelwork on wooden poles shall generally not be earthed except at structures for transformers, isolators, fuse-links, cable boxes, lightning arresters or other equipment which impairs the impulse flashover value of the insulation provided by the wooden structure.

15.5 All metalwork to be earthed, shall be bonded together with 1 mm² bare copper conductors. These common bonds shall be connected to a 35mm² bare stranded or solid copper earth down lead conductor.

15.6 The connection between the overhead conductors and lightning arrestors and between the arrestors and the earth down lead shall consist of bare copper conductors of not less than 25mm². The connecting leads shall have smooth bends and shall follow the shortest possible route.

15.7 The earth down lead conductor shall be stapled to the pole at intervals not exceeding 1m. Where atmospheric conditions are likely to cause galvanic action, staples shall be of non-ferrous metal and an earth clip used where possible.

15.8 The earth conductor shall be threaded through a black polyethylene sleeve for at least 2m above the ground.

15.9 The earth conductor shall not be installed in steel conduit nor shall the conductor be wrapped around the pole at any point since this will increase the reactance of the down lead.

15.10 A trench earth shall be installed at earthed structures carrying equipment such as transformers, fuse-links, lightning arresters, etc. extending 10 m on four sides of the structure in the form of a cross. The ends of the earth wires shall be bonded to four earth electrodes of at least 1,8m in length driven into the ground.

15.11 Intermediate earthing for overhead earth wires may consist of wrapping the earth wire 5 - 6 times around the pole below ground level.

15.12 The earth resistance shall be determined following the installation of the trench earth. Earth resistance values specified or required by protective devices shall be checked. The earth resistance values required to maintain the B.I.L. of the line as specified in par. 7 (assuming an average lightning current value of 25 kA), are as follows:

	Impulse Level (kV)	Earth Resistance (ohm)
Up to 6,6	75	3,0
11	95	3,8
22	150	6,0

15.13 Should the earth resistance be higher than specified or required, additional earthing shall be provided. Trench earths shall not exceed 50m. Proprietary clays may be used for soil treatment to improve the earth resistance.

16. EARTH WIRE ON LV SYSTEMS

16.1 Where specified, a continuous earth wire shall be installed along LV (up to 660 V) overhead lines in order to provide earth continuity between installations served by the line (ECC).

16.2 The earth wire shall be connected to every earth along the route in addition to the substation earth. Refer also to par. 4 of the Engineer's standard specification for "EARTHING", Section B11.

16.3 All metalwork and the top positions of stay wires shall be bonded to the earth wire.

16.4 The earth wire shall be above the conductors.

17. LIGHTNING ARRESTERS

17.1 Lightning arresters shall be of a type approved by the Engineer.

17.2 Lightning arresters shall be installed at all points where the steelwork has to be earthed and where specified.

17.3 The arresters shall be connected to the overhead conductors by 25mm² (minimum) copper conductors minimum and suitable parallel groove clamps.

17.4 Lightning arresters shall be placed on all the phase conductors at the following points in addition to those specified in the Detail Technical Specification :

(a) As near as possible to the transformer terminals on the transformer side of the fused protection where applicable.

(b) At each termination of a cable on the overhead line.

(c) At every line sectionaliser or recloser.

(d) At each connection point to secondary lines.

17.5 Lightning arresters shall be mounted below the overhead conductors in order to reduce the length of the discharge path.

17.6 An earth shall be supplied and installed at each point where lightning arresters are installed in accordance with par. 15 above.

18. FUSE-LINKS

18.1 Fuse-links shall be of a type approved by the Engineer.

18.2 Details of fixing methods and mounting shall be submitted to the Engineer for approval.

18.3 Fuse-links shall be installed at all transformers and where specified.

19. TRANSFORMER MOUNTINGS

19.1 Transformers shall comply with the Engineer's standard specification for "DISTRIBUTION TRANSFORMERS", Section C36.

19.2 Transformers with a maximum power rating of 25kVA may be mounted on a single pole with the mounting brackets as specified in SANS 780.

19.3 Transformers with a power rating in excess of 25kVA and with a maximum of 200kVA shall be mounted on a platform between two poles.

19.4 The transformer platform for pole mounting shall consist of galvanised steel channels bolted to the two poles. The platforms shall be manufactured and installed in accordance with fig. B14.5 and B14.6.

19.5 All steelwork as well as the bolts, nuts and washers shall be galvanised to SANS 32 & 121.

19.6 An earth wire shall be installed against each pole of the structure and must extend for at least 500mm above the poles. These earth wires shall be bonded across at the top of the poles to shield the transformer.

19.7 Earthing in accordance with par. 15 shall be provided.

20. SUBSTATION EARTH

Substation earths and earths at transformers along the route intended for earth continuity connections to installations served by the line, shall be provided in accordance with the Engineer's standard specification for "EARTHING", Section B11.

21. ANTI-CLIMBING DEVICES

21.1 Anti-climbing devices shall be fitted to all poles carrying transformers or mechanically operated fuses or switchgear.

21.2 Galvanised barbed wire wound around the poles for at least 1m at a height of 2m above ground may be employed for this purpose.

22. CRADLES

Where HV overhead lines cross roadways, railways and other supply lines, important communication lines and where an HV line is run above an LV line, an earthed cradle shall be installed. The longitudinal wires of the cradle shall not be less than 7,2mm² and the cross-lacing not less than 4mm².

23. DANGER NOTICES (LIGHTNING SIGN)

Danger notices with the wording "DANGER-GEVAAR-INGOZI" shall be fitted to all structures with transformers, mechanically operated switchgear and fuses.

24. EXCAVATIONS

24.1 Excavations for poles, stays and trench earths shall remain open for as short a period as possible. The Contractor shall erect and maintain guards, warning notices and lights at open excavations and soil heaps.

24.2 Excavations shall be classified as follows:-

Very hard rock shall mean rock that can only be excavated by means of explosives.

Hard rock shall mean granite, quartzitic sandstone, slate and rock of similar or greater hardness, solid shale and boulders in general requiring the use of jack hammers and other mechanical means of excavation.

Soft rock and earth shall mean rock and earth that can be loosened and removed by hand-pick and shovel.

24.3 After poles and stays have been planted, the holes shall be backfilled and well compacted. Compaction shall be executed in layers of not more than 300mm to obtain a high compaction density.

24.4 The following dimensions shall be used when calculating the cubic capacity of excavations:

(a) Pole holes: 1,2m x 0,6m x depth

(b) Stay holes: 1,2m x 0,6m x 1,8m

(c) Trench earths: 0,5m x 0,6m x length

24.5 Poles shall be installed in accordance with the Detail Technical Specification of the installation.

24.6 Poles shall not be installed in clayey soil or in swampy conditions without the necessary precautions to stabilise the installation.

24.7 If unsatisfactory conditions for the installation of poles and stays are encountered during the excavations, the Engineer shall be informed without delay in order to facilitate alteration of the foundation design or alteration of the route of the line.

24.8 Poles and stays shall be installed in undisturbed soil.

24.9 If wooden poles are installed in a concrete or other water retaining foundation, the pole shall protrude through the concrete to ensure adequate natural drainage to prevent rotting of the wooden pole in the foundation due to the accumulation of water between the pole and the foundation.

25. SAMPLES

Samples of equipment, materials and SANS Test Reports proposed for the installation shall be submitted to the Engineer on request.

SECTION B15

B.15 INSPECTIONS, TESTING, COMMISSIONING AND HANDING OVER

1. PHYSICAL INSPECTION PROCEDURE

1.1 Once the Contractor has completed the installation, written notice shall be given to the Engineer in order that a mutually acceptable date can be arranged for a joint inspection.

1.2 During the course of the inspection, the representative of the Engineer will compile a list of items (if any) requiring further attention. A copy of this list will be provided to the Contractor who will have a period of 7 days in which to rectify the offending items of the installation.

1.3 The Contractor shall then provide written notice that he is ready for an inspection of the remedial work to the offending items.

1.4 This procedure will continue until the entire installation has been correctly completed to the satisfaction of the Engineer.

2. TESTING AND OPERATIONAL INSPECTION PROCEDURE

2.1 In addition to the above the Contractor shall have the complete installation tested and approved by the local authorities where applicable.

2.2 Subsequent to the above testing and approval, the Contractor shall in the presence of the representative of the Engineer test all circuits with respect to:

(a) Phase balance.

(b) Insulation level.

(c) Polarity.

2.3 Upon completion of the installation and within 3 months of the handover date, the Contractor shall provide and make available a recording voltmeter to record the voltage at three locations in the complex over a period of 48 hours each. These locations will be nominated by the Engineer.

3. "AS BUILT" DRAWINGS

3.1 As each portion of the work is completed, the Contractor shall provide the Engineer with as-built drawings showing the exact location measured from fixed points of all cables, transmission lines, each outlet point, etc.

3.2 In addition a complete reticulation diagram showing all supply cables and switchboards shall be provided behind a plastic cover in the substation or adjacent to the Main Switchboard if not located in a substation.

3.3 The installation will not be regarded as complete until all of the above requirements listed in 1, 2 and 3 above have been met.

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SECTION C1

C.1 CONDUIT AND CONDUIT ACCESSORIES

1. GENERAL

This section covers the requirements for conduit and conduit accessories for general installations under normal environmental conditions.

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 Part 2 of this specification. 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.

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 National Standards.

(a) Screwed metallic conduit and accessories: SANS 1065 parts 1 and 2.

(b) Plain-end metallic conduit and accessories: SANS 1065 Parts 1 and 2.

(c) Non-metallic conduit and accessories: SANS 950

Bushes used for metallic conduit shall be brass and shall be provided in addition to lock nuts at all points where the conduit terminates at switchboards, switch-boxes, draw-boxes, etc.

Only one manufacture of conduit and conduit accessories will be permitted throughout the installation.

All metallic conduits shall be manufactured of mild steel with a minimum thickness of 1,2mm for plain-end conduit and 1,6mm in respect of screwed conduit.

2. SCREWED CONDUIT

2.1 Conduits shall comply with SANS 1065 and shall bear the SANS mark.

2.2 All conduit shall be heavy gauge, welded or solid drawn, hot-dip galvanised or black enamelled, screwed tube.

2.3 Galvanised conduit shall be hot-dipped inside and outside in accordance with SANS 32 & 121.

2.4 All conduit ends shall be reamed and threaded on both sides and delivered with a coupling at one end and a plastic cap on the other end.

3. METAL CONDUIT ACCESSORIES

All metal conduit accessories shall be of malleable cast iron or pressed steel with brass bushes in accordance with SANS 1065. Alloy or pressure cast metal accessories or zinc base alloy fittings are not acceptable. All fittings whether galvanised or black enamelled, shall be fitted with brass screws.

4. CIRCULAR TYPE BOXES

4.1 The boxes shall be of the long spout pattern, manufactured of malleable cast iron or pressed steel and stove enamelled jet black or galvanised as required. The two cover fixing holes shall be diametrically opposite each other, drilled and tapped at 50mm centres.

4.2 Junction, draw-in and inspection boxes shall be of adequate size and shall be supplied with heavy gauge metal cover plates.

4.3 Boxes shall comply with SANS 1065.

5. SWITCH BOXES AND SOCKET OUTLET BOXES

5.1 All switch boxes and socket outlet boxes shall be manufactured of pressed galvanised steel of at least 1mm thickness. All boxes shall be fitted with the necessary lugs to suit standard flush mounted switches and socket outlets manufactured in accordance with SANS 1085.

5.2 Light switch boxes shall be 100 x 50 x 50mm with two 20mm knockouts on the sides, one 20mm knockout on the top, bottom, side and back.

5.3 Socket outlet boxes shall be 100 x 100 x 50mm with two 20mm knockouts each on the top, bottom, sides and back.

5.4 Switch and socket outlet cover plates shall comply with SANS 1084.

6. FLEXIBLE CONDUIT

Flexible steel conduit and adaptors shall comply with BS 731, part 1 where applicable. Flexible conduit shall be of galvanised steel construction and in damp areas of the plastic sheathed galvanised steel type. Flexible conduit shall only be used as specified and shall then be installed in accordance with par. 5.4.4 of SANS 10142.

7. PLAIN-END METALLIC CONDUIT

7.1 As an alternative to the threaded conduit, plain-end (unthreaded) metallic conduit with accessories may be used under the conditions stated in the Engineer's standard specification for "INSTALLATION AND TERMINATION OF CONDUITS AND CONDUIT ACCESSORIES", par. 3 of Section Bl.

7.2 Unthreaded conduit shall be manufactured of mild steel with a minimum thickness of 1,2mm and shall comply with SANS 1065.

7.3 Bending and setting of conduit shall be done with the correct apparatus recommended by the manufacturer of the conduit.

7.4 The Contractor or Supplier shall be responsible for obtaining the approval of local authorities for the use of this system.

7.5 All conduit and accessories used in areas within 50 km of the coast shall be hot-dip galvanised to SANS 32 & 121. In inland areas electro-galvanised or cadmium-plated accessories will be accepted.

8. NON-METALLIC CONDUIT

Non-metallic conduit shall comply fully with SANS 950 and shall be installed in accordance with Appendix C of the same specification as well as the Engineer's standard specification for "INSTALLATION AND TERMINATION OF CONDUITS AND CONDUIT ACCESSORIES", par. 4 of Section Bl.

9. EARTH CLAMPS

Earth clamps shall consist of copper strips at least 1,2mm thick and not less than 12mm wide secured with a brass bolt, nut and washer and shall be so constructed that the clamp fit firmly to the conduit without any additional packing.

SECTION C.2

C.2 WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING

1. WIRING CHANNELS

1.1 GENERAL

1.1.1 The channels shall be manufactured of rolled sheet steel.

1.1.2 The minimum thickness of the sheet steel shall be:

(a) 1,6mm for ribbed channels with a maximum width of 42mm.

(b) 2,5mm for unribbed channels with a maximum width of 42mm.

(c) 1,2mm for channels with a width in excess of 42mm.

1.1.3 The channels shall be finished as follows:

(a) In coastal areas (under all installation conditions)	Hot-dip galvanised to SANS 32 & 121 or epoxy powder coated
(b) Cast in concrete	Pre-galvanised
(c) False ceiling voids	Pre-galvanised
(d) Vertical building ducts coated	Hot-dip galvanised to SANS 32 & 121 or epoxy powder
(e) Surface mounted in plant rooms, substations, service tunnels, basements	Epoxy powder coated or electro galvanized
(f) Damp areas, exposed to weather underground runs in contact with earth	Hot-dip galvanised to SANS 32 & 121 or epoxy powder coated
(g) Undercover industrial applications	Hot-dip galvanised to SANS 32 & 121 or epoxy powder coated

1.1.4 The above-mentioned finishes shall apply unless specified to the contrary or approved - by the Engineer. Hot-dip galvanised ducts shall be co!d galvanised at all joints. sections that have been cut and at places where the galvanising has been damaged. Powder coated ducts shall likewise be touched up at joints, cuts and damaged portions using methods recommended by the manufacturer of the channels.

1.2 COVER PLATES

1.2.1 All channels shall be supplied with cover plates.

1.2.2 Channels up to 127mm wide shall have snap-in cover plates of metal or PVC.

1.2.3 For channels wider than 127mm only metal cover plates shall be used.

1.2.4 The finish of steel cover plates shall be the same as the finish of the channels.

1.3 ACCESSORIES

All accessories i.e. hangers, brackets etc. shall be purpose made and in general have the same finish as the channels.

1.4 WIRING SUPPORTS

Wiring supports shall be provided in order to prevent the wires falling out when cover plates are removed.

2. UNDERFLOOR DUCTING

2.1 GENERAL

2.1.1 The dueling shall be manufactured of 2mm thick rolled sheet steel or rectangular tubing. Galvanised steel shall be used or shall be epoxy coated after manufacture.

2.2 OUTLETS

2.2.1 Outlets shall be provided on a modular basis in the dueling to accommodate pedestal or recessed socket units. Tapped holes shall be provided to fix the pedestal units to the dueling.

2.2.2 Draw boxes at junctions of perpendicular ducts shall have removable barriers for wiring and shall be provided with a heavy gauge cover plate.

2.3 PEDESTALS

2.3.1 Pedestals shall be manufactured of die-cast aluminium or pressed steel.

2.3.2 The finish of pedestals shall be epoxy powder coating of an approved colour.

3. POWER SKIRTING

3.1 GENERAL

3.1.1 The channel and cover shall be manufactured of 1mm thick rolled sheet steel.

3 1 2 The channel and cover shall be epoxy coated after manufacture.

3.2 OUTLETS

3.2.1 Outlets pre-punched on a modular basis shall be provided to accommodate socket outlets or future socket outlets.

3.2.2 In addition to standard lengths, covers of 250mm length shall be provided for installation on building module lines.

SECTION C3

C.3 CABLE TRAYS AND LADDERS

1. METAL CABLE TRAYS

Metal cable trays shall be manufactured from perforated rolled steel. Metal trays manufactured to the following standards shall be used:

(a)	Less than 150mm wide	1,2mm minimum thickness with 12mm minimum return
(b)	150mm to 457mm	1,2mm minimum thickness with 19mm minimum return
(c)	460mm to 610mm (Heavy duty)	2,5mm minimum thickness with 76mm return

2. CABLE LADDERS

2.1 Metal cable ladders shall consist of a 76mm high side rail of 2mm minimum thickness. Cross pieces shall be spaced at maximum intervals of 250mm. Where cables of $10mm^2$ or smaller are installed on cable ladders, the spacing of the cross pieces shall be 125mm. Cables shall be clamped in position by means of purpose-made cable clamps that fit into the cross pieces.

2.2 Cable ladders consisting of slotted metal rails which accommodate plastic or metal cable binding bands may be used in vertical cable runs against walls, etc. These cable ladders will be considered in horizontal cable runs for small cables for communication and control wiring upon the prior approval of the Engineer.

2.3 Purpose made cable trays consisting of 6mm angle iron and 6 x 40mm minimum cross pieces are acceptable in industrial applications. Cross pieces shall be welded in pairs at 250mm maximum centre-to-centre intervals. The pairs shall be spaced approx. 10mm apart to allow cable clamps or metallic binding bands to affix the cables to the tray.

3. PLASTIC CABLE TRAYS

Rigid un-plasticine PVC cable trays complying with the following standards may be used if specified in the Detail Technical Specification:

The up stands of trays listed in (a) and (b) shall not be perforated and the top of the up stand shall be smooth. The same cable tray type shall be used in long parallel tray runs.

4 FINISHES

Metal cable trays and ladders shall be finished as follows:

(a) In coastal areas	Hot-dip galvanised to SANS 32 & 121 or epoxy powder coated
(b) False ceiling voids	Electro-galvanised baked enamel power coated
(c) Vertical building ducts	Hot-dip galvanised to SANS 32 & 121 or baked enamel epoxy powder coated
(d) Plant rooms, substations, service tunnels	Electro-galvanised baked enamel or basements epoxy powder coated
(e) Damp areas, exposed to weather	Hot-dip galvanised to SANS 32 & 121 baked

	enamel or epoxy powder coated
(f) Undercover industrial application	Hot-dip galvanised to SANS 32 & 121 or baked enamel epoxy powder coated

The above-mentioned finishes shall apply unless specified to the contrary in the Detail Technical Specification. Hot-dip galvanised trays and ladders shall be cold galvanised at all joints, sections that have been cut and at places where the galvanising has been damaged. Powder coated or enamel painted trays and ladders shall likewise be touched up at joints, cuts and damaged portions using spray canisters recommended by the manufacturer of the trays and ladders.

5. ACCESSORIES

Horizontal and vertical bends, T-junctions and cross connections shall be supplied by the Contractor. The dimensions of these connections shall correspond to the dimensions of the linear sections to which they are connected. The radius of all bends shall be 1m minimum. The inside dimensions of horizontal angles or connections shall be large enough to ensure that tine allowable bending radius of the cables is not exceeded. Sharp angles shall be 45° mitred.

SECTION C4

C.4 PVC-INSULATED CABLES 600/1 000 V GRADE

1. GENERAL

This section covers the requirements for PVC-insulated cables for general installations under normal environmental conditions.

2. CONSTRUCTION

2.1 Cables shall be manufactured in accordance with SANS 1507, shall come only from fresh stocks, and shall be constructed as follows:

(a) Unarmoured cables PVC-insulated/PVC-sheathed

(b) Armoured cablesPVC-insulated/PVC-bedded/armoured/black extruded PVC outer sheath

(c) Single core cables PVC-insulated/unsheathed

2.2 The conductors shall be of high conductivity annealed stranded copper and the cores may be shaped or circular.

2.3 The insulation shall be general purpose PVC, 600/1 000V Grade.

2.4 The bedding shall consist of a continuous impermeable sheath of PVC extruded to fit the core or cores closely and in the case of multi-core cables, to fill the interstices between the cores.

2.5 Where armouring is specified it shall consist of one layer of galvanised steel wire in the case of multi-core cables and nonmagnetic metallic wire in the case of single core cables. Aluminium strip or tape armouring is not acceptable.

2.6 Where specified, an earth continuity conductor shall be provided in the armouring in accordance with SANS 1507.

3. PVC-SHEATHED ALUMINIUM-COVERED CABLES

3.1 Aluminium-covered cables shall comprise PVC-insulated copper conductors protected by an aluminium foil tape screen and a PVC sheath.

3.2 Cable ends shall be made off with compression glands fitted with a neoprene ring to seal the end.

3.3 Aluminium sheathed cable shall be installed on surface only using matching saddles installed at suitable intervals to prevent sagging.

3.3 Where exposed to sunlight, the cable shall have a stabilised black outer sheath.

4. LENGTHS

Cable shall be manufactured and supplied in one length to the lengths specified unless these lengths exceed a standard drum length in which case a ruling shall be obtained from the Engineer.

5. TESTS

At the option of the Engineer, acceptance tests shall be carried out on production runs of the cable in accordance with SANS 1507.

SECTION C5

C.5 GLANDS FOR PVC-INSULATED CABLES

1. Glands to be used for terminating PVC/PVC/SWA/PVC cables shall be of the adjustable type.

2. Glands shall be suitable for general purpose 600/1 000 V Grade cable with steel armouring.

3. The glands shall be made of nickel-plated cadmium plated or in coastal area bronze or brass.

4. The glands shall consist of a barrel carrying a cone bush screwed into one end and a nickel-plated brass nipple carrying a nickel-plated brass or a heavy galvanised steel locknut screwed into the other end. The galvanising shall comply with SANS 32 & 121.

5. Non-watertight glands must be easily converted to watertight glands by means of a waterproofing shroud and inner seal kit. On the cable entry side of the barrel a concave groove shall be provided to accommodate the top rim of the waterproofing shroud.

6. The shrouds shall be made of non-deteriorating neoprene or other synthetic rubber, and shall be resistant to water, oil and sunlight. The shrouds shall fit tightly around the glands and cable.

7. Glands shall be provided with ISO threads and shall be suitable for the specified cable sizes.

8. Flameproof glands shall comply with SANS 808, Groups 1, 2a and 2b.

9. Suitable accessories shall be provided with glands to be used on ECC armoured cables to facilitate a bolted lug connection of the earth continuity conductors. Grooves cut into the barrel or cone bush to accommodate the earth continuity conductors are not acceptable.

10. For unarmoured cables the cone bush and compression ring of the gland shall be replaced with a synthetic rubber compression bush and ring to provide the required grip on the outer sheath of the cable.

SECTION C6

C.6 CABLE TERMINATIONS AND JOINTS

1. HEAT-SHRINKABLE MATERIALS

1.1 GENERAL

1.1.1 Heat-shrinkable materials may only be used in exceptional circumstances with the written permission of the Engineer.

1.1.2 The complete kit shall be packed in a container that is marked for the type of cable insulation and construction as well as the voltage range for which the materials are suitable.

1.1.3 An illustrated set of instructions for the installation of the materials shall accompany every kit.

1.1.4 The joints and terminations shall make minimal, if any, use of insulating or stress relieving tapes. The use of electrical stress control and insulating tubing that is heat-shrunk onto the termination or joint, is preferred above other methods.

1.1.5 The materials shall comply with VDE 0278 and the supplier shall be called upon to confirm this aspect before acceptance of the materials or installation.

1.1.6 The heat-shrinkable and other materials used for the terminations and joints shall be of a high quality and shall retain their electrical and mechanical properties without deterioration.

1.2 TERMINATIONS WITH HEAT-SHRINKABLE MATERIALS

1.2.1 Terminations shall be made of a material that gives lasting protection against ultraviolet radiation.

1.2.2 The cores of all cables terminated outdoors and the cores of 3,3 kV and higher voltage cables terminated indoors, shall be completely covered with a shrunk-on protective layer against surface tracking, ultraviolet radiation and weathering.

1.2.3 Outdoor terminations shall be designed to prevent flashover under wet or contaminated conditions and to ensure additional mechanical strength. This shall be achieved with shrunk-on insulating spacers and rain shields.

1.3 JOINTS WITH HEAT-SHRINKABLE MATERIALS

1.3.1 The electrical continuity of all the conductors, screens and armouring shall not be impaired by the joints and the earth continuity shall be accomplished within the joints, i.e. no external earth continuity conductor that will be subject to corrosion, is acceptable. The joints shall be completely covered by a watertight sheath to prevent corrosion.

1.3.2 In the case of joints in cables with an outer PVC anti-electrolysis sheath, the joints shall be subject to the same electrical insulation test as the outer sheath of the cable.

2. RESIN FILLED JOINTS

2.1 The resin filled joint kit shall comprise a self sealing plastic mould of high mechanical strength having sufficient connector space.

2.2 The exact amount of cold hardening resin shall be provided in a two-compartment plastic bag.

2.3 The resin shall have absolute minimum shrinkage.

2.4 The mould and resin shall be completely waterproof and non-hygroscopic and shall be resistant to ultraviolet radiation.

2.5 Joint kits shall be of "SCOTCHCAST", "CELLPACK" or similar

3. CABLE JOINTS BOX

3.1 Cable joint boxes shall be manufactured of die cast aluminium material for normal conditions or glass fibre reinforced thermosetting compound where exposed to corrosive conditions.

3.2 The lid shall provide an absolute moisture barrier.

3.3 Boxes shall contain 2. 3 or 4 entries as required.

3.4 Unused entries shall be sealed with watertight blanking plugs.

3.5 Earth continuity shall be maintained through the box by means of the material of the box in the case of aluminium boxes or by means of earth straps and studs in the case of glass fibre reinforced boxes.

SECTION C7

C.7 PAPER-INSULATED CABLES

1. GENERAL

This section covers the requirements for paper-insulated cables for general installations under normal environmental conditions.

2. CONSTRUCTION

2.1 Cables shall be manufactured in accordance with SANS 97 and shall come only from fresh stocks.

2.2 The cable construction shall be impregnated paper-insulated/lead or lead alloy E sheathed/PVC bedding/galvanised steel wire armoured/outer PVC sheath.

2.3 The conductors shall be of high conductivity, annealed, stranded copper that may be shaped or circular.

2.4 The conductor insulation shall consist of impregnated paper tapes, either pre-impregnated or mass-impregnated with a non-draining compound.

2.5 The sheath shall be lead or lead alloy E. The cable shall be sheathed with watertight extruded black PVC to eliminate electrolytic corrosion of the cable. Abbreviation for this type is PLSTC or PESTC.

2.6 Armouring shall consist of galvanised steel wire. It should be noted that a cable with wire armour has a much highenfault rating than a cable with tape armour and that in vertical installations only wire armour shall be used.

2.7 The cable insulation shall be suitable for the supply voltage specified and the cable must be suitable for a system with an unearthed neutral.

3. LENGTHS

Cable shall be manufactured and supplied in one length to the lengths specified unless these lengths exceed the standard drum length.

4. TESTS

Tests shall be carried out on production runs of the cable in accordance with SANS 97.

SECTION C8

C.8 CABLE END BOXES AND COMPOUND

1. CABLE END BOXES

1.1 Cable end boxes shall be suitable to accept PLSTS, PLSTC, PESTS and PESTC cables.

1.2 The cable end boxes shall be of the metal clad type suitable for indoor or outdoor use as required for the specific application.

Only inverted type boxes shall be supplied for outdoor use. The insulators of the inverted type boxes are angled downwards.

1.3 The boxes shall be equipped with armour clamps and brass or gunmetal conical wiping glands.

1.4 All cable end boxes shall comply with BS 542.

1.5 The cable boxes shall be suitable for filling with bituminous, cold filling compound or resin oil semi-fluid compound.

1.6 The cable boxes for resin oil semi-fluid compound shall be equipped with a sight glass for compound level indication.

2. CABLE END BOX FILLING COMPOUND

2.1 Bituminous Compound

2.1.1 The compound shall be suitable for filling metal clad cable end boxes.

2.1.2 The compound shall comply with BS 1858, shall be non-hygroscopic and shall have a high dielectric strength and insulation resistance.

2.1.3 The compound shall have good adhesive properties and shall not be susceptible to cracking.

2.1.4 The compound shall be suitable for use in high ambient temperatures and system voltages of up to 22kV nominal.

2.2 Resin Oil Semi-fluid Compound

2.2.1 The compound shall be suitable for filling metal clad cable end boxes with level indicators.

2.2.2 The compound shall have a pouring temperature above 100°C,

2.2.3 The compound shall be non-hygroscopic and shall have a high dielectric strength and insulation resistance.

2.2.4 The compound shall have minimal contraction when cooling.

2.2.5 Specification "HENLEY COMPOUND NO. 57018. INSULOL DG" conforms to this specification.

3. QUANTITY

An adequate quantity of compound shall be supplied to fill each cable end box. The supply of the compound is included in the contract. The compound level shall be checked after approximately 6 months and topped up.

SECTION C9

C.9 WIRING TERMINALS

1. Terminal bodies and screws shall be of non-corrosive metal, enclosed in fire resistant, moulded plastic insulating bodies. Terminal bodies or screws shall not project beyond the insulating material and shall afford suitable protection against accidental contact by personnel and against short circuits and tracking.

2. The construction of the terminal block and mounting rail shall be such as to ensure a firm and positive location of the terminal blocks. It shall be possible to add additional terminal blocks within the terminal sequence without having to disconnect or dismantle the terminal strip. The terminal blocks shall be held in position by means of standard end clamps.

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

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

5. Terminals shall be sized and rated to match the conductors that are connected to them.

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

SECTION C10

C.10 LIGHT SWITCHES

1. GENERAL

This section covers the requirements for switches for use in general installations under normal environmental conditions.

2 FLUSH AND SURFACE MOUNTED SWITCHES

2.1 All switches shall be suitable for mounting in 100 x 50 x 50mm boxes shall comply with SANS 1663 and shall bear the SANS mark.

2.2 Switches shall be of tumbler operated microgap type rated at 16A, 220/250V.

2.3 Switches shall have protected terminals for safe wiring.

2.4 Contacts shall be of silver material.

2.5 On multi-lever switches, it shall be possible to individually change any of its switches.

2.6 The yoke strap shall be slotted to allow for easy alignment.

2.7 The covers of surface mounted switches shall have toggle protectors.

2.8 Where light switches are installed in partitions, they shall, where possible, be of the special narrow type intended for installation into the mullions.

3. WATERTIGHT SWITCHES

3.1 Watertight switches shall be of the microgap type suitable for surface mounting and shall bear the SANS mark.

3.2 The housing shall be of galvanised cast iron or die cast aluminium with watertight cover plate and toggle.

3.3 The switch shall have a porcelain base and a quick acting spring mechanism and shall be rated at 16A, 220/250V.

3.4 The ON/OFF position shall be clearly marked on the switch housing.

4. CEILING SWITCHES

4.1 Ceiling switches shall be rated at 10A. 220/250V and shall be suitable for ceiling mounting on a round conduit box.

4.2 The switch shall be made of high impact strength nylon material.

4.3 Adequate space shall be provided within the unit for ease of wiring.

4.4 The switch colour shall be white and shall be fitted with a nylon cord 1.25m long.

5. COVER PLATES

5.1 Cover plates shall be finished in ivory coloured baked enamel, anodised bronze or aluminium unless otherwise specified.

5.2 Cover plates shall overlap the outlet to cover wall imperfections.

5.3 Cover plates shall comply with SANS 1084.

SECTION C11

C.11 UNSWITCHED AND SWITCHED SOCKET-OUTLETS

1. GENERAL

This section covers the requirements for unswitched and switched socket-outlets for use in general installations under normal environmental conditions.

2. FLUSH AND SURFACE MOUNTED SWITCHED SOCKETS

2.1 All switched socket-outlets shall be suitable for mounting in 100 x 100 x 50mm or 100 x 50 x 50mm boxes, shall comply with SANS 164.

2.2 Switches shall be of the tumbler operated microgap type rated at 16A, 220/250V.

2.3 Terminals shall be enclosed for safe wiring.

2.4 Contacts shall be of silver material.

2.5 Safety shutters shall be provided on live and neutral openings.

2.6 The yoke strap shall be slotted to allow for easy alignment

2.7 The covers of surface mounted switched socket shall have toggle protectors.

2.8 Miniature circuit-breakers shall be used in lieu of a switch where specified.

2.9 Where 13A flat pin switched socket-outlets are specified, these shall comply with BS 1363.

3. WATERTIGHT SWITCHED SOCKETS

3.1 The housing of watertight switched sockets shall be of galvanised cast iron or die cast aluminium with watertight machined joints.

3.2 The switch shall have a porcelain base and a quick-acting spring mechanism and shall be rated at 16A. 220/250V.

3.3 The ON/OFF positions shall be clearly marked on the switch housing.

3.4 The socket openings shall be rendered watertight by means of a gasketed cover plate which is screwed onto the body of the unit. The cover plate shall be secured to the body of the unit by means of a chain.

4. UNSWITCHED SOCKET-OUTLETS

4.1 Unswitched socket-outlets shall only be used in the case of 5A, 220/250V, 3-pin socket-outlets intended for the connection of recessed light fittings installed in false ceilings.

4.2 The socket-outlets shall have shuttered live and neutral openings.

1.3 The socket-outlets shall be suitable for installation in pre-punched wiring channels. deep round conduit boxes, 100 x 50 x 50mm or 100 x 100 x 50mm boxes.

5. THREE-PHASE SWITCHED SOCKET-OUTLETS

5.1 Three-phase switched socket-outlets shall have 5 pins, one for each phase, neutral and earth. The current rating shall be as specified in the Detail Technical Specification.

5.2 The units shall be interlocked to prevent switching on if the plug top is not installed.

5.3 The units shall be supplied complete with plug top.

5.4 The live terminals shall be shrouded and shall be completely safe when the plug top is removed.

5.5 Samples shall be submitted to the Engineer for approval prior to the installation.

6. SHAVER SOCKETS

6.1 Shaver sockets shall comprise a double wound isolating transformer rated at 20 VA.

6.2 A three hole system shall be provided to provide for 115 V or 230V systems and also to cater for various types of shaver plugs.

6.3 Insertion of a shaver plug shall automatically switch on the unit by energising the primary side of the isolating transformer. Removal shall switch it off.

6.4 The unit shall be protected against overload by a thermal overload device.

6.5 The unit shall comply with BS 3052.

SECTION C12

C.12 LUMINAIRES FOR INTERIOR AND EXTERIOR APPLICATIONS

C.12.1 TUBULAR FLUORESCENT LAMP LUMINAIRES FOR INTERIOR APPLICATIONS

1. SCOPE

This specification covers the requirements for fluorescent luminaires using tubular fluorescent lamps for general indoor use. The types of luminaires covered are open-channel, industrial, decorative and recessed types and includes luminaires with one or more lamps with standard wattage ratings as specified in the project specification. Luminaires for use in special applications or atmospheres are not included in this specification.
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2. GENERAL

2.1 To promote work creation in South Africa, the luminaire should preferably be manufactured within the Republic of South Africa and should have a local content of at least 50%.

2.2 If the luminaire offered is of foreign origin, full specifications on technical performance and quality must be submitted and full reasons shall be given why the unit had to be imported.

2.3 A sample luminaire shall be provided for evaluation and approval by the Electrical Engineer prior to installation.

2.4 Luminaires, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective covering.

2.5 Lamps shall be delivered separately.

3. STANDARDS

The following standard specifications of the South-African National Standards shall apply to this luminaire specification:

3.1	SANS 1119:	Interior luminaires for fluorescent lamps.
3.2	SANS 1250:	Capacitors for use with fluorescent and other discharge lamp ballasts.
3.3	SANS 890:	Ballasts for fluorescent lamps.
3.4	SANS 1464:	Safety of luminaires.
3.5	SANS 1479:	Glow starters for fluorescent lamps.
3.6	IEC 400:	Lamp holders for tubular fluorescent lamps.
3.7	SANS 1041:	Tubular fluorescent lamps for general service.
3.8	SANS VC 8031:	Coatings applied by the powder-coating process.
3.9	SANS 783:	Baked enamels.
3.10	SANS 10142:	The wiring of Premises

Any standard referred to in the above specifications.

4. PHYSICAL AND ENVIRONMENTAL REQUIREMENTS

4.1 AREAS OF APPLICATION: The luminaires are intended for standard indoor use in buildings under the control of the Engineer .

4.2 FIXING: The luminaires shall be suitable for mounting in or against ceilings as described in the

project specification.

4.3 ENVIRONMENTAL: Unless otherwise specified in the detail specification the luminaires shall be suitable for operation in ambient temperatures between -10°C and +25°C.

4.4 SAFETY: The luminaire shall bear the SANS 1464 safety mark.

4.5 NOISE: Noisy ballasts will not be accepted and shall be replaced at no cost to the Engineer. All ballasts shall comply with the requirements of the latest edition of SANS 890. Part 1.

5. GENERAL TECHNICAL REQUIREMENTS

5.1 GENERAL

5.1.1 Tubular fluorescent lamp luminaires shall comply fully with SANS 1119 and all amendments as well as the additional requirements of this specification. Luminaires shall bear the SANS mark, or at least have a SANS Certificate of Compliance.

5.1.2 The Engineer reserves the right to have samples of luminaires offered tested by the SANS for compliance with SANS 1119. If a sample luminaire is found not to comply with SANS 1119 the cost of such tests shall be borne by the Tenderer.

5.2 CONSTRUCTION

5.2.1 A luminaire shall consist of a ventilated body manufactured of cold rolled sheet steel not less than 0,8mm thick, suitably braced or stiffened to prevent distortion. The body shall be of sufficient strength for the mounting of the entire luminaire.

5.2.2 The luminaire shall be designed to accommodate the control gear, wiring, lamp holders and, where applicable, the diffuser and reflectors. It shall be possible to reach the control gear without disconnecting wiring or removing the luminaire.

5.2.3 Except for mounting holes and/or slots and the required openings in air-return luminaires. the back of the body channel shall be closed over the full length of the luminaire.

5.2.4 Suitable knockouts shall be provided in the rear of the luminaire body for wire entry.

5.2.5 All components, including screws, bolts and nuts utilised in the construction of the luminaire or fixing of its components, shall be corrosion proof. Cadmium plated or stainless steel materials are preferred.

5.3 INTERNAL WIRING

5.3.1 Luminaires shall be completely wired internally. Conductors shall be protected with grommets where they pass through holes in the body.

5.3.2 The wiring shall be totally metal enclosed to prevent any possible contact with live components while changing lamps.

5.3.3 The conductor insulation shall be rated to withstand the temperature inside the luminaire body without deterioration.

5.3.4 The wiring shall terminate on a suitable terminal block having screw down plates bearing on the wires. Terminals where screws bear down directly on wires will not be acceptable.

5.3.5 An earth terminal, welded to the luminaire body, shall be provided. To ensure good earth continuity the earth terminal shall not be spray painted. The earth conductor shall be connected to this terminal by means of a crimped lug.

5.4 LAMP HOLDERS

Lamp holders shall preferably be of the telescopic spring-loaded type. Where twist-lock type lamp holders are provided, the mounting of the holders shall be able to accommodate the tolerances experienced in the length of lamps and in the manufacture of luminaires.

5.5 CONTROL GEAR

5.5.1 The control gear, ballasts, capacitors and starters shall be designed and manufactured to suit the control circuitry adopted. All luminaires shall operate on a switch-start basis.

5.5.2 Ballasts shall comply with SANS 890 and SANS 891, suitable for operation on 220V to 250V, 50Hz supplies.

5.5.3 Ballasts shall further be suitable for the particular luminaire to ensure that the thermal limits specified in paragraph 3.5 of SANS 1119 are not exceeded.

5.5.4 Starters shall comply with SANS 1479 or with BS 3772 if it is not covered by SANS 1479. Starters with metal cans shall contain integral earthing facilities to earth the can upon insertion.

5.5.5 Starters shall be accessible from the outside of the luminaire, and the replacement of the starter shall not necessitate the removal of lamps.

5.6 CAPACITORS

Capacitors shall comply with SANS 1250. The power factor of each complete fitting shall be corrected to at least 0,85.

5.7 LAMPS

5.7.1 Fluorescent lamps shall be suitable for the control circuitry used. Lamps shall comply with SANS 1041.

5.7.2 If no colour is specified in the Detail Technical Specification, the light colour shall correspond to colour 2 (4 300K) of SANS 1041.

5.7.3 Lamps of the same colour shall be provided for an entire installation unless specified to the contrary.

5.7.4 There shall be no visible flicker in the lamps and lamps shall readily strike when switched on. Faulty lamps or ballasts shall be replaced at no cost to the Engineer.

6. PHOTOMETRIC DATA

Photometric data sheets of the luminaire as prepared by a laboratory that complies with SANS requirements, shall be submitted with the luminaire.

7. TECHNICAL INFORMATION

The Tenderer shall include full technical particulars regarding the luminaire offered with the tender.

8. CHANNEL LUMINAIRE

8.1 Channel luminaires shall consist of a ventilated, enclosed channel body with one or more lamps as specified in the project specification. The channel body shall house the ballast, capacitor, terminals and internal wiring.

8.2 Provision shall be made for the addition of reflector wings and/or diffusers.

8.3 Three sets of mounting slots and knock-outs suitable for mounting onto standard round conduit boxes and/or 20mm diameter conduit pendant rods, shall be provided in the rear of the channel, one in the centre and one approximately one sixth from each end.

8.4 A knockout suitable for a 20mm diameter conduit entry shall be provided at each end of the channel. The distance between the back of the luminaire and centre of the knockout shall be approximately 25mm.

8.5 The knockouts shall be positioned on the centre line of the channel.

8.6 The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders.

8.7 The reflector shall be firmly held in position with a latching device consisting of knurled, coin slot, captive screws. Plastic, used as a spring mechanism, is not acceptable as a fixing device for reflectors. The action of the latching device shall not deteriorate due to use and/or ageing.

9. INDUSTRIAL LUMINAIRES

9.1 Industrial type luminaires shall consist of a basic channel luminaire fitted with detachable side reflectors.

9.2 The reflectors shall be manufactured of cold rolled steel, not less than 0,8mm thick.

9.3 The reflectors shall be designed to improve the downward light output ratio and decrease the upward light output ratio to a value of less than 2%.

10. DECORATIVE LUMINAIRES

10.1 Decorative luminaires shall incorporate an injection moulded prismatic acrylic diffuser or a high-grade optical reflector covering the entire reflecting surface of the luminaire.

10.2 The diffuser shall be hinged or easily removable for maintenance and lamp replacement. Optical reflectors shall be hinged.

10.3 Decorative luminaires with diffusers shall be constructed and so installed to prevent the ingress of dust and insects.

10.4 Highly polished reflectors shall be protected and carefully handled and to prevent fingerprints showing on the surface.

10.5 Surface mounted luminaires on suspended ceilings shall be arranged to suit the grid and shall fit tightly against the ceiling.

11. RECESSED LUMINAIRES

11.1 Recessed luminaires shall be suitable for mounting in the ceiling structure specified in the project specification.

11.2 The attachment of the prismatic diffuser or reflector shall be similar to that specified in paragraph 10 above.

11.3 The djffuser or reflector shall fit flush with the ceiling and the only visible portion shall be the reflector or diffuser.

11.4 Should the luminaire be so designed that a surrounding frame is visible, then this frame shall be manufactured of anodised aluminium. The frame shall form a neat trim with the ceiling. The comers of the surrounding frame shall be mitred and reinforced.

12. LOW-BRIGHTNESS LUMINAIRES

12.1 The luminaire shall be provided with an aluminium louver with V-shaped longitudinal vanes and extruded stepped cross-shielding plates.

12.2 Louvers shall be constructed from high purity aluminium (99,98%), chemically brightened and anodised.

12.3 The total Light Output Ratio (LOR) shall be 62% or better. In the plane between 60 and 90 (from the vertical), the LOR shall be below 3%.

13. LOW GLARE LUMINAIRES

13.1 The luminaire shall be provided with a die-formed, bright anodised high-purity aluminium (99,98%) louver with parabolic reflecting surfaces in both directions.

13.2 The total LOR shall be 62% or better. In the plane between 60 and 90(from the vertical), the LOR shall be less than 1,3%

14. LUMINAIRES FOR USE IN AREAS WITH VISUAL DISPLAY TERMINALS

14.1 The luminaire shall have anodised specular louvers to provide the brightness control required for this type of application.

14.2 At angles between 60 and 90 (from the vertical) the luminance shall not exceed 200cd/m2.

14.3 At the above angles the LOR shall be less than 0,6%. At angle between the vertical and 60 the LOR shall be 61% or better.

SECTION C12.3

C12.3 BULKHEAD LUMINAIRES FOR USE WITH COMPACT FLUORESCENT OR TUNGSTEN FILAMENT LAMPS FOR INTERIOR AND EXTERIOR APPLICATIONS

1. SCOPE

This specification covers the requirements for bulkhead type luminaires, using compact fluorescent or tungsten filament lamps, for general indoor and outdoor use. The types of luminaires covered are decorative round, rectangular or square surface-mounted and recessed types and include luminaires with one or more lamps with standard wattage ratings as specified in the project specification. Luminaires for use in special applications or atmospheres are not included in this specification.

2. GENERAL

2.1 To promote work creation in South Africa, the luminaire should preferably be manufactured within the Republic of South Africa and should have a local content of at least 50%.

2.2 If the luminaire offered is of foreign origin, full specifications on technical performance and quality must be submitted and full reasons shall be given why the unit had to be imported.

2.3 A sample luminaire shall be provided for evaluation and approval by the Electrical Engineer prior to installation.

2.4 Luminaires. associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective covering.

2.5 Lamps shall be delivered separately.

3. STANDARDS

The following standard specifications of the South-African National Standards and the International Electrotechnical Commission shall apply to this luminaire specification:

3.1	SANS1119:	Interior luminaires for fluorescent lamps. Note: The latest amendments whereby luminaires with compact fluorescent lamps are covered, shall apply.
3.2	SANS 1250:	Capacitors for use with fluorescent and other discharge lamp ballasts.
3.3	SANS 890, IEC 920 & IEC 921:	Ballasts for fluorescent lamps.
3.4	SANS 1464:	Safety of luminaires.
3.5	SANS 1479:	Glow starters for fluorescent lamps.
3.6	IEC 400:	Lamp holders for tubular fluorescent lamps.
3.7	SANS 1041, IEC 81 & IEC 901:	Tubular fluorescent lamps for general service.
3.8	SANS 1247:	Coatings applied by the powder-coating process.
3.9	SANS 783:	Baked enamels.
3.10	SANS 10142:	The wiring of Premises
3.11	SANS 56:	Incandescent lamps

3.12 Any standard referred to in the above specifications.

4. PHYSICAL AND ENVIRONMENTAL REQUIREMENTS

4.1 AREAS OF APPLICATION: The luminaires are intended for standard indoor and exterior use in buildings under the control of the Engineer .

4.2 FIXING: The luminaires shall be suitable for mounting against ceilings or walls as described in the project specification.

4.3 ENVIRONMENTAL: Unless otherwise specified in the detail specification the luminaires shall be suitable for operation in ambient temperatures between -10°C and +45°C.

4.4 SAFETY: The luminaire shall bear the SANS 1464 safety mark.

4.4 NOISE: Noisy ballasts will not be accepted and shall be replaced at no cost to the Engineer. All ballasts shall comply with the requirements of the latest edition of SANS 890, Part 1 or IEC 920 and IEC 921.

5. GENERAL TECHNICAL REQUIREMENTS

5.1 GENERAL

5.1.1 Compact fluorescent lamp luminaires shall comply fully with SANS 1119 and all amendments as well as the additional requirements of this specification. Luminaires. which bear the SANS mark, are preferred. Luminaires shall at least have an SANS Certificate of Compliance.

5.1.2 The Engineer reserves the right to have samples of luminaires offered tested by the SANS for compliance with SANS 1119. If a sample luminaire is found not to comply with SANS 1119 the cost of such tests shall be borne by the Tenderer.

5.1.3 Luminaires for tungsten filament lamps shall not materially differ from those for compact fluorescent lamps, but shall be capable of dissipating the extra heat generated without deterioration in the luminaire materials.

5.2 CONSTRUCTION

5.2.1 A luminaire shall consist of a ventilated body manufactured from die-cast aluminium. The body shall be of sufficient, strength for the mounting of the entire luminaire.

5.2.2 The luminaire shall be designed to accommodate the control gear, wiring, lamp holders, the diffuser and reflectors. It shall be possible to reach the control gear without disconnecting wiring or removing the luminaire.

5.2.3 Except for mounting holes and/or slots, the back of the body shall be closed over the full extent of the luminaire.

5.2.4 Suitable knockouts shall be provided in the rear of the luminaire body for wire entry.

5.2.5 All components, including screws, bolts and nuts utilised in the construction of the luminaire or fixing of its components, shall be corrosion proof. Cadmium plated or stainless steel materials are preferred.

5.2.6 The luminaire shall, as an option, be available with a high-pressure die-cast aluminium skirt, which shall be designed in such a way that it covers the base completely when mounted. The skirt shall be mounted onto the body by means of at least three screws

5.3 INTERNAL WIRING

5.3.1 Luminaires shall be completely wired internally. Conductors shall be protected with grommets where they pass through holes in the body.

5.3.2 The wiring shall be totally metal enclosed to prevent any possible contact with live components while changing lamps.

5.3.3 The conductor insulation shall be rated to withstand the temperature inside the luminaire body without deterioration.

5.3.4 The wiring shall terminate on a suitable terminal block having screw down plates bearing on the wires. Terminals where screws bear down directly on wires will not be acceptable.

5.3.5 An earth terminal, welded to the luminaire body, shall be provided. To ensure good earth continuity the earth terminal shall not be spray painted. The earth conductor shall be connected to this terminal by means of a crimped lug.

5.4 LAMP HOLDERS

Lamp holders shall be of the type suitable for the relevant compact fluorescent or general lighting service lamp. The following standard lamps and lamp holders shall apply:

5.4.1

LAMP	HOLDER	LAMP	HOLDER
7W PL	2G11	13W PLC	G24d-1
9W PL	2G11	16W 2D	GR10q
11W PL	2G11	18W PLC	G24d-2
60/100E GLS	E27, porcelain		

5.5 CONTROL GEAR

5.5.1 The control gear, ballasts, capacitors and starters shall be designed and manufactured to suit the control circuitry adopted. All fluorescent luminaires shall operate on a switch-start basis where external starters are employed.

5.5.2 Ballasts shall comply with SANS 890 & SANS 891, or IEC 920 & IEC 921 as applicable and shall be suitable for operation on 220V to 250V, 50Hz supplies.

5.5.3 Ballasts shall further be suitable for the particular luminaire to ensure that the thermal limits specified in paragraph 3.5 of SANS 1119 are not exceeded.

5.5.4 Starters shall comply with SANS 1479 or with BS 3772 if it is not covered by SANS 1479. Starters with metal cans shall contain integral earthing facilities to earth the can upon insertion.

5.5.5 Starters shall be accessible from the outside of the luminaire, and the replacement of the starter shall not necessitate the removal of lamps.

5.5.6 The luminaire reflector shall act as the gear/mounting tray and shall be manufactured from sheet steel at least 0,7mm thick. The gear tray shall preferably be white epoxy powder coated after all the cut-outs and holes have been made on the tray. The tray shall be mounted to the body of the luminaire by means of screws and the tray shall be provided with a hole through which the screw head can pass plus a slot of the same width as the screw thickness so that the tray can be removed without removing the screws completely.

5.5.7 The gear tray shall be equipped with the components suitable for the luminaires specified in the project specification.

5.6 CAPACITORS

Capacitors shall comply with SANS 1250. The power factor of each complete fitting shall be corrected to at least 0,85.

5.7 LAMPS

5.7.1 Fluorescent lamps shall be suitable for the control circuitry used. Lamps shall comply with the applicable clauses of SANS 1041 and, where it does not apply, the lamps shall comply with IEC 81 or IEC 901.

5.7.2 If no colour is specified in the Detail Technical Specification, the light colour shall correspond to colour 2 (4 300K) of SANS 1041.

5.7.3 Lamps of the same colour shall be provided for an entire installation unless specified to the contrary.

5.7.4 There shall be no visible flicker in the lamps and lamps shall readily strike when switched on. Faulty lamps or ballasts shall be replaced at no cost to the Engineer.

5.7.5 The following standard lamps shall be used for the purposes of this specification:

PL lamps:	7W, 9W AND 11W
PLC Lamps:	13W
2D Lamps:	16W
GLS Lamps:	60 and100W

5.8 DIFFUSER

5.8.1 The diffuser shall consist of a high-impact resistant ultra-violet stabilised acrylic moulding. The diffuser shall be either transparent or opaque as described in the project specification. Where transparent diffusers are required, these shall be moulded with internal prismatic refractors and the outer surface shall be smooth.

5.8.2 The diffuser shall be mounted to the body by means of an external mounting ring and at least three screws, which should preferably not pass through the diffuser body as well. A silicon sponge gasket which fits into a groove on the diffuser shall be used to allow breathing of the luminaire whilst prohibiting the ingress of insects.

6. PHOTOMETRIC DATA

Photometric data sheets of the luminaire as prepared by a laboratory that complies with SANS requirements, shall be submitted with the luminaire.

7. TECHNICAL INFORMATION

The Tenderer shall include full technical particulars regarding the luminaire offered with the tender.

SECTION C13

C.13 FIXED WATER STORAGE HEATERS

1. The water heaters shall comply with SANS 151 and shall bear the SANS mark.

1. This specification covers the following types of water heaters:

   TYPE 1: (Free outlet type) - A water heater provided with an open outlet. The flow of water is controlled by means of a stopcock in the inlet pipe.

   TYPE 2: (Combination type) - A water heater having an integral cold water cistern. The flow of water is controlled on the outlet side.

   TYPE 3: (Low pressure type) - A water heater designed for a working pressure of 100kPa with or without an open expansion or vent pipe and intended to work from a supply derived from either a pressure control valve or a cold water cistern that does not form an integral part of the heater. The flow of water is controlled on the outlet side.

   TYPE 4: (High pressure type) - A water heater designed for a working pressure of 400kPa derived from the mains via a combined pressure control/expansion valve. The flow of water is controlled on the outlet side.

2. The background colour of the nameplate indicating details of the cylinder shall be in accordance with the appropriate working pressure specified in SANS 151 namely:

   50kPa or less - Yellow
   100kPa - Blue
   200kPa - Black
   300kPa - Brown
   400kPa - Red
   500kPa - Grey

4. The working pressure of types 1 and 2 shall be 20kPa and the minimum working pressure of type 3 shall be 100kPa. Where a working pressure higher than 100kPa is required, type 4 shall be used.

5. The rating of the heating units shall be as follows:

TYPE	CAPACITY (LITRES)	220/250 V, 50 Hz (kW)
1	15	0.5
1 & 3	25	0,5
2 & 3	50	1,0
2,3 & 4	100	2,0
2,3 & 4	150	3,0
2,3 & 4	200	4,0
2,3 & 4	250	4,0
3	350	Will be specified by the
3	450	Engineer
3	550	

6. The paint finish shall be at least equal to Class I baked enamel of SANS 757 with a dry film thickness of at least 0,03mm.

7. The insulation between the cylinder and the outer casing shall consist of a 50mm high density fibreglass blanket or granulated cork.

8. The heating element shall be of the immersion type.

8. The following safety accessories shall be supplied as standard :

On types 1, 2 & 3	(a)	Fail-safe type thermostat graduated to operate at any temperature between 40°C and 75°C
On type 4	(b)	Fail-safe type thermostat graduated to operate at any temperature between 40°C and 75°C

(c) Emergency over-pressure/temperature Relief valve relieving at 600/650 kPa or at 94-97°C

10. In areas with aggressive water, an incalloy heating element shall be provided.

SECTION C15

C.15 BUSBARS (RISING AND OVERHEAD FOR VOLTAGES UP TO 1 KV)

1. GENERAL

1.1 Busbars shall be designed and manufactured in compliance with SANS 1473 and SANS 1195.

1.2 Rising and overhead busbar trunking shall be fully enclosed in a sheet metal duct which shall form part of the busbar support.

1.3 The entire busbar system shall be manufactured in sections. It shall be possible to remove intermediate sections without having to dismantle or remove adjacent sections.

2. BUSBAR ENCLOSURE

2.1 The metal enclosure shall form an integral part of the bus section and shall be of the same length as the conducting sections of the busbar. Bus sections shall be securely fixed at each joint by means of bolted fishplates.

2.2 The busbar shall be splash proof and vermin proof and adequately ventilated.

2.3 Each bus section shall have at least four fixing points. These points shall be capable of accepting M10 bolts with hexagonal heads.

2.4 The covers of the busbar trunking shall be firmly secure to one chassis or framework by at least four points per section.

2.5 Self-tapping screws are not acceptable as a means of fixing or securing any part or component on busbar trunking.

2.6 Suitable locking devices, i.e. spring washers or locknuts, shall be incorporated with all threaded parts to withstand vibration and stresses caused under normal and fault conditions.'

2.7 Busbar covers shall be so designed to facilitate removal of the covers after installation. Sections of the busbars which pass through walls and floors shall have separate covers. This is necessary because the walls and floors will be built up to the busbar enclosure as a fire barrier.

3. PAINT FINISH

Metal components of the framework and panels of the busbar trunking shall be painted in accordance with the Engineer's "STANDARD PAINT SPECIFICATION", Section C39. The colour shall be "LIGHT ORANGE", colour B26 of SANS 1091.

4. BUSBARS

4.1 GENERAL

Busbars shall be manufactured of solid drawn high conductivity copper with a rectangular cross section in accordance with SANS 1473 and SANS 1195 and BS 159 and BS 1433 where applicable.

4.1.2 The voltage and current rating of the busbar shall comply with the Detail Technical Specification.

4.1.3 The current rating shall be indicated on a stamped metal label on each section of the busbar trunking as well as the name and address of the manufacturer.

4.2 VOLTAGE RATING

4.2.1 The busbar system shall be designed to withstand the service voltage and the corresponding test voltage specified in SANS 1473.

4.2.2 The minimum clearance between current carrying parts and other metal parts specified in SANS 1473

shall be maintained.

4.3 CURRENT RATING

4.3.1 The maximum allowable temperature of busbars (including joints) carrying full load current in an ambient temperature as specified shall not exceed 80°C, unless different ambient temperatures are specified, an ambient temperature of 35°C shall be assumed with a maximum temperature increase of 45°C.

4.3.2 Table C15.2 may be used as a guide in determining busbar ratings where the distance between the phase busbars is at least the distance of the longer side of the cross-section with a minimum spacing of 50mm and at least 150mm from the sheet metal enclosure. It is however essential that the busbar manufacturer shall make due allowance for the "proximity and skin" effects, the effect of ferrous enclosures, ventilation etc. and for the arrangement used in his busbar design. Manufacturers shall, where requested, prove that the busbar rating and enclosure design comply with the temperature rise specified above. The busbars can also be rated to DIN 43671 for unpainted busbars.

4.3.3 Neutral busbars in three-phase, four wire supplies shall have the same dimensions as the phase busbars.

4.3.4 Busbars may not be tapered. The rating of the bars shall be equal to the incoming current rating. In cases where the main switch is an isolator, the isolator rating may not be taken as the incoming current rating.

4.3.5 In addition to the current rating busbars shall comply with the following fault level rating:

$A = 8,2 \times 1 \times (t)^{1/2}$

where

A = minimum cross-section (mm^2)

I = prospective fault current (kA)

t = maximum time in seconds required for protection equipment to clear the fault.

(Minimum allowable value for t = 0,2s).

4.3.6 Where a busbar consists of two or more busbars per phase (laminations), the laminations shall be separated by a minimum distance of the thickness of one lamination. The laminations shall be clamped together with copper spacers at intervals not exceeding 450mm in order to equalise the current distribution in the laminations. The busbar ratings in Table C15.2 shall be multiplied by the factors shown in Table C15.1 to determine the total current rating per phase.

4.4 MOUNTING

4.4.1 Busbar sections shall be supported at a minimum of two points in each section.

Busbars shall be supported by resin bound synthetic wood panels or other suitable dielectric material. The surface of these supports shall be treated to prevent surface tracking. The supports shall be bolted securely to the framework and busbars shall fit tightly in the supports.

4.4.2 The rating and fixing of busbars shall be designed to withstand mechanical and temperature stresses during fault conditions. The busbar system shall withstand a fault current under test conditions of 20 times rated current for 1 second when applied :

(a) between all three phases,

(b) any two phases,

(c) neutral and the adjacent phase, and

(d) earth conductor and nearest phase conductor.

4.4.3 If no other methods are specified, the stresses under fault conditions shall be calculated as follows, taking into account correction factors for different configurations.

Mechanical stresses

$$F = \frac{16 \times I^2 \times k}{D \times 10\,000} \quad N/m$$

where F = force (N/m)

I = maximum fault current (A RMS symm.)

d = spacing between bars (m)

k = space factor for rectangular bars (Fig. C15.1)

4.4.4 The maximum allowable spacing of busbar supports for fault levels of 15 kA and more is 600mm.

4.5 BENDS

Busbars shall be radius edged where they change direction.

4.6 BUSBAR SECTIONS

Busbars shall be divided into sections (par. 1.3) and jointed to overlap for a distance equal to twice the width of the bar to prevent localised heating. Contact surfaces shall be tinned (acid-base flux may not be used) or silver-plated and bolted down with cadmium-plated bolts and nuts and spring washers with an applied torque in accordance with SANS 1473. Busbars shall be prepared for extension where they terminate at the ends of the trunking.

4.7 EARTH BUSBAR

4.7.1 An earth busbar shall be installed in a convenient position along the entire length of the busbar.

4.7.2 The cross-sectional area of earth busbars shall be calculated in accordance with the following formula in IEC 439 with a minimum cross-section of 6,3 x 20mm:

$$S = \frac{I}{X} \times \frac{(t)^{1/2}}{(d)^{1/2}}$$

where S = cross-section (mm^2)

I = the r.m.s. value of the current (A)

X = 13 for Copper

t = operating time of protection equipment (s) (Minimum value = 0,2s)

dT = temperature rise (°C) = 120°C for insulated conductors = 180°C for uninsulated conductors

If t is between 2s and 5s, then dT may be increased in the same formula to:

dT = 145°C for insulated conductors

= 215°C for uninsulated conductors.

4.7.3 In addition to the above considerations, the longer side of the earth busbar shall be at least twice the diameter of the largest bolt that wiil be fitted to the busbar.

4.7.4 The method of installation of the earth bar shall permit the connection of earth conductors at any point.

4.8 EXPANSION JOINTS

4.8.1 Expansion joints to allow for thermal expansion and contraction shall be provided at intervals not exceeding 10m to allow for a temperature variation from 0°C to 90°C.

4.8.2 These expansion joints shall be made with flexible braided copper strap or laminated copper foil with the same current carrying capacity as the rest of the busbar trunking.

4.8.3 Connections to transformers and switchboards shall consist of similar flexible connections.

5. EARTHING OF METAL PARTS

5.1 All non-current carrying metal parts of the busbar system, e.g. framework, panels, transformer cores, metal covers, etc. shall be bonded to the earth busbar.

5.2 Provision shall be made at each fused take-off for a connection to the earth bar. This connection shall consist of a hole to accommodate one or more M10 bolts with nuts and washers and be prepared as described in par. 4.6.

6. BOLTS AND NUTS

Only cadmium-plated high tensile steel bolts and hexagonal nuts may be employed at busbar joints and connection points. All nuts shall be provided with spring washers or be of the "NYLOCK" type with washers. The largest possible size bolt that will fit into holes in lugs and fixing holes of equipment shall be used in every instance. Bolts shall be of sufficient length so that at least two but not more than five threads protrude beyond the nut.

7. ACCESSORIES AND CONNECTIONS

7.1 All the accessories such as bends, cable connection boxes and fused take-offs shall be purpose-made and comply with the same specification as the busbars.

7.2 The temperature rise of terminals or connections at incoming or outgoing cables may not exceed the temperature rating of the cable insulation. This final temperature shall not exceed 70ºC for PVC insulated cables.

7.3 Where busbars terminating at the ends of switchboards are intended for future extension, these busbars shall be pre-drilled to accommodate the extension. Where pre-fitted space is specified for future equipment, the busbars in the proposed position shall be pre-drilled and nuts and bolts shall be provided to accommodate the future busbars or cables feeding the equipment.

8. FUSED TAKE-OFFS

8.1 Fused take-offs for secondary supplies and equipment shall be supplied and installed in accordance with the Detail Technical Specification.

8. 2 No connections shall be made to the main busbar without fuses. Take-offs shall comply with SANS 1473.

8.3 The fuses of these take-offs shall comply with the Engineer's standard specification for "CARTRIDGE FUSES AND FUSE HOLDERS", Section C22.

9. FIRE BARRIERS

9.1 Two fire barriers in the busbar trunking shall form an integral part of each section of rising busbars.

Non-flammable, non-conducting material such as asbestos-cement shall be used for this purpose.

9.3 The fire barriers shall be placed to prevent the spreading of fire from one floor of a building to the next but not restrict the ventilation of the busbars.

9.4 Overhead busbars shall be equipped with fire barriers where the busbars pass through walls or

partitions from one room to another, in accordance with par. 3.5 of SANS 1473.

10. TESTING

10.1 Completed busbars shall be subjected to a test voltage of 2,5 kV r.m.s. for 1 min. in accordance with SANS 1473.

10.2 Where required, fault current tests in accordance with par. 4.4.2 above shall be conducted.

TABLE C15.1

DERATING FACTORS FOR LAMINATED BUSBARS

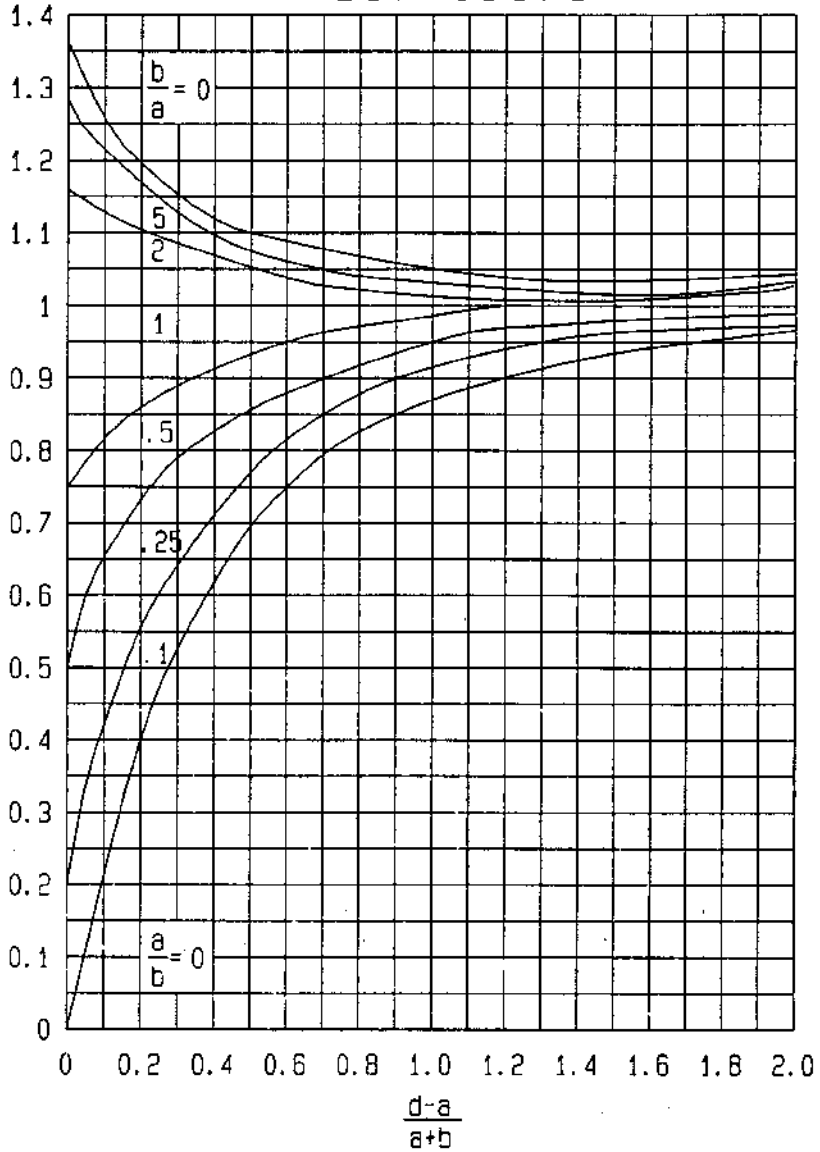
Area of Cross Section (mm^2)	No of parallel busbars per phase		
	2	3	4
500	1,78	2,45	3,13
1 000	1.72	2,36	3,00
1 500	1,65	2,24	2,84
2000	1,60	2,16	2,70
2500	1,55	2,10	2,60
3000	1,52	2,02	2,52
3500	1,48	1,98	2,48
4000	1,44	1,96	2,45

TABLE C15.2

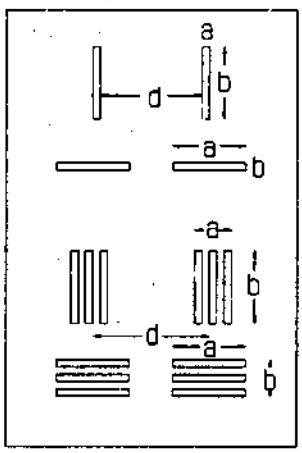
CURRENT RATING OF SINGLE COPPER BUSBARS (A)

Width (mm)	Thickness (mm)						
	2,5	3.15	4,0	6,3	10	12,5	16
12,5 16 20 25 31,5	155 190 230 280 340	180 220 265 320 385	 250 300 365 440	 470 560			
40 50 63 80 100	420 510	475 575	540 650 790 970 1160	680 820 990 1200 1430	870 1030 1240 1480 1760	 1160 1370 1640 2180	
125 160 200 250 315 400				1710 2070	2100 2530	2310 2780 3290 3900 4630	2570 3090 3660 4300 5120 6230

FIG. C15.1



k=space factor for rectangular bars



SECTION C16

C.16 EARTHING ELECTRODES

1. GENERAL

This section covers uncoated, coated and metal clad circular rod electrodes intended to provide an earth in soil for electrical and lightning arrestor systems.

2. CATEGORY AND TYPE

2.1 Only the following type of earth rods shall be used:

1(a) - Solid copper.

1(b) - Solid stainless steel.

2 (a) - Solid steel with bonded copper protection.

2 (b) - Solid steel with plated copper protection.

2 (c) - Solid steel with a shrunk-on copper jacket.

3 - Solid steel with a shrunk-on stainless steel jacket.

4 - Galvanised steel.

2.2 Bare aluminium is not acceptable as an electrode material.

2.3 All rods shall be solid and of circular cross section with length as specified in the Detail Technical Specification.

2.4 The nominal diameter of the earthing rods shall not be less than 16mm unless the rods are specified for placing in pro-drilled holes in which event the minimum nominal diameter shall not be less than 12mm.

3. COUPLINGS AND CONDUCTOR CLAMPS

3.1 Earthing electrodes shall be provided with (n-1) couplings where n = number of rods supplied.

3.2 Rods designed for coupling by means of external sleeves shall be provided with an adequate quantity of hydrocarbon or silicon grease to be applied to the coupling before the joint is made.

3.3 Rods designed for coupling by means of internal pins or splines shall be provided with thin-walled tubes and hydrocarbon or silicon grease to seal the joint.

3.4 Conductor clamps shall be provided to suit the type and size of rods provided and the type and size of conductor specified in the Detail Technical Specification.

3.5 The material of the clamps shall be electrolytically compatible with the rod and conductor materials.

3.6 Where brazed or welded connections are specified, the supplier of the rods shall stipulate at least two types of metals which are compatible with the rod and conductor materials.

3.7 An adequate number of driving caps or bolts shall be supplied with the rods to protect the ends of the earthing rods whilst being driven into hard soil.

SECTION C17

C.17 SWITCHBOARDS (UP TO 1 KV)

1. GENERAL

1.1 SCOPE

This section covers the manufacturing and testing of flush mounted, surface mounted and floor standing switchboards for general installations in normal environmental conditions and for system voltages up to 1 kV.

1.2 SIZE

All switchboards shall be of ample size to accommodate the specified switchgear and provide space for future switchgear. For every 4 (or part of 4) 5kA circuit-breakers on a switchboard, space for an additional 5kA circuit breaker shall be allowed unless future space requirements are dearly specified. For circuit breakers above 5kA, this factor shall be 15%. The clearance between adjoining switchgear openings shall be as specified in par. 6.2.

1.3 EXTERNAL DIMENSIONS

The maximum allowable height of free standing switchboards is 2,2m. Cubicle type boards may be up to 2,4m high if they can be fully dismantled into individual cubicles. Where, due to space restrictions, a board exceeds 2,4m in height, equipment not normally requiring access, shall be installed in the top section, enabling equipment normally requiring access to be installed lower down in the board. All other specified external dimensions for switchboards shall be strictly adhered to. If the clearances specified in par. 6.2 cannot be adhered to as a result of restricting external dimensions, the Contractor shall obtain the approval of the Engineer before manufacturing the switchboards.

1.4 MOISTURE AND VERMIN

All switchboards shall be rendered moisture proof and vermin proof and shall be adequately ventilated. Refer to par. 4.10 and 4.11.

1.5 LOAD BALANCE

The load shall be balanced as equally as possible across multiphase supplies.

2. CONSTRUCTION OF FLUSH MOUNTED SWITCHBOARDS

2.1 STANDARD

Flush mounted switchboards shall comply fully with SANS 1765. Unless the depths of the switchboards are specified, the depths shall be determined in accordance with par. 6.

2.2 EXPANDED METAL

Where switchboards are to be built into 115mm thick walls, expanded metal shall be spot-welded to the rear of the bonding trays. The expanded metal shall protrude at least 75mm on each tray side to prevent plaster from cracking.

2.3 KNOCK-OUTS

Knock-outs shall be provided in the top and bottom ends of each switchboard tray to allow for the installation of conduits for the specified and future circuits. Knock-outs shall be provided for an equal number of 20mm and 25mm dia. conduits.

2.4 PANEL

Front panels shall have machine punched slots for housing the specified and future flush mounted switchgear. The distance between the inside of the closed doors and the panel shall not be less than 20mm. No equipment may be mounted on the panel unless the panel is permanently hinged to the switchboard frame.

2.5 FIXING OF FRONT PANELS

The front panel shall be secured to the architrave frame by means of 6mm studs and chromium-plated hexagonal domed nuts, hank nuts or captive fasteners. Alternatively the panel may be secured to the architrave frame by means of two pins at the bottom and a latch or lock at the top of the panel. Self-tapping screws will not be allowed. All front panels shall be provided with a minimum of one chrome plated handle.

2.6 DOOR HANDLES AND CATCHES

Switchboard doors shall be equipped with handles and catches. Locks shall only be provided when specified. In all cases where lockable doors are required and in all cases where the switchboard doors are higher or wider than 450mm, handles consisting of a push-button-and-handle combination with spring loaded catch or rotary handle-and-catch combination shall be installed. Switchboard doors smaller than 450mm in height and width may be equipped with spring loaded flush mounted ring type latches. Square key operated catches are not acceptable unless specified.

3. CONSTRUCTION OF SURFACE MOUNTED SWITCHBOARDS

3.1 STANDARD

Surface mounted switchboards shall comply with SANS 1765.

3.2 SWITCHBOARD TRAY

Surface mounted switchboards shall be equipped with a 1,6mm minimum sheet steel reinforced tray suitably braced and stiffened to carry the chassis, door and equipment. Lugs to secure the switchboard to a vertical surface shall be provided.

3.3 CONSTRUCTION

All joints shall be welded or securely bolted. The tray shall be square and neatly finished without protrusions. The front tray sides shall be rounded with an edge of at least 20mm to accommodate flush doors.

3.4 CHASSIS

A sheet steel chassis for the mounting of equipment shall be bolted to the tray and shall comply with the requirements of par. 6.1 and 6.3.

3.5 FRONT PANEL AND DOOR

The front panel and door shall comply with par. 2.4 to 2.6 above. Doors shall fit flush in the tray when closed.

3.6 DIMENSIONS

Unless the depth of the switchboards is specified, the dimensions shall be determined in accordance with the requirements of par. 6.2 and 6.3.

4. CONSTRUCTION OF FREE STANDING SWITCH BOARDS

4.1 FRAMEWORK

A metal framework for free standing switchboards shall be manufactured from angle iron. channel iron or 2mm minimum folded metal. A solid U-channel base frame, sufficiently braced to support all equipment and span floor trenches and access holes shall be provided. Switchboards shall be of cubicle design with 2mm side

panels forming divisions between cubicles. The maximum allowable cubicle width is 1,5m. (Refer also to par. 4.7). Joints shall be non-continuously butt-welded. Welds shall be ground smooth and the joint wiped with plumber's metal in order to provide a smooth finish. Switchboards wider than 2m shall be fitted with screwed eye-bolts attached to the framework to facilitate loading and transportation of the board.

4.2 REAR AND SIDE PANELS

The rear panels shall be removable and shall be manufactured from 2mm minimum sheet steel. The panels shall have returned edges which are recessed in the frame or which fit over lips on the switchboard frame. The panels shall be secured to the frame by means of studs and chromium-plated hexagonal domed brass nuts or hank nuts or captive fasteners equal or similar to "DZUS" or "CAMLOC". Where switchboards are intended for installation in vertical building ducts or against walls, the rear and side panels may consist of a single folded sheet which is either bolted or welded to the frame or which forms part of the folded metal frame.

4.3 FRONT PANELS

4.3.1 The front panels of floor standing switchboards shall preferably be hinged except where flush mounted equipment prevents this. Alternatively, panels shall be secured by means of the methods described in par. 2.5. The panels shall be arranged in multi-tiered fashion to allow for the logical grouping of equipment in accordance with par. 6.

4.3.2 The hinged front panels shall have a dished appearance with 20mm upturns which fit over a lip on the switchboard frame. Alternatively the hinged panels shall have folded edges and shall be fitted flush or slightly recessed in the switchboard frame. The latter method shall be used where doors are required. (Also refer to par. 4.6). Corners shall be welded and smoothed.

4.3.3 The panels shall be of 2mm minimum sheet steel with machine punched slots to allow for the flush mounting of instrumentation, switchgear toggles and operating handles. A minimum clearance of 50mm shall be maintained between the rear of equipment mounted on the panels (taking into account terminals or other projections) and the frame and chassis of the switchboard. Separate panels shall preferably be provided for the mounting of instrumentation and for covering flush mounted switchgear. Enclosed switchgear with front panels e.g. combination fuse-switch units, may be flush mounted in the board in lieu of separate hinged panels.

4.3.4 Hinged panels shall be suitably braced and stiffened to carry the weight of flush mounted equipment and to prevent warping.

4.3.5 Hinged panels with flush mounted equipment and panels higher than 600mm shall be supported by hinges of adequate strength to ensure smooth and reliable operation. 16mm pedestal or similar heavy duty hinges with single fixing bolts may be used on panels smaller than 600mm. On the larger panels long pedestal type hinges with two fixing bolts per hinge are preferred. Piano hinges are not acceptable for this application.

4.3.6 A tubular chromium-plated handle shall be fitted on each panel. The handle may be omitted if "DZUS" or "CAMLOC" fasteners are used.

4.3.7 Blanking plates shall be fitted over slots intended for future equipment. These plates shall be fixed in a manner which does not require the drilling of holes through the front panel. Dummy circuit-breakers may be fitted where applicable.

4.3.8 Front panels containing live equipment such as instrumentation or control switches, shall be bonded to the switchboard frame with a braided copper earth trap with an equivalent cross-sectional area of at least 4mm^2.

4.4 SECURING OF FRONT PANELS

Hinged panels shall be secured in position by means of square key operated non-ferrous fasteners designed to draw the panels closed or similar quick-release fasteners. Self-tapping screws are not acceptable. Where non-hinged removable panels are specified, they shall be secured in position by means of 6mm studs and hexagonal chromed brass dome nuts and washers or hank nuts. Non-hinged removable panels may alternatively be secured in position by means of two pins at the bottom and a latch or lock at the top.

4.5 CHASSIS

A suitably braced chassis for the mounting of switchgear and equipment shall be firmly secured to the frame of the switchboard. The chassis shall be designed so that the switchgear can be installed in accordance with par. 6. Circuit-breakers and isolating switches which are not of the moulded-case air-break type and the insulators of busbars for ratings of 200 A and more may be secured directly to the framework. (Refer to par. 6.1).

4.6 DOORS

(a) Doors need only be provided when specified. Doors shall be arranged in multi-tiered fashion to allow for the logical grouping of equipment in accordance with par. 6.

(b) Doors shall have a dished appearance with a minimum of 20mm upturns which fit over a lip on the switchboard frame or shall fit flush in the switchboard frame. Corners shall be welded and smoothed.

(c) Doors shall be of aluminium sheet steel with machine punched slots to allow for the flush mounting of instrumentation, control and protection equipment. Switchgear shall be flush mounted in the front panels behind the doors unless specified to the contrary. A minimum clearance of 50mm shall be allowed between the rear of equipment mounted on doors (including terminals and projections) and the frame, front panel and chassis.

(d) Doors shall be suitably braced and stiffened to carry the weight of the equipment and to prevent warping.

(e) Hinges for doors shall be provided as described in par. 4.3.5. At least three hinges shall be provided on doors higher than 1,2m.

(f) Doors shall be fitted with handles consisting of a pushbutton-and-handle combination with springloaded catch or a rotary handle-and-catch combination. Flush mounted ring type handles or square key operated latches are not acceptable. The same key shall fit all locks on the switchboard in cases where locks are required.

(g) Doors shall be fitted with hypalon or neoprene seals.

(h) Doors containing any electrical equipment shall be bonded to the switchboard frame with a braided copper earth w re with an equivalent cross-sectional area of at least 4mm^2.

4.7 SECTIONS

For ease of transportation and to facilitate access to the allocated accommodation, switchboards may be dismantled into cubicles or sections. Each section shall be rigidly manufactured to ensure that damage to the switchgear will not occur during transportation and handling. Where required, switchboards shall have temporary wood or steel bracing to protect switchgear and facilitate handling.

4.8 GROUPING OF SWITCHGEAR

The switchgear shall be logically arranged and grouped as described in par. 6. Depending upon the number and size of components, a common front panel may be installed over one or more groups of equipment. All equipment shall be installed in accordance with the requirements of par. 6.

4.9 CABLE GLAND PLATE

A cable gland plate shall be installed across the full width of each power cubicle at a minimum height of 300mm above the bottom of the switchboard to house the cable glands. A Steel cable channel or other approved support shall be provided to carry the weight of the cable and remove mechanical stress from the cable glands. A minimum distance as required by the bending radius of outgoing cables shall be provided between the lowest terminals of major equipment and the gland plate.

4.10 VENTILATION

Switchboards shall be property ventilated, especially cubicles containing contactors, transformers, motor starters, lighting dimmers and other heat producing equipment. Louvres shall be fitted to provide adequate

upward or cross ventilation. All louvres shall be vermin proofed with 1,5mm brass mesh or perforated steel plate internally spot welded over the louvres. The internal ambient temperature shall not exceed 40ºC.

4.11 VERMIN PROOFING

Free standing boards shall be protected against vermin, especially from below, where cables have to pass through the gland plate, rubber grommets shall be provided and enough non-hardening compound shall be delivered with the board so that these holes can be sealed properly after installation of the cables.

5. CONSTRUCTION OF MAIN LOW TENSION SWITCHBOARDS

Main low tension switchboards and sub-main low tension switchboards heavily equipped shall comply with par. 4.1 to 4.11 as well as the following exceptions or additions:

(a) These boards shall be fully extensible with removable busbar cover plates in the side panels.

(b) Doors shall not be supplied unless specifically called for.

(c) Switchgear and equipment shall be installed in accordance with the requirements of par. 6.

(d) Provision for metering equipment shall be made in accordance with requirements of local authorities where applicable.

6. MOUNTING OF EQUIPMENT

6.1 The mounting of equipment shall comply with SANS 1765 where applicable. Equipment to be mounted on the chassis shall be mounted by bolts, washers and nuts or by bolts screwed into tapped holes in the chassis plate. In the latter case the minimum thickness of the chassis plate shall be 2,5mm. The latter method shall not be used where boards will be subject to vibration or mechanical shocks. Self-tapping screws will not be accepted.

6.2 SPACE REQUIREMENTS

In designing the switchboards the following requirements shall be strictly adhered to:-

(a) A minimum of 50mm between any piece of equipment and the frame or internal partitioning. This minimum space is required on all sides of the equipment. In the case of a single row of single-pole circuit-breakers the spacing on one side row may be reduced to 25mm if the incoming side of the circuit-breakers is busbar connected.

(a) A minimum of 75mm between horizontal rows of equipment. The maximum outside dimensions of equipment shall be considered.

(c) Circuit-breakers up to a fault rating of 10 kA may be installed adjacent to each other. For higher ratings a minimum of 40mm shall be allowed between circuit-breakers or isolators.

(d) Sufficient space shall be provided for wiring allowing for the appropriate bending radius.

(e) Space for future equipment shall be allowed as described in par. 1.2.

6.3 MOUNTING OF CHASSIS

The chassis of flush mounted and smaller surface mounted boards shall be mounted in accordance with SANS 1765. For all free standing switchboards and surface mounted switchboards where the main switch rating exceeds 100 A (triple-pole), space for wiring shall be provided between the chassis and tray. This space shall be adequate to install the supply cable behind the chassis and terminate on the main switch without sharp bends in the cable cores.

6.4 GROUPING OF EQUIPMENT

6.4.1 Equipment shall be arranged and grouped in logical fashion as follows:

(a) Main switch - to be installed either at the top or bottom of the board.

(b) Short circuit protection equipment - fuse gear or fuse-switches.

(c) Change-over contactors or other contactors controlling the supply.

(d) Motor supplies.

(e) Fuse-switches for outgoing circuits.

(f) Other circuits and equipment.

6.4.2 Where a portion of the equipment on the switchboard is supplied from a standby power source, the change-over contactor and the associated equipment shall be grouped in a separate compartment.

6.4.3 Where earth leakage units are required, the associated circuit-breakers shall be installed adjacent to the unit.

6.5 MOUNTING OF CIRCUIT-BREAKERS

All moulded-case circuit-breakers shall be flush mounted with only the toggles protruding. Miniature circuit-breakers may be installed in clip-in trays mounted on the frame. All other circuit-breakers shall be bolted to the chassis. Special provision shall be made for large main switches when designing the framework. Care shall be exercised that the rear studs of circuit-breakers are properly insulated from the steel chassis. Where necessary, insulating material shall be installed between the rear studs and the chassis. Circuit-breakers shall be installed so that the toggles are in the up position when "ON" and down when "OFF".

6.6 INSTRUMENTATION

All metering instruments shall be flush mounted in the front panel or door. The rear terminals of instruments mounted on doors shall be covered with an insulating material to prevent accidental contact. Current transformers for metering shall be mounted so that the rating plate is clearly visible. Fuses for instrumentation shall be mounted in an easily accessible position and clearly marked.

6.7 MOUNTING OF FUSES

6.7.1 Fuse holders shall be mounted semi-recessed in the front panel so that fuses can readily be changed without removing the front panel. Busbar mounted fuses for instrumentation shall be used as far as possible.

6.7.2 Where equipment requiring fuses is specified on a board (fuse switches etc), a ruling shall be obtained from the Engineer on the quantity of spare fuses to be provided.

6.8 EQUIPMENT IN MAIN BOARDS

Equipment in main low tension switchboards and sub-main boards shall be grouped in individual compartments. Equipment shall be installed as follows:

6.8.1 Rack-out type air circuit-breakers shall be mounted in the bottom section, flush behind the panel with the handle only protruding. If this is not possible, the panel shall be omitted and the air circuit-breakers installed behind a door.

6.8.2 If the main switch is a moulded-case circuit-breaker or isolator it shall be flush mounted.

6.8.3 Contactors controlling the supply shall be installed behind separate front panels.

6.8.4 All metering, protection and indicating equipment shall be clearly visible from the front of the board. Current transformer ratios and multiplication factors shall be clearly marked. Where doors are specified the equipment shall be installed flush in the doors and covered as described in par. 6.6.

6.8.5 All circuit-breakers and fuses (with the exception of fuse-switches) may be grouped together behind one or more panels as described in par. 4.8.

6.8.6 Fuses or fuse-switches providing back-up protection for circuit breakers, shall be grouped with the

associated circuit-breakers. Exposed surfaces effuse-switches shall be of the same finish and colour as the rest of the board where practical.

6. 9 STANDBY SUPPLIES

6.9.1 Where standby power from a diesel-generator set or other sources is available and has to be connected to some of the equipment on a switchboard, the switchboard shall be divided into separate sections with sheet metal divisions to isolate standby power and mains power sections.

6.9.2 Standby and normal supply shall each have its own incoming isolator or circuit-breaker.

6.9.3 The two sections of the switchboard shall be labelled "ESSENTIAL" and "NON-ESSENTIAL" respectively.

6.9.4 The front panels of standby and no-break supply sections shall be painted in distinctive colours as follows:

(a)	Normal supply	"LIGHT ORANGE",	colour B26 of SANS 1091
(b)	Standby power	"SIGNAL RED",	colour All of SANS 1091
(c)	No-break supply	"DARK VIOLET",	colour F06 or
		"OLIVE GREEN".	colour H05 of SANS 1091

7. BUSBARS IN SWITCHBOARDS

7.1 APPLICATION

7.1.1 Busbars shall be manufactured of solid drawn high conductivity copper with a rectangular cross-section in accordance with SANS 1473, SANS 1195 and BS 159 and BS 1433, where applicable.

7.1.2 Although SANS 1473 refers only to overhead or rising busbars, busbars in switchboards shall comply with applicable sections of this specification especially as far as insulation and clearance values, creepage distance, joints, insulation resistance, dielectric strength, deflection test, absorption resistance and rated short time withstand current are concerned.

7.1.3 Busbars shall be supplied for the following applications:

(a) Distribution of supply voltage.

(b) Connection of equipment with ratings exceeding the current rating of 70mm^2 conductors (par. 8.6).

(c) Connection of outgoing circuits with current ratings in excess of that allowed for 70mm^2 conductors (par. 7.8).

(d) Collector bars for parallel cables (par. 8.1).

(e) Connection bars for neutral conductors (par. 7.9).

(f) Earth busbars (par. 7.10).

(g) Connections to miniature circuit-breakers (par. 8.6).

7.2 SEE PART C15 FOR FURTHER DETAILS.

8. WIRING

8.1 CABLING

Cables connected to incoming or outgoing circuits shall be terminated on the gland plate supplied for this purpose. (Refer to par. 4.9). Power cables up to and including 70mm^2 may terminate on clamp type terminals

where the clamping screws are not in direct contact with the conductor. Connection to the equipment can then be made with cables that are similarly connected to the clamp terminal. All power cables larger than 70mm^2 terminate on busbars that are connected to the associated equipment. Parallel incoming or outgoing cables shall be connected to a collector busbar without crossing the conductors.

8.2 TERMINAL STRIPS

External wiring for low voltage, control, interlocking, alarm, measuring and DC circuits shall terminate on numbered wiring terminals complying the with Engineer's standard specification for "WIRING TERMINALS", Section C9. The correct terminal size as recommended by the manufacturer for each conductor to be connected shall be used throughout. The terminal numbers shall appear on the wiring diagrams of the switchboard. Terminals for power wiring shall be separated from other terminals. Terminals for internal wiring shall not be interposed with terminals for external circuits. All connections to terminals shall be identified as described in par. 8.8. Where switchboards consist of separate sections, the control wiring passing between sections shall be terminated on strips in each section so that control wiring can be readily re-instated when reassembling the board.

8.3 CURRENT RATINGS

The current rating of conductors for the internal wiring shall be sufficient for the maximum continuous current that can occur in the circuit. This value shall be determined from the circuit-breaker or fuse protection of the circuit.

TABLE 17.3

CURRENT RATING FOR INTERN

Nominal cross-Section mm^2	CONDUCTOR RATING (A)				
	Number of conductors in bunch				
	1	2-3	4-5	6-9	10 and more
2,5	28	25	22	19	16
4	37	33	30	26	22
6	47	42	38	33	28
10	64	54	51	44	38
16	85	76	68	59	51
25	112	101	89	78	67
35	138	124	110	96	88
50	172	154	137	120	103
70	213	191	170	149	127

The above table shall be applied for ambient temperatures up to 30ºC. (Refer to table 41.2 in VDE 0100). For higher ambient temperatures the values shall be derated as prescribed by SANS 10142. Table 10.

8.4 INTERNAL WIRING

(a) Standard 600/1 000 V grade PVC-insulated stranded annealed copper conductors to SANS 1507 shall be employed for the internal power wiring of switchboards. The smallest conductor size to be used for

power wiring in switchboards shall be 2.5mm^2. Flexible cord of minimum size 1,0mm^2 may be used for control wiring.

(b) Where heat generating equipment is present and the internal temperature of the board is likely to exceed 50°C, silicon-rubber insulated stranded conductors shall be used.

(c) Wiring shall be arranged in horizontal and vertical rows and shall be bound with suitable plastic straps or installed in PVC wiring channels. Under no circumstances may PVC adhesive tape be used for the bunching of conductors or for the colour identification of conductors.

(d) Bunched conductors shall be neatly formed to present a uniform appearance without twisting or crossing the conductors. Conductors leaving the harnesses shall be so arranged that they are adjacent to the chassis.

(e) Conductors to hinged panels and doors shall be secured on both the door and the frame and shall be looped between the two points. The loop shall be arranged to produce a twisting motion when the door is opened or closed. A flexible protection sleeve shall be installed over the conductors.

(f) Where wiring channels are used, they shall be installed horizontally and vertically. Under no circumstances may power and control circuit wiring be installed in the same wiring channels. Channel shall not be more than 40% full.

(g) All wiring between different Panels within the same switchboard shall be installed in wiring channels.

(h) Grommets shall be installed in each hole in the metalvvork through which conductors pass.

(i) All wiring shall be installed away from terminals, clamps or other current carrying parts. Wiring shall also be kept away from exposed metal edges or shall be protected where they cross metal edges protected where they cross metal edges.

(k) Conductors may be jointed at equipment terminals or numbered terminal strips only. No other connections are allowed.

(l) Where conductors change direction, smooth bends shall be formed with a radius of at least 5 times the outside diameter of the conductor or harness.

(m) Where screened cables are specified, the screening shall be earthed in the switchboard or control board only unless clearly specified to the contrary, Screened cables entering control boxes through pressed knock-outs, shall terminate in compression glands. Conductors shall as far as possible remain inside the screening at terminations. Where conductors have to separate from the screen, the braiding shall be separated and the conductors drawn through the braid without damaging the braiding. The conductors shall then be connected to their respective terminals and the screening smoothed and connected to the earth terminal.

(n) Where neutral connections are looped between the terminals of instruments, it is essential that the two conductor ends be inserted into a common lug or ferrule and are crimped or soldered together in order that the neutral connection is not broken when the conductors are removed from one of the instruments.

(o) Wiring should as far as possible be confined to the front portions of switchboards for ease of access. This requirement is important for wiring between smaller circuit-breakers and the associated main circuit-breaker as well as the wiring from circuit-breakers to lighting and socket-outlet circuits.

(p) A maximum of two conductors will be allowed per equipment terminal. Where more conductors must be connected to the same equipment terminal (e.g. a main circuit-breaker feeding other circuit-breakers), stub busbars shall be provided for the various conductors. Refer also to par. 8.6.

8. 5 LOAD END CONNECTIONS

The supply end connections to all equipment shall under all circumstances be at the top and the load end connections at the bottom.

8.6 WIRING TO CIRCUIT-BREAKERS

Equipment with a rating exceeding the current rating of 70mm^2 conductors shall be connected by means of busbars to the main busbars. Looped connections may only be installed for a maximum of two outgoing circuits. Where there are more than two outgoing circuits, busbars shall be used and equipment connected individually to the busbars. Where miniature circuit-breakers are mounted in continuous rows and supplied by busbars connected to each MCB. each busbar shall be supplied by a separate conductor. This conductor shall be connected to the busbar by means of a separate lug and not via an MCB terminal.

8.7 CONDUCTOR TERMINATIONS

Conductors connected to terminals complying with the Engineer's standard specification for "WIRING TERMINALS". Section C9, need not be soldered or ferruled. Connections to circuit-breakers, isolators or contactors shall be made by one of the following methods:

(a) A ferrule of the correct size,

(b) soldering the end of the conductor, or

(c) winding a conductor strand tightly around the end to totally cover the end.

All conductors terminating on meters, fuse holders and other equipment with screwed terminals shall be fitted with lugs. The lugs shall be soldered or crimped to the end of the conductor. The correct amount of insulation shall be stripped from the end to fit into the terminal. Strands may not be cut from the end of the conductor.

8.8 IDENTIFICATION

8.8.1 The colour of the conductors for all 220/250 V circuits shall correspond to the colour of the supply phase for that circuit. Neutral conductors shall be black.

8.8.2 All other conductors in the board, supplying control circuits, etc. shall be coded in colours other than those specified above. A colour code shall be devised for each board and the colour code shall be shown on the wiring diagrams.

8.8.3 All conductors that terminate at wiring terminals and all conductors used for the internal wiring of the switchboard, shall further be identified at both ends by means of durable cable marking ferrules. PVC or other tape is not acceptable.

8.8.4 The numbers on the markers shall be shown on the wiring diagrams.

9. PAINT FINISH

Metal components of the framework, panels and chassis shall be painted in accordance with the Engineer's "STANDARD PAINT SPECIFICATION". Section C39.

10. LABELLING

10.1 Care shall be taken to ensure that all equipment is fully labelled and that accurate descriptions and safety warning notices appear in both official languages.

10.2 MATERIAL

Engraved plastic or ivory sandwiched strips shall be used throughout. The strips shall bear white lettering on a black background for normal labels and red letters on a white or yellow background for danger notices.

10.3 MAIN SWITCHBOARDS

Main switchboards and sub-main switchboards shall be supplied with the following bilingual labels:

(a) Number and allocation of switchboard. Example:

CONTROL BOARD A4

BEHEERBORDA4

Lettering: at least 10 mm high prominent position. Label on the outside in a prominent position.

(b) Designation of busbar sections. Example:

BUSBAR SECTION 2

GELEISTAMSEKSIE2

Lettering: at least 10mm high. Label on the outside in a prominent position.

(c) Designation of all switchgear including circuit-breakers, isolators, contactors, etc. If the current rating of circuit-breakers is not clearly marked on the equipment, the value shall be indicated on the engraved label. Example:

SUPPLY TO BOARD C3 TOEVOER NA BORD C3

PUMP SUPPLY
POMPTOEVOER

Letters at least 5mm high. Label on the outside of the switchboard.

(d) All other equipment including meters, instruments, indicator lights, switches, push-buttons, circuit-breakers, fuses, contactors, control relays, protection relays, etc. shall be identified. The function of the equipment and circuits shall be clearly indicated. The main switch shall be labelled as such and designated :

"SWITCH OFF IN CASE OF EMERGENCY"
"SKAKEL AF IN NOODGEVAL"

Flush mounted equipment within doors or front panels shall be identified with labels fixed to the doors or front panels respectively. The labels for equipment installed behind panels, shall be fixed to the chassis close to the equipment. If this equipment is positioned too close together to accommodate descriptive engraved labels, the equipment may be identified by a code or number on an engraved label which shall be fixed close to the equipment. The code number shall be identified on a legend card which shall be installed on the switchboard behind a plastic or other protective cover.

10.4 OTHER SWITCHBOARDS

All equipment on switchboards shall be identified with the necessary bilingual labels.The circuit numbers shall appear at grouped single-pole circuit-breakers. The circuit numbers shall correspond to the circuit numbers on the final installation drawings. The above-mentioned circuits shall be identified on a legend card, which shall be installed on the inside of the switchboard door, or in any other position where it can conveniently be observed. All fuses, including instrument fuses, shall have labels stating function, fuse rating and duty or type where applicable. All other equipment shall be identified separately and their functions shall be clearly indicated.

10.5 FIXING OF LABELS

10.5.1 Labels shall not be fixed to components or trunking but to doors, panels, chassis or other permanent structures of the switchboard.

10.5.2 Engraved strips shall be secured to facilitate a neat alteration of the designation of the labels. Sufficient fixing points shall be provided to prevent labels from warping. Labels in slotted holders shall be secured in position to prevent unauthorised removal. Labels may be secured by the use of brass bolts and nuts, self-tapping screws, slotted label holders or pop-rivets.

11 TESTS

11.1 The Engineer shall be notified when the mechanical construction of the switchboard, i.e. frame, panels and base frame, is complete in order that it may be inspected at the factory.

11.2 Function tests of all equipment, control and interlocking circuits shall be conducted to the satisfaction of the Engineer. Testing equipment and facilities including instruments, dummy loads and additional switchgear and cables shall be provided by the Contractor at no extra cost. The Engineer shall be notified in writing two weeks in advance of any test to be conducted, to allow its representative to be present at such tests. A complete report on the tests shall be handed to the Engineer.

12. DRAWINGS

12.1 DRAWINGS FOR APPROVAL

A set of three prints of the shop drawings for the switchboards shall be submitted to the Engineer for approval before the boards are manufactured. The following information shall be presented:

(a) A complete wiring diagram of the equipment on the boards.

(b) A complete layout of the arrangement of the switchboards indicating all equipment dimensions and the construction of the boards. The positions and method of fixing and sizes of busbars shall be shown.

(c) All labelling information in both the official languages on a separate sheet.

(d) The make, catalogue number and capacity of all equipment such as isolators, circuit-breakers, fuses, contactors, etc.

The approval of drawings shall not relieve the Contractor of his responsibility to the Engineer to supply the switchboards according to the requirements of this Specification.

12.2 FINAL DRAWINGS

A complete set of "as-built" transparent drawings of all switchboards shall be submitted to the Engineer within two weeks after delivery of the boards. The following information shall be presented:

(a) Item (a) to (d) of the previous paragraph.

(b) Terminal strip numbers, numbers and colours of conductors connected to the terminal strips and numbers and colours of the conductors utilised for the internal wiring.

(c) A separate schedule of all equipment.

12.3 MANUALS

Three sets of manuals for all specified main and sub-main switchboards shall be supplied to the Engineer at no extra cost. These manuals shall include the following information:

(a) Complete information on the operation of the equipment.

(b) Complete information for maintenance of the equipment.

(c) Brochures and ordering information.

(d) A complete equipment list indicating quantities and relevant catalogue numbers.

12.4 COMPLETION

The supply contract shall be regarded as incomplete until all tests have been conducted successfully and all drawings and manuals have been handed to the, Engineer

SECTION C18

C.18 LOW VOLTAGE DISTRIBUTION CUBICLES (KIOSKS)

1. GENERAL

This specification covers the manufacture of distribution kiosks for general reticulation and distribution systems in normal environmental conditions for three-phase, four-wire, 400/231V, 50 Hz systems.

2. SIZE

Kiosks shall be of ample size to accommodate the specified equipment and provide space for future requirements as specified.

3. MOISTURE AND VERMIN

3.1 Kiosks shall be weatherproof. To prevent the ingress of water onto live equipment, the door entry surrounds shall have a channel shape, at least 12mm deep, to accommodate the door edge.

3.2 The roof shall be constructed with an overhang above non continuous panelling and shall be provided with a drip-edge.

4. VENTILATION

4.1 Two ventilation grilles or slots, approximately 150 x 125mm, vermin proofed and insect proofed by means of 1,5mm brass mesh or perforated steel plate spot-welded on the inside, shall be provided on the top and bottom of both side panels.

4.1 The construction of the grilles shall prevent the ingress of rain or water.

5. FIBREGLASS CANOPIES

5.1 APPLICATION

Where specified and for all kiosks to be installed within 50km of the coast and in corrosive industrial atmospheres, the canopy and doors shall be manufactured of fibreglass.

5.2 CONSTRUCTION

5.2.1 The laminate shall be constructed to SANS 141.

5.2.2 An outer isophalec resin gelcoat with a minimum thickness of 0,4mm and ultraviolet absorption properties to prevent degradation of the surface from exposure to the sun shall be provided.

5.2.3 The gelcoat shall be backed by multiple layers of chopped strand mat glass rendering not less than 1,2kg/m^2. The strength shall be increased to 1,3 kg/m^2 on kiosks with panelling larger than 500 x 500mm.

5.2.4 The fibreglass shall be thoroughly impregnated with polyester resin. The resin should preferably be clear.

5.2.5 The resin to fibreglass ratio shall not be less than 2,5 :1 and not more than 3,0 :1.

5.2.6 Air entrapped between the glass mat layers shall be thoroughly worked out. The laminate must be free of air bubbles and voids.

5.2.7 All edges shall be reinforced with an additional 700 g/m^2 of fibreglass.

5.2.8 All large surfaces, wider than 300mm, shall be reinforced or panelled to improve stiffness and rigidity.

5.2.9 A resin coat shall be applied to the inside of the kiosk to cover the fibre pattern.

5.2.10 Brass or steel backing plates shall be laminated into the fibreglass at hinge points, locking mechanism catch support areas, door restraint fixing points and all other points which will be subjected to mechanical stresses.

5.2.11 Doors shall be adequately braced, reinforced, ribbed or double laminated with an air gap between the two layers of laminate to ensure rigidity.

5.2.12 The fibreglass canopy shall be fixed to the internal equipment support frame with bolts accessible through the door only.

5.3 FINISH AND COLOUR OF FIBREGLASS KIOSKS

5.3.1 The outside surface of the kiosk shall nave a glossy, smooth finish to ensure good weathering. To obtain this the manufacturer shall ensure that the mould is smooth, free of voids, hairline cracks, pores or other defects.

5.3.2 Compound rubbing or sanding of the outside surface will not be permitted.

5.3.3 Pigments shall be added to the outer gelcoat to obtain a matching colour to SANS 1091 "AVOCADO GREEN" colour C12 or "LIGHT STONE", colour C37.

5.3.4 Fibreglass kiosks shall not be painted.

6. SHEET STEEL CANOPIES

6.1 Where specified the canopy and doors shall be manufactured of either mild steel as 3Cr12 stainless steel to the following requirements:

6.1.1 A metal framework shall be manufactured from solid angle iron, channel iron or 2,5mm minimum folded sheet steel.

6.1.2 Joints shall be non-continuously butt welded. Welds shall be ground smooth and the joint wiped with plumber's metal in order to provide a smooth finish.

6.1.3 Side panels, doors and the roof shall be manufactured from 2mm minimum sheet steel. The panels shall have upturned edges which are recessed in the frame or which fit over lips on the frame. The side panels may be either bolted or welded to the frame or form part of the folded metal frame.

6.1.4 The roof of the cubicle shall be removable and shall be fitted by means of bolts which shall be accessible from inside the cubicle only.

6.1.5 All panels and doors shall be suitably braced and stiffened to ensure rigidity and to prevent warping.

6.1.6 The steel canopy and framework shall be fixed to the base frame by four M16 high tensile steel bolts.

6.2 FINISH AND COLOUR OF SHEET STEEL KIOSKS

6.2.1 Metal components of the framework, panels and doors shall be painted in accordance with the Engineer's "STANDARD PAINTING SPECIFICATION", Section C39.

6.2.2. The colour shall be "AVOCADO GREEN", colour C12 or "LIGHT STONE", colour C37 of SANS 1091. A tin of matching touch-up paint (not smaller than 500ml) shall be provided with each consignment.

7. CAST IRON KIOSKS

7.1. Where specified the cubicle panels and doors shall be manufactured from cast iron to the following requirements:

7.1.1 A metal framework shall be manufactured from solid angle iron or channel iron.

7.1.2 Cast iron panels shall be bolted to the frame work and shall be replaceable with standard cast iron panels.

7.1.3 The panels shall be bolted to the frame from the inside of the cubicle. Bolts or nuts on the outside of the cubicle are not acceptable.

7.1.4 The roof of the cubicle shall be one casting and shall be bolted in position from inside the cubicle.

7.1.5 The minimum thickness of the cast iron panels and doors shall be 6mm

7.1.6 All cast iron panels and doors shall be fettled prior to painting.

7.2 FINISH AND COLOUR OF CAST IRON KIOSK:

7.2.1 Metal components of the framework, panels and doors shall be painted in accordance with the Engineer's "STANDARD PAINTING SPECIFICATION". Section C39.

7.2.2 The colour shall be "AVOCADO GREEN".colour C12 or "LIGHT STONE", colour C37 of SANS 1091. A tin of matching touch-up paint (not smaller than 500ml) shall be provided with each consignment.

8. DOORS

8.1 Doors shall be fitted to the front and to the rear of each cubicle. The doors shall provide free access to equipment which has to be operated and shall provide a full view of all meters. Cubicles wider than 700mm shall be provided with double doors.

8.2 Doors shall have well returning edges to fit into the channel of the door entry surrounds. Refer to par. 3.1 and 6.1.3.

8.3 Doors shall swivel through 135.

8.4 Brass hinges shall be used to hang the doors. The hinges shall be bolted to the canopy with brass bolts and nuts. Bolt heads or nuts shall not protrude beyond the outer surface of the kiosk. Nylon, aluminium or piano hinges are not acceptable.

8.5 Doors shall be fitted with lever locks with a 135° movement. The locking mechanism shall have a catch on the rear which catches behind the frame or door entry surround. The locking mechanism as well as the catch support area shall be backed with brass or galvanised steel plates. The locking mechanism shall be lockable by padlocks. Padlocks will be provided by the Engineer.

8.6 The locking mechanism shall be made of brass or stainless steel.

8.7 Door restraints shall be provided. Cloth or canvas straps are not acceptable. The fixing points of the restraint at both the door and canopy shall be reinforced.

8.8 At least three hinges shall be supplied on steel doors higher than 12mm.

8.9 Doors shall be fitted with neoprene or equivalent seals.

8.10 Metal doors shall be earth bonded to the frame by means of a copper braided strap, tooth washers, bolts and nuts.

9. EQUIPMENT SUPPORT FRAME

9.1 A free standing, angle iron or similar type rigid support framework shall be provided.

9.2 The frame shall be bolted down on the base by four M16 high tensile steel bolts. The holding-down bolts shall be accessible from the inside of the cubicle only. The frame of sheet steel canopies may be bolted to the canopy framework.

9.3 A galvanised steel cable gland plate shall be bolted to the bottom of the frame across the full width of

the cubicle to cover the cable entry opening in the base.

9.4 The gland plate shall be suitably punched to accept the number and size of cables specified.

9.5 All steelwork shall be hot-dip galvanised in accordance with SANS 32&121.

9.6 A panel of resin bound synthetic wood or other suitable dielectric material shall be provided for the mounting of all equipment and busbars. Impregnated hardboard, other treated or untreated wood products are not acceptable.

9.7 Alternatively, all equipment and busbars shall be flush mounted within a purpose-made sheet metal frame enclosed by a machine punched removable front panel through which the operating handles of the equipment protrude. Care shall be exercised that the rear studs of circuit-breakers are properly insulated from the steel chassis. Miniature circuit-breakers may be installed in clip-in trays mounted on the frame.

10. CONCRETE BASES AND BASE FRAMES

10.1 To ensure stability of the kiosk after installation, it shall be mounted on a base frame which, in turn, shall be bolted to a concrete base cast into the bottom of the cable trench.

10.2 The base frame shall be constructed of angle iron, at least 50 x 4mm thick and shall be of welded construction hot-dip galvanised and coated with epoxy resin tar.

10.3 The vertical height of the box frame shall be at least 900mm and the construction shall be such as to provide a rigid support for the kiosk.

10.4 The base frame shall protrude to a maximum height of 200mm above ground level. Provision shall be made for the protection and concealing of the cables entering the kiosk and to prevent access of animals and vermin.

10.5 The base frame shall be secured by at least four M16 bolts to the support frame of the kiosk and four M16 anchor bolts and nuts to the concrete base. The bolts, nuts and washers shall be galvanised and supplied with the kiosk.

10.6 All galvanising shall be to SANS 32&121.

10.7 The kiosk manufacturer shall supply a detailed drawing of the base frame and the concrete base required.

10.8 Alternative designs and materials for the base (or root) of the kiosk will be considered but full details must be submitted for approval by the Engineer.

11. BUSBARS

See Section C15 for details.

12. WIRING

See Section 17.8 for details

13. MOUNTING OF EQUIPMENT

13.1 The mounting of equipment shall comply with SANS 1765 where applicable. Equipment shall be fixed to the support panel with bolts, nuts, washers and spring washers or self locking nuts with washers. Self-tapping screws are not acceptable.

13.2 Equipment shall be arranged and grouped in a logical fashion.

13.3 All equipment shall be flush mounted behind panels with only circuit-breaker and isolator toggles and meter faces protruding. The front panels shall be secured in position by 6mm studs and hexagonal chromed brass dome nuts and washers or hank nuts fasteners. Self-tapping or similar screws are not

acceptable.

13.4 Blanking plates shall be fitted over slots intended for future equipment. These plates shall be fixed so that fixing holes do not need to be drilled through the front panel.

14. ACCESS

All equipment, busbars and wiring shall be completely accessible with the door open and the back door and front panel removed. In the case of fibreglass kiosks the complete canopy shall be removable.

15. LABELLING

15.1 All equipment shall be fully labelled and accurate descriptions shall be given in both official languages.

15.2 Engraved brass shall be used for labels. The labels shall be riveted to the kiosks.

15.3 The following labels shall be supplied as a minimum requirement:

15.3.1 Number and allocation of kiosk, e.g. KIOSK B26

(Lettering: At least 10mm high. Label on the outside in a prominent position).

15.3.2 Designation of circuit i.e. circuit-breaker, isolator, meter, etc. e.g.

HOUSE 473
HUIS473

PUMP SUPPLY
POMPTOEVOER

(Lettering: At least 5mm high. One label installed directly below each item of equipment pertaining to the particular circuit shall be provided).

15.3.3 The main switch shall be marked in accordance with the regulations.

15.3.4 The function and circuits of all other equipment shall be clearly identified. Flush mounted equipment within the front panel shall be identified by labels fixed to the front panel. The labels for all equipment installed behind panels shall be fixed to the support panel close to the equipment.

15.3.5 The labels shall be secured by means of rivets. Self-tapping screws are not acceptable. Labels shall not be glued to their mounting positions. Sufficient rivets shall be provided to prevent labels from warping.

15.3.6 All label designations shall be confirmed with the Engineer before manufactured.

16. NOTICES

At least one with the words "DANGER/INGOZI/GEVAAR" shall be mounted outside on the front of the kiosk. This notice shall be riveted to the steel or cast iron door so that it cannot easily be removed. Brass rivets shall be used. The notice shall be laminated into the fibreglass door in the case of fibreglass kiosks.

17. INSPECTION

The Engineer shall be notified at least two weeks in advance of the completion of the kiosks in order that an inspection may be carried out before delivery.

18. DRAWINGS

18.1 DRAWINGS FOR APPROVAL

18.1.1 A set of three prints of the shop drawings of the cubicles shall be submitted to the Engineer for approval before the cubicles are manufactured. The following information shall be presented:

(a) Schematic and wiring diagrams of the cubicles.

(b) A complete layout of the arrangement of the cubicles showing all equipment dimensions and constructional details. The positions and method of fixing of busbars shall be shown.

(c) All labelling information in both the official languages on a separate sheet.

(d) The makes, catalogue numbers and capacities of all equipment.

(e) A detail drawing of the concrete plinth, showing concrete mixes, dimensions, sizes, steel reinforcing details and holding-down bolt fixing details.

18.1.2 The approval of drawing shall not relieve the Contractor of his responsibility to the Engineer to supply the cubicles according to the requirements of this Specification.

18.2 FINAL DRAWINGS

A complete set of "as built" drawings of the cubicles shall be submitted to the Engineer within two weeks after delivery of the kiosks. The information contained in par. 18.1.1 shall be provided.

18.3 COMPLETION

The supply contract shall be regarded as incomplete until all drawings have been handed to the Engineer.

SECTION C19

C.19 METAL CLAD AIR CIRCUIT BREAKERS, WITHDRAWABLE TYPE

1. This section covers with drawable air circuit breakers for use in power distribution systems up to 1kV, 50 Hz.

2. The circuit breakers shall be metal clad and shall comply with BS 4752 and IEC 157.

3. The circuit breaker shall be horizontally withdrawable and shall be a self-contained unit of the dead front type, allowing maintenance and tests to be carried out without having to remove the circuit breakers from the withdrawal mechanism.

4. The unit shall contain the necessary mechanical interlocks to prevent:

(a) Access to "LIVE" terminals when the circuit breaker is withdrawn.

(b) The withdrawal or insertion of the unit, when the circuit breaker is in the closed position.

(c) Closing of the circuit breaker following an automatic trip condition without resetting the mechanism.

5. Adjustable thermal overload releases shall be provided to suit the required current range. In addition instantaneous magnetic short circuit trips which are adjustable shall be fitted. The tripping devices shall be direct acting. The delay adjustment shall be bypassed with an instantaneous making current release when the circuit breaker is closed to prevent the delay timer from operating when the circuit breaker is closed on a fault.

6. The air circuit breakers shall be of the quick make and quick break type with a stored energy spring assisted operating mechanism provided with:

(a) A trip free mechanical hand operated closing mechanism.

(b) A manually operated mechanical trip mechanism suitably protected to prevent inadvertent tripping.

(c) A positively driven mechanical device to provide ON/OFF/ TRIP indication. This indication shall be clearly visible with the circuit breaker in position.

7. Provision shall exist for the addition, if required, of a supply side under voltage release.

8. Air circuit breakers shall have electrically separate auxiliary contacts as specified. Where none are specified two N/0 and two N/C auxiliary contacts shall be provided.

9. Shunt trips and electrical stored energy circuit breakers shall be interlocked to prevent repeated operation of the trips or winding mechanisms when the circuit breaker is in the tripped or closed position.

10. All non current carrying metal parts of air circuit breakers shall be solidly interconnected and connected to an earth contact on the truck which shall engage with a mating contact or copper plate on the cradle which is connected to the earth busbar of the switchboard. The arrangement shall be such that the air circuit breaker frame is earthed in the test position and before the circuit breaker contacts engage the live fixed contacts.

11. The fixed cradle shall be of high mechanical strength.

12. The circuit breaker shall have "RACKED OUT". "TEST" and "ENGAGED" positions that are clearly marked.

13. The air circuit breaker shall bear a clearly legible rating plate indicating the current rating, breaking capacity and voltage rating.

14. The complete circuit breaker and its electrical and mechanical constituents and accessories shall

be from a standard product range of a single original supplier.

15. Extension type operating handles shall be fixed to the air circuit breaker on completion of the installation.

16. A description and illustration of the circuit breaker as well as trip curves, operating manuals and rupturing test certificates shall be provided.

17. The circuit breakers shall be designed to allow the incoming terminals to be at the top or bottom without affecting the operation of the unit.

18. Circuit breakers shall be derated if necessary to compensate for the following environmental factors:

(a) Maximum ambient air temperature in excess of 40°C or the daily average ambient air temperature in excess of 30°C. This is especially important with regard to the type of enclosure in which the circuit breaker is to be installed.

(b) Height above sea level.

(c) Operational duty cycle and estimated loading.

SECTION C20

C.20 MOULDED-CASE CIRCUIT-BREAKERS

1. This section covers single or multi pole moulded case circuit breakers for use in power distribution systems, suitable for panel mounting, for ratings up to 1 000 A, 600 V. 50 Hz.

2. The circuit breakers shall comply with SANS 156.

3. The continuous current rating, trip rating and rupturing capacity shall be as specified.

4. The contacts shall be silver alloy and shall close with a high pressure wiping action.

5. Where specified, the circuit breaker shall be capable of accommodating factory fitted shunt trip or auxiliary contact units or similar equipment.

6. The operating handle shall provide clear indication of "ON", "OFF" and "TRIP" positions.

7. The mechanism shall be of the TRIP-FREE type preventing the unit from being held in the ON position under overload conditions.

8. All moulded case circuit breakers in a particular installation shall as far as is practical be supplied by a single manufacturer.

9. The incoming terminals of single pole miniature circuit breakers shall be suitable for connection to a common busbar.

10. The circuit breaker shall have a rating plate indicating the current rating, voltage rating and breaking capacity.

11. Extension type operating handles shall be provided for units of 600 A rating and above.

SECTION C23

C.23 DIRECT ACTING INDICATING INSTRUMENTS

This section covers direct acting indicating instruments suitable for flush mounting in switchboards or instrument panels.

1. GENERAL REQUIREMENTS

1.1 Instruments shall be suitably rated for the supply voltage and frequency to be applied, which shall be 400/230 V, 50 Hz unless specified to the contrary.

1.2 All the instruments used for a particular application or a specific project shall be from the range of a single reputable supplier and shall have the same face dimensions. The face dimensions shall be square and not less than 96 x 96mm.

1.3 All instruments shall comply with BS 89 and/or IEC 51.

1.4 Instruments shall be screened against magnetic interference and shall have anti static, impact-resistant glass faces.

1.5 Preference will be given to locally manufactured instruments.

1.6 Instruments shall be insulated to achieve a 2 kV insulation resistance to earth.

1.7 All instruments shall be splash proof and dustproof unless more stringent requirements are specified for hazardous locations.

1.8 Instruments shall be sufficiently resistant to vibration that may be encountered in the specific application.

1.9 For normal environmental and supply conditions, instruments shall be suitable for use inside the limits specified in Tables III and VI of IEC 51.

1.10 All instruments shall be capable of withstanding overloads of continuous or short duration in accordance with section 8.3 of IEC 51.

1.11 Instruments shall be provided with studs for rear connection. Shrouds shall be provided to prevent accidental contact where instruments are to be installed in hinged panels of switchboards.

2. VOLTMETERS AND VOLTMETER SELECTOR SWITCHES

2.1 Unless specified to the contrary, voltmeters shall be scaled from 0 - 250V in the case of LV applications.

2.2 Voltmeters shall be of the moving iron type with class 1,5 accuracy as specified in IEC 51.

2.3 A zero adjustment screw shall be provided.

2.4 Unless specified to the contrary, a single voltmeter and selector switch shall be provided. The voltmeter switch shall have an "OFF" and three metering positions to indicate readings between neutral and each of the three phases.

2.5 The markings shall be indicated clearly on the face plate of the selector switch and the handle position shall be accurate in relation to the markings on the face plate.

2.6 The selector switch shall be of the cam-actuated or wiping air break type with two breaks per pole.

3. AMMETERS

3.1 Ammeters shall have a moving coil element to indicate instantaneous values.

3.2 Direct reading ammeters up to a maximum rating of 60 A may be used. Current transformer operated ammeters shall be 5 A full scale, calibrated to read actual primary circuit currents. The current transformer ratio shall be indicated on the face plate.

3.3 A zero adjustment screw shall be provided.

3.4 Where combined maximum demand and indicating ammeters are specified, a bimetallic spiral element shall be provided in the same housing to indicate mean value over a 15 minute period.

3.5 The bimetal element shall drive a residual pointer to indicate maximum mean current between resettings. This pointer shall operate on the main scale and shall be of a distinctive colour. The pointer shall be resettable from the face of the meter.

3.6 The bimetal element shall be designed to compensate for limits of ambient temperature between -20°C and 70°C.

3.7 Full load or rated current shall be clearly indicated, preferably with a red line. Unless specified to the contrary, a 100% condensed over scale shall be provided for instantaneous reading instruments and no over scale for combined maximum demand ammeters.

3.8 The intrinsic error, expressed in terms of the fiducial value in accordance with IEC 51, shall be class 1,5 for the instantaneous readings and class 2,5 for the mean maxima.

3.9 Where saturation current transformers are required, these shall form an integral part of the meter. Separate saturation current transformers are unacceptable to the Engineer.

4. KILOWATT-HOUR METERS

4.1 Unless specified to the contrary, kilowatt-hour meters shall be suitable for operation on 220/250 V. 50 Hz systems.

4.2 Meter elements shall be of the inductor disc type and designed to carry the rated current continuously.

4.3 Kilowatt-hour meters shall comply with the relevant parts of BS 37 and BS 5685.

4.4 The integrating period on maximum demand meters shall be 30 minutes unless specified to the contrary.

4.5 The registering mechanism shall be of the cyclometer type, providing a six digit readout with the sixth digit indicating one-tenth of a unit.

4.6 Unless specified to the contrary, the meters shall conform to accuracy Class 1 as specified in IEC 51.

4.7 Kilowatt-hour meters shall be graded and calibrated for the specific application to avoid the application of multiplication factors where possible. Where multiplication factors are unavoidable this shall be clearly indicated in unit form and not as a combination of several factors. Current transformer ratios shall be incorporated in the factor.

4.8 The kilowatt-hour meter shall preferably be provided with a magnetic type of bearing for the disc spindle.

4. 9 Facilities for a security seal shall be provided on the fixing screws of the cover.

5. FREQUENCY METERS

5.1 Frequency meters may be of the vibrating reed type or the direct indicating type consisting of a moving coil milli-ammeter and a current/frequency transducer.

5.2 Unless specified to the contrary, the indicating range shall be 45 HZ - 55 Hz.

5.3 The accuracy class shall be class 0,5 in accordance with IEC 51 unless otherwise specified.

5.4 Where required an adjustable speed alarm contact shall be provided, adjustable over the complete scale length.

6. RUNNING HOUR-METERS

6.1 Running hour-meters shall be of the electrically operated cyclometer type, suitable for flush mounting.

6.2 Numerals shall be clearly defined white on a black background.

6.3 The range of hour-meters shall be five digits, the fifth digit indicating one-tenth of an hour, i.e. from 0 to 9999,9 hours.

6.4 The accuracy class shall be class 1 in accordance with IEC 51 unless otherwise specified.

SECTION C24

C.24 EARTH LEAKAGE RELAYS

1. Earth leakage relays shall be single or three-phase units with a sensitivity of 30mA with associated circuit breaker or on-load switch for use on 220/250V single phase or 380/433 V three phase, 50 Hz, supplies.

2. The units shall be suitable for installation in switchboards in clip-in trays or bolted to the chassis.

3. The earth leakage relay shall function on the current balance principle and shall comply with SANS 767 as amended, and shall bear the SANS mark. Integral test facilities shall be incorporated in the unit.

4. Circuit breakers with trip coils used integrally with earth leakage units (two pole for single phase units and three pole for three phase units) shall comply with SANS 156.

5. On-load switches used integrally with earth leakage units (two pole for single-phase units and three pole for three phase units) shall comply with SANS 60497.

6. The fault current rating of the unit shall be 2,5kA or 5kA as required, when tested in accordance with SANS 156.

SECTION C25

C.25 MICRO-GAP SWITCHES

1. Micro-gap switches shall be suitable for ratings up to 400 A at 660 V (triple pole) and may be used for main and distribution switches in domestic applications, offices, small factories and similar applications.

2. Double pole switches shall be suitable for voltages up to 230V ± 10%.

3. The switches shall comply with SANS 60947.

4. Micro-gap switches may be used on AC circuits only.

5. Metal clad and moulded casings are acceptable.

6. Micro-gap switches shall be capable of carrying rated current continuously and making and breaking rated current.

7. Heavy, fully accessible, brass terminals with two screws each shall be provided to facilitate easy wiring. Contacts shall have large contact surfaces, made from high quality material such as solid silver.

8. The "ON" and "OFF" positions and the rating of the switch shall be clearly and indelibly marked.

SECTION C26

C.26 CURRENT TRANSFORMERS

1. GENERAL

Current transformers shall comply with the requirements of BS 3938 and IEC 185 with the exception of the required impulse test level, par.6 below.

2. RATINGS

Current transformers shall be suitable for the primary currents listed hereunder and their decimal multiples:

10, 12.5, 15, 20, 25, 30, 40, 50, 60 and 75.

The preferred values are:

10,15, 20, 30, 50 and 75.

2.2 Current transformers shall have secondary ratings of 1, 2 and 5A, with 5A being preferred.

2.3 Current transformers shall have standard outputs of 2, 5, 5, 10, 15 or 30 VA as applicable in terms of the burden of the instruments and interconnecting wiring. The current transformer output shall match the actual instrument burden as closely as possible in order not to introduce unnecessary errors.

3. ACCURACY CLASS

3.1 For metering applications, accuracy classes of 0.1, 0.2, 0.5, 1, 3 or 5 are applicable.Where no accuracy class has been specified, the following table may be used as a guide:

Application	Primary Current	Suggested Class
Indicating Instruments	All .	5
Metering Applications	Up to 200 A	1
Metering Applications	250 to 600 A	0.5
Metering Applications	800 A and above	0.2

3.2 Where ring type current transformers are specified, the aperture shall not be unnecessarily large as accuracy is thereby reduced.

3.3 The classes for protection are 5P, 10P, 15P, 20P or 30P with 5P and 10P being standard. Turns compensation shall not be employed on protection current transformers for ratios greater than 150/5.

3.4 Class X current transformers shall be used in differential protection systems.

3.5 Manufacturers shall supply the magnetisation curve details and saturation factors for each different transformer ratio.

4. MARKINGS

All current transformers shall come complete with a label on which the following Information is indelibly stamped:

Manufacturer.

Serial No. or Type.

Rated primary and secondary current.

Rated frequency.

Rated output and accuracy class.

Highest system voltage.

Rated insulation level.

5. FAULT CURRENT

Current transformers shall be capable of withstanding the dynamic forces resulting from the maximum through-fault current which may be encountered at the point where they are installed. The short time current rating of current transformers shall be at least equal to that of the associated circuit breaker.

6. IMPULSE LEVEL

Current transformers used in system voltages in excess of 660 V shall withstand an impulse test level of 95 kV. Impulse levels for current transformers used in system voltages up to 660 V shall comply with BS 3938.

7. TESTS

7.1 One protection current transformer of each type used in a contract shall be tested to confirm the estimated characteristics. The following results shall be submitted:

(a) Magnetisation Curve

(b) Secondary resistance

(c) Secondary leakage reactance, if not negligible or if required by the Engineer.

7.2 The power frequency, secondary to earth and over voltage inter-tum tests in accordance with BS 3938 shall be conducted on all current transformers. Impulse tests shall be conducted on all current transformers intended for use in system voltages in excess of 660 V.

SECTION C27

C.27 INDICATOR LIGHTS

1. Indicator lights shall be of neon, incandescent (filament) or LED types. Lamp voltages shall suit the supply or control voltage. Lamps shall be derated for continuous duty by using economy resistors or using input voltages at least 20% lower than the rated lamp voltages.

2. Where LED's are used as indicators on main supply voltages a suitable current limiting capacitor and reverse voltage protection diode shall be used. For low AC or DC voltages (+ 24 V) a current limiting resistor will suffice.

3. Indicator lights shall comply with BS 1050 where applicable.

4. Indicator lights shall be suitable for installation in switchboard panels and doors and shall consist of interchangeable lenses, lamp base, suitably rated and accessible terminals and a chromed screw-on retaining ring or other suitable means to secure the units.

5. It shall be possible to replace lamps from the front of the panel without the use of tools.

6. Surface mounted indicator lights shall be housed in purpose-made boxes with suitable cover plates.

7. Indicator lights shall be equipped with standard removable legend plates. Alternatively, the function shall be clearly indicated by means of labels or by engraving on the lenses.

8. All indicator lights for a specific application or switchboard shall be from the range of one manufacturer and shall preferably be of the same size and shall use the same lamp types.

9. The following are the preferred colours for indicator lights:

(a) RED : Abnormal state.

(b) YELLOW : Attention or caution, (or amber)

(c) GREEN : Ready for operation.

(d) WHITE : Circuit live or circuit operating (or clear) normally

(e) BLUE : Any function not covered by the above colours.

SECTION C28

C.28 TRIPLE POLE ON-LOAD ISOLATORS

1. This section covers switches suitable for panel mounting for use in power distribution systems up to 600 V, 50 Hz. Switches for motor isolation are included.

2. The switches shall be of the triple pole, hand operated type complying with SANS 60947.

3. The switches shall have a high speed closing and opening feature.

4. The switches shall be suitably rated for the continuous carrying, making and breaking of the rated current specified as well as the through-fault current capacity as specified.

5. To distinguish the switches from circuit breakers the operating handles shall have a distinctive colour and/or the switch shall be clearly and indelibly labelled "ISOLATOR".

SECTION C29

C.29 ROTARY CAM SWITCHES

1. This section covers rotary cam switches used for control functions in switchboards, motor control centres, etc., up to 600 V.

2. The switches shall be rotary cam switches and shall comply with BS 4794, IEC 337 and VOE 0113. where applicable.

3. The switches shall be of the cam actuated type with two breaks per pole. The required number of poles and number of control functions shall be provided by the assembly of switching units on a common spindle.

4. The spindle shall be operated by a control handle suitable for the method of installation of the switch. The control handle shall be located by a key way on the spindle.

5. The switches shall be provided with a suitable face plate of non-conductive material, indicating the angle of throw and the switch positions. The latching mechanism shall ensure positive positioning in accurate relation to the positions indicated on the face plate.

6. The switches shall be suitable for use with the supply voltage level. The contacts shall be silver plated or gold laminated and shall be suitably rated for the switching functions intended.

7. For normal applications the making capacity of the switch shall be at least three times the normal current rating. For AC4 duties (inching, reversing, plugging) the rated current of the switch shall be at least equal to the stalled rotor current of the motor.

8. Special contacts, e.g. late-making, early-breaking, etc. shall be inherent in the design and shall not be improvised by loading or bending contacts, etc.

9. Time-delay units (if required) shall be of the electronic type with an adjustable time delay on energisation from 50 to 600 s. The units shall be suitable for clip-on rail mounting and supply voltage as specified.

SECTION C30

C.30 TIME SWITCHES AND PHOTOCELLS

1. Time switches shall be of single-pole type, suitable for 220/250 V systems, with contacts rated for the duty to be performed with a minimum rating of 15A. Contacts shall be of high quality material, e.g. silver-plated or solid silver.

2. The clock shall be driven by a self-starting, hysteresis synchronous motor, keeping accurate mains time. All clocks shall be controlled by an electrically wound escapement providing the main spring with a minimum of 15 hours reserve in case of a power failure. The main spring shall be kept fully wound without the use of slipping clutch devices that may wear and fall out of adjustment.

3. The main spring shall have a minimum of 15 hours reserve under full load and if fully discharged, shall be completely rewound within 15 minutes of the restoration of power.

4. An external manual bypass switch shall be provided to permit the circuit to be switched "ON" or "OFF" manually without affecting the operation of the time switch.

5. The time switch shall have a 24 hour dial, with day and night indication, that can be set to switch in 30 minute steps. The dial shall be fitted with 48 tappets corresponding to 48 change-over operations in a 24 hour period.

6. The time switch shall be fitted with a day omission dial comprising a total of 14 tappets which can be set to switch in 12 hour steps.

7. The time switch shall be housed in a dust-tight moulded plastic or metal case, consisting of a plastic clip-on front cover and a moulded plastic or metal base. Time switches to be used for surface mounting on walls shall be provided with a suitably positioned 20mm conduit knock-out.

PHOTOCELLS

1. GENERAL

1.1 The switches shall be used for the control of street lights and shall be provided with switch contacts able to carry at least 5 A. The current during no-load conditions may not exceed 50 mA.

1.2 The units shall be suitable for 240 V + 6%. 50Hz. single-phase alternating current.

2. CONSTRUCTION

2.1 The units shall be weather and vibration resistant as they are to be mounted on top of streetlight luminaires. The design shall be of such a nature that the units will be able to withstand both hail damage and damage by stone-throwers. If the units do not meet with these requirements, separate wire screens shall be provided for this purpose.

2.2 The units shall be provided with a standard NEMA plug and socket. The socket shall have a bracket for mounting on a pole.

2.3 All components shall be treated to be corrosion resistant.

3. OPERATING CONDITIONS

3.1 The units shall be suitable for operating under dusty conditions between temperatures of -5 EC and 55 EC.

4. TECHNICAL REQUIREMENTS

4.1 units shall switch on when the light intensity drops to 15 lux + 20% and shall switch off when the light intensity again reaches 40 lux + 20%.

4.2 When the unit is in the "on" position there must be a delay of one minute if it were to switch off in the case of a sudden increase in the light intensity.

SECTION C31

C.31 CONTACTORS

1. Contactors shall be of the open or totally enclosed, triple- or double-pole, electromechanically operated, air-break type suitable for 380/433 V or 220/250 V supplies and shall comply with ~~SANS 1092~~.

2. Contactors shall have the following characteristics:

(a) Enclosed coil easily replaceable.

(b) A permanent air gap in the magnetic circuit to prevent sticky operation.

(c) Provision for quick and simple inspection of contacts.

(d) Clearly marked main and auxiliary terminals.

3. All parts shall be accessible from the front.

4. Contactors which are not located in switchboards shall be housed in enclosures which comply with IP 54 of IEC 144.

5. The current rating of the contactor shall be as specified for the circuit with a switching duty in accordance with the ~~SANS 1092~~ or IEC 158-1, utilisation category ACI for lighting and power circuits and utilisation category AC3 for motor starting.

6. In addition to the required current carrying capacity and switching duty of a contactor, the contactor chosen for a particular application shall be rated for the maximum through fault current allowed by the back-up protection devices at the point where the contactor is installed. Careful co-ordination of short circuit devices shall take place.

7. All laminations of the magnetic system of the contactor shall be tightly clamped. Noisy contactors will not be accepted.

8. Non-current-carrying metallic parts shall be solidly interconnected and a common screwed earth terminal shall be provided. The contactor shall be earthed to the switchboard earth bar.

9. Latched contactors shall be provided with a trip coil and a closing coil. The contactor shall remain closed after de-energising the closing coil and shall only trip on energising the trip coil.

10. Contactor operating coils shall have a voltage rating as required by the control circuitry and shall have limits of operation and temperature rise as specified in Clause 7.5 and Table IV of IEC 158-1. Latched contactors shall be capable of being tripped at 50% of the rated coil voltage.

11. Contactors for normal/standby changeover circuits shall be electrically and mechanically interlocked. Contactors in star-delta starters shall be electrically interlocked.

12. Contactors with provision to add auxiliary contacts and convert auxiliary contacts on site are preferred. Contactors with permanently fixed auxiliary contacts shall have at least 1 x N/0 and 1 x N/C spare auxiliary contacts in addition to the contacts specified or control purposes and in addition to contacts required for self-holding operations or economy resistances. Where the number of auxiliary contacts required is greater than the number of contacts that can be accommodated on the contactor, an auxiliary relay or additional contactor shall be provided to supply the additional contacts.

13. It shall be possible to replace main contacts without disconnecting wiring.

14. Auxiliary contacts shall be capable of making, carrying continuously and breaking 6A at 230V AC, unity power factor for contactors used on 380-433/220-250 V systems.

15. Auxiliary contact functions required e.g. "lazy" contacts late-make, late-break, make-before-break, etc. shall be inherent in the contact design. Under no circumstances may these functions be improvised by bending contacts, loading contacts, etc. These functions shall be available in all contactors.

16. Spare auxiliary contacts shall be wired to numbered terminal strips in the switchboard and shall appear on the switchboard drawings.

17. All contactors on a specific project shall be from a standard range of one single manufacturer, unless specified to the contrary.

SECTION C32

C.32 PUSH-BUTTONS AND PUSH-BUTTON ASSEMBLIES

1. Push-buttons and push-button arrangements may be used in switchboards and control boards or in self-contained units for control functions.

2. Push-buttons and push-button assemblies for one specific project shall be supplied from a single reputable supplier's product range.

3. The various types of push-buttons employed shall be specifically selected for the required duty and mounting characteristics, e.g. flush mounted, enclosed, self-contained, illuminated, etc.

4. All push-buttons on a specific switchboard shall be of the same physical dimension (round or square) and shall be fully interchangeable as far as possible. Push-buttons must preferably be interchangeable with indicator lamps, key switches, etc.

5. Push-buttons shall be designed for long life, low contact bounce and constant contact resistance. Mechanisms may be of the mechanical type with spring control and a clutch or catch frame or of the solid state type operating on the principle of a non contacting, inductive proximity switch.

6. All push-buttons shall be provided with replaceable lenses with a variety of symbols. Legend plates shall be interchangeable.

7. Push-button terminals shall be suitable for the application with regard to spacing. conductor capacity, etc. Terminals shall be suitable for conductor sizes to be used. Push-button assemblies mounted on doors of control boards shall be enclosed to prevent inadvertent contact with the terminals and when the doors are open.

8. Push-buttons shall be suitable for the environmental conditions to be encountered. e.g. moisture, excessive temperatures, mechanical shock, vibration, etc.

9. Contact duty shall be chosen to suit the application. Wiping contacts shall be used for low voltages and currents and snap action contacts for high voltages and currents. Contacts shall be constructed of high quality material such as silver-tipped or gold laminated contacts.

10. Illuminated push-buttons may employ neon, incandescent or LED lamps. Lamp voltages shall suit system control voltages. Lamps shall be derated when used for continuous duty. e.g,. using 20 V supply on 28 V rated lamps. External resistors shall be used with LED lamps to avoid excessive current.

11. Push-buttons may be grouped together in purpose-made stations, suitable for the environment in which they are to be installed.

12. Keylock push-buttons shall be supplied with duplicate keys. The removal action of the key shall suit the application.

13. Push-buttons shall comply with the applicable requirements of BS 4794.

14. The following are the preferred colours for push-buttons:

(a)	RED	:	Stop or emergency stop.
(b)	GREEN	:	Start (preparation)
(c)	GREEN	:	Start (implementation) (or black)
(d)	YELLOW	:	Interrupt a function (action)
(e)	WHITE	:	Any function not covered by the (or pale blue) above colours

SECTION C33

C.33 INDOOR SURGE ARRESTORS

1. Surge arrestors shall comply with the requirements of SANS 61643 or VDE 0675.

2. Surge arrestors shall be suitable for installation at altitudes of up to 1800m above sea level.

3. The unit shall be contained within a thermoplastic or cast resin housing and all internal components shall be fully sealed in.

4. The unit shall be supplied complete with a galvanised steel mounting bracket for convenient mounting onto the metalwork or tray of a switchboard.

5. Alternatively, the unit shall be of the type which can be mounted into the clip-tray of a switchboard.

6. Surge arrestors shall be provided in all cases where a switchboard is supplied directly from an overhead line.

7. In other cases, surge arrestors, if required, will be specified in the Detail Technical Specification.

SECTION C39

C.39 STANDARD PAINT SPECIFICATION

1. FINISH REQUIRED

Metalwork of electrical equipment such as switchboards, equipment enclosures, sheet steel luminaire components, purpose-made boxes, etc. shall be finished with a high quality paint applied according to the best available method. Baked enamel, electrostatically applied powder coating or similar proven methods shall be used.

2. CORROSION RESISTANCE

Painted metal shall be corrosion resistant for a period of at least 168 hours when tested in accordance with SANS 166.

3. EDGES

Care shall be taken to ensure that all edges and comers are properly covered.

4. SURFACE PREPARATION

Surface preparation shall comply with SANS 10064. Prior to painting, all metal parts shall be thoroughly cleaned of rust. mill scale, grease and foreign matter to a continuous metallic finish. Sand or shot blasting or acid pickling and washing shall be employed for this purpose.

5. BAKED ENAMEL FINISH

5.1 Immediately after cleaning all surfaces shall be covered by a rust inhibiting, tough unbroken metal-phosphate film and then thoroughly dried.

5.2 Within forty eight (48) hours after phosphatising, a passivating layer consisting of a high quality zinc chromate primer shall be applied, followed by two coats of high quality alkyd-based baked enamel.

5.3 The enamel finish on metal luminaire components shall comply with SANS 783, Type III.

5.4 Other metal parts e.g. switchboard panels, etc., shall comply with SANS 783, Type IV with a minimum paint thickness after painting of 0,06mm. In coastal areas, the dry film thickness shall be increased to at least 0,1mm.

5.5 The paint shall have an impact resistance of 5,65 J on cold-rolled steel plate and a scratch resistance of 2kg

6. POWDER COATED FINISH (NOT TO BE USED LESS THAN 50KM FROM SEASIDE)

6.1 Immediately after cleaning the metal parts shall be pre-heated and then covered by a microstructure paint powder applied electrostatically.

6.1 The paint shall be baked on and shall harden within 10 minutes at a temperature of 190°C.

6.3 The minimum paint thickness after baking shall be 0,05mm. The dry film thickness shall be increased in coastal areas. The paint cover shall have an impact resistance of 5,65 J on cold-rolled steel plate and a scratch resistance of 2kg.

7. TOUCH-UP PAINT

In the case of switchboards and larger equipment enclosures, a tin of matching touch-up paint not smaller than 1 litre shall be provided.

8. COLOURS

8.1 The colour of HV switchboards and HV switchgear enclosures shall be "DARK ADMIRALTY GREY", colour G12 of SANS 1091.

8.2 The colour of LV switchboards and equipment enclosures in buildings shall be "LIGHT ORANGE", colour B26 of SANS 1091 as recommended in SANS 10140, Part II unless specified to the contrary.

8.3 The colour of LV distribution kiosks and miniature substations shall be "AVOCADO GREEN", colour C17 or "LIGHT STONE", colour C37 of SANS 1091.

8.4 The standby power section of LV switchboards in buildings shall be coloured "SIGNAL RED", colour All of SANS 1091.

8.3 Switchboards for No-Break Power Supplies or sections of switchboards containing No-break power supplies, shall be coloured "DARK VIOLET", colour F06 or "OLIVE GREEN" colour H05 of SANS 1091.

MPOLWENI CLINIC: CONSTRUCTION OF NEW VERY SMALL CLINIC WITH STAFF ACCOMMODATION

TECHNICAL
ELECTRICAL SPECIFICATION

SECTION E: PROJECT SPECIFICATION

ELECTRICAL INSTALLATIONS

PROJECT SPECIFICATION

1 GENERAL

This project specification must be read together with the general and quality specifications for electrical works and lightning protection specification. In case of conflict, the project specification shall take preference. The contractor is however required to refer the matter first to the Engineer for clarification prior to work proceeding

This project specification together with the drawings and Bill of Quantities describes the scope of works to be executed in terms of this documentation and takes precedence over the general electrical specification.

2 PROPRIETARY MATERIALS, SYSTEMS, ETC.

Any reference in these Bill of Quantities to trade or brand names (and catalogue numbers, etc.,) shall be deemed to be followed by the words “or other approved”. Refer to Clauses 14 and 15 on page GA3 for definition of “approved” and for procedure to be followed.

The Tenderer’s special attention is drawn to the fact that in connection with the aforementioned where ever any wording with meanings equating with similar to, equal to, equivalent to, etc, are used in combination with a trade or brand names (and catalogue numbers, etc.,) they shall be deemed to be omitted and entirely replaced by the trade or brand names (or catalogue numbers, etc.,) followed by the words “OR OTHER APPROVED”. This will take precedence over any contradictory clause or note appearing anywhere on these Bills of Quantities.

3 REGULATIONS, FACTORY ACT AND BYLAWS

- The consumer code for the wiring of premises, South African National Standards, SANS 10142-1
- The Occupational Health and Safety Act regulations, as amended.
- Any special requirements of the electricity supply authorities of the particular area/district.
- The Local Authority fire regulations.
- ICASA Regulations.
- National Building regulations and SANS 10400, Code of Practice for the Application of National Building Regulations.

4 SITE

The Tenderers must, before submitting their tenders, acquaint themselves with the local conditions, accessibility of the sites, soil conditions, availability of labour and labour conditions, transport, off-loading store and custody conditions for materials and equipment necessary for the completion of the total contract. No claim based on ignorance in this regard shall be considered. Permission must be obtained from the Client Representative before any Tenderer visits the site, or the Contractor establishes himself of the site.

5 SCOPE OF WORKS

Construction of a new small clinic and staff accommodation, with bore hole and generator.

The site is situated 54km from Appelsbosch Hospital, which is the mother Hospital and 29km from Pietermaritzburg off the R33. The site is situated adjacent to the Mpolweni Community Hall which is currently used as the mobile clinic point.

The clinic will consist of the following blocks / areas:

- Block A: Gaurdhouse
- Block B: Admin & Main Central Area
- Block C: Emergency and Support Services
- Block D: Services and Stores
- Block E: Preventative & Promotive
- Block F: Acute Care
- Block G: Chronic Care
- Block H: Youth and Outreach
- Block K: 3 x Staff 01 Bedroom
- Block L: Staff 02 Bedroom

The scope of the electrical works described in detail in this document, bill of quantities and drawings covers the supply, delivery, off-loading, storage, installation, commissioning, testing, handing over and maintenance for the period stated in the tender document of all specified equipment and materials for the complete electrical installation. The electrical works in certain areas may only be carried out after hours or as instructed by the Engineer.

The electrical installation will carry a 12-month guarantee and maintenance period from the date of first delivery/handover.

New electrical installation entails:

- Electrical Point of supply for the site
- Backup electrical power supply
- Alternate Solar PV installation
- Electronic reticulation (LAN and VOIP)
- CCTV installation
- Electrical feed from Main LV panel to sub distribution boards
- Low voltage Distribution Boards
- Cable Reticulation, manholes, sleeves, wireways, excavations, trenching, etc
- General interior lighting layout
- Power points for HVAC systems
- Wireways, trunking, conduiting and wiring
- Fire detection system and voice evacuation
- Lightning protection system
- General earthing system
- Testing and Commissioning

6 RELATED WORK BY OTHERS

The following work will be provided by others under the main contract:

6.1 Plaster and patching of conduit chases by the Principal Contractor

6.2 Closing up of ducts and openings in slabs or through walls after the installation of cables by the Principal Contractor,

6.3 Fireproofing of all inter-floor openings to be carried out by the Principal Contractor,

6.4 Installation of air-conditioning units by the Mechanical Contractor,

6.5 Installation of extract fans by the Mechanical Contractor,

6.6 Installation of hydroboil by the Principal Contractor,

6.7 Inter-connection between air-conditioning panels and equipment fed from it,

6.8 Internal air-conditioning equipment and air-conditioning distribution boards,

7 DOCUMENTATION

This document forms part of the principal builder's document. All terms and conditions of contract would be as per the main document.

8 NATURE OF CONTRACT

This contract shall form part of the main contract, and the Electrical Contractor shall enter into a contract with the main contractor.

9 LOCAL SUPPLY AUTHORITY

Mpolweni is located in the Umgungundlovu district under Umshwati local municipality. The Electrical Supply Authority to site is Eskom. The successful tenderer shall ensure that he is fully conversant with all the by-laws of the local supply authority.

10 STANDBY ELECTRICAL SUPPLY

Option 1 - A new 88KVA standby diesel generator will be installed as the main backup power supply. The generator will feed only essential circuits, lighting and the staff residences.

Option 2 – Solar PV with battery backup. The installation of 90 * 550W Tier 1 solar panels with a 50kW Hybrid inverter and 6 hours backup via lithium-ion batteries. This system will feed only the essential circuits and lighting.

11 ELECTRICAL SITE CONDITIONS

All equipment shall be suitably rated and shall be able to perform as specified under the following site conditions:

Nominal LV Supply 400/230V (No Load) 4-Wire, 3 Phase System with earth neutral

12 ENVIRONMENTAL CONDITIONS

The installation is in Mpolweni, 29km from Pietermaritzburg, KZN and conditions of altitude; temperature and humidity should be allowed for accordingly.

The location of the equipment is as indicated on the drawings. Tenderers should visit the site in order to ascertain what rigging equipment, cranes etc. will be required in order to deliver and install equipment.

13 BUILDING CONSTRUCTION

The building consists of the following:

a. Brick walls

b. In situ reinforced concrete walls, floor slabs and columns

c. Concrete and rafter supported, steel roof structure.

The electrical Contractor shall be responsible to study the Architects drawings for details of the above before installing his equipment.

14 NOTICES AND FEES

The contractor shall ensure the co-ordination of the works on site in relation to other services during the completion of the works. The contractor shall also include for his profit and attendance for these items.

A new application will be lodged with Eskom for the site supply:

160kVA, 230A, 400V, 50Hz

The supply will be provided by the local supply authority to a metering kiosk on the property boundary. The applicable Fees / Quotation received from Eskom will be paid through the contract.

15 QUALITY OF MATERIALS

Only materials of first-class quality shall be used and all materials shall be subject to the approval of the Engineer.

Wherever applicable, material is to comply with the relevant South African Bureau of Standards Specifications, or to British Standard Specifications, where no SABS Specifications exist.

Materials, wherever possible, must be of South African manufacture.

All fittings, material and equipment and component parts thereof are to be in accordance with the Specification and must have the approval of the Engineer. In addition, all equipment shall be designed, manufactured and tested in accordance with the relevant South African Bureau of Standards Specification, or otherwise, the relevant British Standard Specification.

All material and equipment must be suitable for the supply voltage 400/230V and the necessary precautions shall be taken against corrosion, i.e. exposed metal shall be anti-rust treated to approval and all metalwork to be galvanized or painted.

16 REJECTION OF INFERIOR WORK AND MATERIALS

All inferior work or work containing inferior material shall be rejected by the Engineer whereupon the Contractor shall immediately remove and rectify/replace the faulty work and/or material and bear all costs in connection therewith.

17 MOUNTING OF EQUIPMENT

The mounting of equipment shall comply with SANS 1180, where applicable. Equipment to be mounted on the chassis shall be mounted by bolts, washers and nuts or by bolts screwed into tapped holes in the chassis plate.

In the latter case, the minimum thickness of the chassis plate shall be 2,5mm. The latter method shall not be used where boards will be subject to vibration or mechanical shocks. Self-tapping screws will not be accepted.

18 PAINT FINISH

Where provision is not made for the protection of steel in either the relevant standard specification, the following procedure shall be adopted:

a) Surfaces shall be thoroughly cleaned in accordance with SANS 064.

b) Surfaces shall be primed with zinc chromate primer complying with Type 1 of SANS 679.

c) Surfaces shall then be given two coats of paint complying with Grade 1 of SANS 630. Colours to be approved by the principal agent or agents.

d) Care shall be taken that all edges and threads are covered to the same standard.

e) Surfaces, which have been damaged during installation, shall be touched up to the same standard.

19 MATERIALS ETC. TO BE PROVIDED BY ELECTRICAL CONTRACTOR

The Electrical Contractor shall provide all materials, equipment, labour, appliances and all sundries necessary for the successful completion of the contract, whether mentioned in the specification or not; he shall provide for all necessary handling, transport and storage and shall be responsible for all materials delivered to the site in connection with the contract.

20 BALANCING OF LOAD

The contractor will be required to balance the load as equally as possible across multi phase supplies. The loads at the various points in the system are to be recorded by the contractor and included in the plantroom instructions as detailed below.

21 COMPLETION

On completion of the contract, any damage, which may have been done to the plasterwork, floors, ceilings, wood and paintwork, etc., during the progress of the electrical installation, shall be repaired and made good to original finishes by the contractor or principal contractor for the account of the contractor, to the satisfaction of the principal agent.

22 LV ROOM

The new switchgear is to be supplied and installed and shall include for all necessary connections, terminations, busbar work and panel adjustments.

23 DISTRIBUTION BOARDS

23.1 GENERAL

The scope of this portion of the works will be the supply, delivery, off-loading, possible storage, placing in position, erecting, testing and commissioning of all low voltage boards required for the project.

The distribution boards indicated in the schedules shall be installed on site by the electrical contractor. The electrical contractor will ensure that the distribution board manufacturer meets the requirements of the specification and the programme of works.

A shop drawing of each of the distribution boards shall be submitted to the engineer for comment before construction begins. A reasonable amount of time shall be afforded to the engineer to check these drawings.

The manufacturer shall design the distribution board based on the single line diagram provided by the engineer to ensure that all switchgear and control gear can be fitted within the enclosure with 30% spare space for future additions without the need to change the assembly construction. The unused spaces shall be covered by means of blanks to ensure that the IP rating of the assembly remains in tack.

As a minimum the assemblies with the fault levels as stated shall comply to the following standards:

- fault level ≤ 10kA shall comply with SANS1973-3
- fault level > 10kA with operating current less than 1600A – SANS 1973-8 (Only if specified)
- fault level > 10kA shall comply with SANS1973-1 / SANS60439 / SANS61439

All enclosures or partitions including locking means and hinges for doors shall be of sufficient mechanical strength to withstand all mechanical stresses to which it may be subjected to during normal and short circuit conditions.

Prior to construction the manufacturer shall submit general arrangement drawings containing the following:

- Physical size, i.e. height, width and length
- Weight
- Transport section
- Rated operating voltage
- Rated insulation voltage
- Rated operating current
- Rated short time withstand current
- IP rating
- Detail control diagrams
- Schedule with make, model and rating of all switchgear and control gear

All switchgear and control gear used within the assembly shall comply with Section IV.6 of this specification. The manufacturer needs to ensure that the selection of the co-ordination of the protective devices are done to ensure selectivity of the protective system and needs to be proven by the supplier of the protective equipment.

23.2 MATERIAL

Assemblies shall be constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity. The minimum thickness of the galvanised / alloy cold rolled zinc steel that will be used is 2mm, unless the rigidness of a thinner material can be demonstrated.

The enclosure shall be protected against corrosion by applying a suitable coating on the exposed surfaces.

All metal parts shall be externally and internally prepared for painting in accordance with SANS 10064, thereupon treated with baked enamel primer, and finally finished in an infra-red baked enamel, in the colour externally called for in the Detail Specification and the minimum thickness of the finished product shall be 85µm.

Assemblies can be wall mounted, free standing with front access only or free standing with front and rear access.

For panels with front access only, a cable way of at least 400mm shall be provided where practical possible.

The gland plates shall be galvanised and at least 3mm thick and shall be bonded to the main earth bar by means of copper conductor. The minimum cross-sectional area of the protective/bonding conductor shall be in relation to the rated operational current.

Gland plates and cable support bars must be placed at suitable heights to allow for the bending radius of the cables concerned and making off of cables. Gland plates for single core cables shall be manufactured from insulating material of adequate strength.

23.3 DOORS AND COVERS

Doors of smooth flat finish steel sheet suitably braced to ensure stiffness shall be recessed flush in the architrave. Catches shall be flush mounted. Single doors shall not exceed a width of 610 mm.

All steelwork to be pacified, smooth finished and covered with hard baked enamel paint. Final finish of boards shall be beige or as indicated by the Engineer.

All doors shall be fitted with rubber or neoprene seals. Door and cover latches shall be of robust construction and shall be manufactured from steel. Doors and covers shall be secured by square key latches.

Doors and covers greater than 800mm shall be provided with stiffeners / webs to avoid wobbling.

All doors with electrical equipment mounted on it shall be bonded to the protective earth conductor by means of at least a 4mm² multi strand conductor.

23.4 DEGREE OF PROTECTION

All distribution boards shall be moisture proof, vermin proof and adequately ventilated. Distribution boards shall at all times shall be protected against damage, moisture, dust and vermin. If IP rating is not specified on the single line drawings or the detail specification the following minimum ratings shall be applicable and shall be tested in accordance with SANS 60529:

- Indoor use IP3X
- Outdoor use IP54
- Cable entry IP2X

23.5 FORM OF SEPERATION

The form of separation shall be as specified on the single line diagrams issued with the specification.

23.6 DEGREE OF POLLUTION

Unless otherwise specified the assembly shall be rated for a degree of pollution of 3.

23.7 LABELLING

All labels shall be of engraved Trafolite or similar plastic material and shall be fixed by means of machine screws or aluminium channelling.

Lettering shall be black on white background. Glued-on plates or embossed plastic self-adhesive tape labels shall not be accepted.

The distribution board ID as well as where the panel is supplied from will be secured to the panel.

All circuit breakers, contactors, timers, switches, relays, pushbuttons, terminals, etc., must be clearly labelled as to their title or function.

All wire ends to contactors, relays, terminal strips, etc., must be clearly numbered by means of slip-on plastic ferrules. Self-adhesive tape markers shall not be acceptable.

All terminal strips must be numbered on both incoming and outgoing sides by means of suitable clip-on numbers. Should the incoming and outgoing wire numbers be identical, then numbers on one side only of a terminal strip shall be acceptable.

A suitable legend card (paper shall not be acceptable) covered by a removable glass or perspex panel shall be provided and installed inside the door or on the face of the panel. This legend card shall give the designation of the various outgoing circuits, the corresponding circuit breaker numbers in the board and the area where the circuit is taken to. i.e. lights, L1, Ablutions.

During construction temporary hand written legend cards shall be used. Final legend cards must be typed. Hand written final legend cards shall not be accepted.

The following information shall appear on the name plate which shall be secured to the assembly’s incomer section:

- Assembly ID
- Manufacturer’s trade name, address and contact number
- Standard to which the panel has been manufactured and tested

- Main busbar current rating
- Rated short time withstand current
- Rated operating voltage
- Rated insulation voltage
- IP rating
- Form of separation
- Degree of pollution

Where series connected (cascaded) systems are used the warning label shall be fitted on the incomer section of the assembly as noted in the SANS10142-1 regulations.

23.8 BUSBARS

The busbar system shall be manufactured of high conductivity copper complying with SANS804.

Joints in the busbars shall overlap not less than 6 times the thickness of the busbar or shall equal the width of the busbar whichever is the greater. A minimum of two bolts with conical or spring washers shall be used to secure the joint.

The support system shall be designed to cater for the rating of the short time withstand rating of the assembly.

Busbars shall be identified to confirm to which phase it is connected to using Red, White, Blue and Black for Neutral.

In a multi phase assembly the neutral bar size shall not be less than 50% of the phase conductor.

All busbar connections shall be torqued and marked to the standard torque settings.

23.9 EARTHBAR

Each board shall be equipped with a copper earth bar over the full length of the board to allow for the termination of all the incoming and outgoing earth conductors. The protective earth conductor shall be colour coded Green with a Yellow Stripe or left bare.

23.10 WIRING

All internal wiring shall either be laced or run in wiring channels and shall be clearly marked with numbered ferrules and colour coded.

Only one neutral and one earth wire will be allowed per terminal.

The minimum wiring which may be used in the fault free zone is 16mm², and shall be braced at least every 300mm.

23.11 DRAWINGS FOR COMMENT

A set of three prints of the shop drawings for the switchboards shall be submitted to the Engineer for comment before the boards are manufactured. The following information shall be presented.

- A complete wiring diagram of the equipment on the boards.
- A complete layout of the arrangement of the switchboards, indicating all equipment dimensions and the construction of the boards.
- The make, catalogue number and capacity of all equipment such as isolators, circuit-breakers, fuses, contractors, etc.

23.12 LABELLING

All equipment shall be labelled and identified using white TRAFFOLYTE or alternative approved labels having 12 mm high black lettering engraved on them; where two similar items exist, they shall additionally be numbered for clarity in identification. Labels shall be neatly riveted or secured using epoxy-based glue, no other type of adhesive being acceptable.

Clearly legible labels, in English, are to be mounted below each circuit breaker, plug points and light switches to show the type of circuit each supplies using above mentioned labels fixed to the boards and not dymo taped labels. The name of the distribution board, e.g. DB-Kiosk, shall be fixed on to the door.

In addition a label, e.g. (Fed from Main DB-Kiosk), of lettering one size smaller than the main label shall be fixed below the main label.

23.13 INSTALLATION

The distribution boards must be chased into the wall on the position shown on the drawings and must be installed level with the top most circuit breaker 2,0 m above the finished floor level.

24 CABLE RETICULATION

24.1 GENERAL

The installation of cables in buildings, and in the ground for system voltages up to 11000 volts, 50Hz, shall conform to the following standards:

- SANS 10142-1
- SANS 10142-2
- SANS 1507
- SANS 97

- SANS 1339
- SANS 10198 part 1 to 13

Please note that all amendments published at the time of tender shall be applicable.

24.2 CABLE SCHEDULE

This clause covers the supply, delivery, installation and commissioning of all low-tension cables as specified in the schedules below and/or as indicated on the drawings and measured in the bills of quantities.

FROM	TO	SIZE AND TYPE	LEN GTH (M)
ESKOM CONNECTION POINT	Main LV Panel	120mm² PVC SWA PVC & 95 mm² BCEW	80
Main LV Panel	DB A	10mm² PVC SWA PVC & 10mm² BCEW	160
Main LV Panel	DB B	16mm² PVC SWA PVC & 16mm² BCEW	90
Main LV Panel	DB B	10mm² PVC SWA PVC & 10mm² BCEW	90
Main LV Panel	DB C	16mm² PVC SWA PVC & 16mm² BCEW	50
Main LV Panel	DB C	10mm² PVC SWA PVC & 10mm² BCEW	50
Main LV Panel	DB G	16mm² PVC SWA PVC & 16mm² BCEW	85
Main LV Panel	DB G	10mm² PVC SWA PVC & 10mm² BCEW	85
Main LV Panel	DB H	10mm² PVC SWA PVC & 10mm² BCEW	80
Main LV Panel	DB K (Kiosk)	16mm² PVC SWA PVC & 16mm² BCEW	40
DB K (Kiosk)	DB-K1	6mm² 3-Core PVC SWA PVC & 6mm² BCEW	50
DB K (Kiosk)	DB-K2	6mm² 3-Core PVC SWA PVC & 6mm² BCEW	50
DB K (Kiosk)	DB-K3	6mm² 3-Core PVC SWA PVC & 6mm² BCEW	50
DB K (Kiosk)	DB-K4	6mm² 3-Core PVC SWA PVC & 6mm² BCEW	50
Main LV Panel	To Site	6mm² PVC SWA PVC & 6mm² BCEW	300
DB A	To Equipment	6mm² 2-Core + Earth Surfix	30
DB B	To Equipment	6mm² 2-Core + Earth Surfix	160
DB C	To Equipment	6mm² 2-Core + Earth Surfix	60

DB D	To Equipment	6mm² 2-Core + Earth Surfix	60
DB E	To Equipment	6mm² 2-Core + Earth Surfix	30
DB F	To Equipment	6mm² 2-Core + Earth Surfix	30
DB G	To Equipment	6mm² 2-Core + Earth Surfix	270
DB H	To Equipment	6mm² 2-Core + Earth Surfix	100
DB K	To Equipment	6mm² 2-Core + Earth Surfix	120
Main LV Panel	To Equipment	6mm² 2-Core + Earth Surfix	60
Main LV Panel	To Site	6mm² 3-Core PVC SWA PVC & 6mm² BCEW	100
LIGHTING CIRCUITS		2.5mm² HOUSE WIRE	SEE BOQ
POWER CIRCUITS		4mm² HOUSE WIRE	SEE BOQ
ISOLATOR CIRCUITS		4mm² HOUSE WIRE	SEE BOQ

24.3 CABLE TYPES

The following cable types shall be used, unless otherwise specified in the specification or bills of quantities:

Low voltage:

The cables shall be PVC insulated PVC bedded SWA PVC sheathed 600/1000V cables manufactured to SANS1507.

Un-armoured PVC insulated cables may only be used if specified in the detail specification and measured in the bills of quantities.

Connections to equipment: PVC insulated steel wire armoured or unarmoured when installed in conduit or metal trunking. Cable bending radius shall be as specified in SANS 10142-1.

All cables supplied shall have the following information on the cables:

- Every meter the length of a cable shall be visible
- The size of the cable shall be marked on the cables
- The applicable SANS number to which the cable complies with

CABLE TAGGING

All cables shall be identified at each termination by means of punched metallic bands or engraved PVC tags cable tied to cable. PVC tape with printed characters will not be accepted.

The following shall appear on the cable tags:

- At point of supply:

Cable voltage, Cable size, Cable type, and Supply to DB-XXX – Normal/Emergency/UPS Section or equipment name

e.g. 11kV, 70mm² 4 Core XLPE – Supply to Substation 1

- At point of consumption:

Cable voltage, Cable size, Cable type, and Supplied from DB-YYY – Normal/Emergency/UPS Section

e.g. 400V, 95mm² 4 Core PVC – Supply from DB-MLVP

Identification numbers of cables shall be shown on the "as built" drawings of the installation.

TESTING

Each cable shall be tested after installation in accordance with SANS 1507 and SANS 97 and SABS 1339 (up to 11kV) as well as the requirements of the Local and Supply Authorities.

The minimum acceptable insulation resistance values for the cables shall be calculated as follows:

a) LV Cables

LV cables shall be tested by means of a suitable insulation resistance tester at 2,000Vac (RMS) or 3000Vdc for a period of 15min 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 at least 7 days prior to the tests so that their representatives may witness the tests.

On Completion of the tests on any cable, the Contractor shall without delay, submit three copies of the certified Test Reports to the Engineer.

The contractor shall provide all the testing equipment as required for the respective tests.

24.4 JOINTS

Jointing shall be carried out strictly in accordance with the manufacturer's instruction and by personnel competent in jointing the types of cables involved.

No joints in cable runs will be allowed unless a cable run exceeds the maximum length available on a cable drum. (Normally 300 m)

The joint shall not impair the anti-electrolysis characteristics of the cable.

Joints shall be fully water and air tight and shall be free of voids and air pockets.

The crossing of cores in joints will 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 an 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.

Outdoor termination must be able to withstand air pollution and bad weather without any signs of surface current tracking.

Termination for high voltage cables must have a satisfactory stress relief in order to keep the partial discharges extinguished.

Taped or prefabrication terminations may be used, in accordance with the manufacturer's recommendation.

24.5 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 tools designed for this purpose.

Cables that are connected to clamp type terminals where the 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.

25 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 coordinated with the general construction programme.

The Contractor shall acquaint himself with the position of all the existing electrical, civil and other services before excavation is commenced.

The Contractor will be held responsible for damage to any such existing services and shall be responsible for the cost of repairs.

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 that can be encountered is classified as follows:

a) Very hard rock shall mean rock that can only be excavated by means of explosives.

b) Hard Rock shall mean granite, quartzitic sandstone, slate and rock of similar or greater hardness, solid shale and boulders over 0,03 cubic metre in volume.

c) Soft rock shall mean rock that can be loosened by hand-pick and includes hard shale, compact gravel stone and rocks from 75mm in diameter up to 0,03 cubic meters in volume.

d) Soil shall mean ground that can be removed by pick and hand shovel and includes loose gravel, clay, made-up ground, loose or soft shale, loose gravel stone and rocks less than 75 mm in diameter.

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.

25.1 CABLE SLEEVES

Where cables cross under roads, railway tracks, other service areas, etc. and where cables enter buildings, the cables shall be installed in hard walled PVC or earthenware pipes. Road and railway crossings shall be done at right angles.

Sleeves shall have a minimum diameter as specified and shall extend at least 1,0 m beyond the road edge or kerb on either side of the crossing.

After the 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.

25.2 CABLE INSTALLATION AND BACK FILLING

Before the cable is laid into the trench the bottom of the trench shall be filled across the full width with a 75 mm layer of suitable sifted soil and levelled off. After cable laying a further layer of bedding shall be provided to extend to 75 mm 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 purposes 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 a timeous notification, the trenches shall be re-opened at the Contractor's cost. Such an inspection will not be unreasonably delayed.

Cables (1000V to 11000V) shall be provided with a yellow coloured plastic marking tape installed 400 mm above the cable. The tape shall be marked with a red skull and crossbones with the words "Electric Cable". This marking shall be installed over the entire length of the cable.

The maximum accepted diameter of stones present in the back fill material is 75 mm.

The back fill 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 road ways or paved areas the excavations shall be consolidated to the original density of the surrounding material and the surface finish reinstated.

25.3 CABLE MARKERS

Cable markers shall consist of concrete blocks dimensioned as follows:

300mm high, 150mm x 150mm at the top and 250mm x 250mm at the bottom.

A brass 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 brass plates.

a) For MV and LV cable routes - "ELECTRICAL CABLES"
b) For joint positions - "ELECTRIC CABLE JOINT".

Cable markers shall be installed on the surface along all the underground routes and shall project 50 mm above finished or natural 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 changes of direction, at the beginning and 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.

25.4 PROVINCIAL ADMINISTRATION, NATIONAL ROAD AND S.A.R. CROSSINGS

The Contractor shall conform with the various Administrations' requirements with regard to the crossing of Provincial and National roads, especially with regard to safeguarding of the public and traffic control. The Contractor shall also provide proof of adequate insurance cover against any claim from any accident as a result of work done by the Contractor during the crossing operation. The Owner shall be indemnified from all liability in this regard.

The Contractor shall liaise with the various Administrations and Traffic Departments etc., well in advance regarding the intended dates, times and expected duration of the crossing operations and obtain their approval of the programme and method of operation before work is commenced.

25.5 INSTALLATION OF CABLES

INSTALLATION DEPTHS IN GROUND

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 ground surface is not less than the values given below:

MV & LV Cables
Cables in open ground or under pedestrian paved areas :

Residential Sites 450 mm

Industrial and Commercial Sites 600 mm

Road Crossings 1 100 mm

Railway Crossings 1 500 mm (From top of sleepers)

Cables shall not be laid direct in the ground if any corrosive agent is found to be present.

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 minimum of 550 mm. The width shall be increased as more cables are installed allowing for at least two cable diameters spacing for each cable added.

25.6 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 ONLY.

SPACING OF CABLES IN GROUND

Cables installed in a common trench shall be laid parallel to each other spaced as follows: (LV: up to 1000V; HV: 1000V to 11000V):

LV/LV : 2 cable diameters
LV/HV : 300 mm minimum

Where HV and LV cables have to be installed in the same trench, the HV cable shall be laid on the one side of the trench at a depth as specified above and then covered with soil. The LV cable shall then be laid on the other side of the trench at the depth specified above.
Cables shall not be buried on top of each other unless layers are specified. The minimum spacing between layers shall be 200 mm.

Cables for telephones, communication systems and other low voltage systems (less than 50V) shall be separated from power cables by at least 1000mm. All control or pilot cables shall be laid at least 300mm from power cables.

25.7 CABLE BENDING RADIUS

The cable bending radius shall be in accordance with the cable manufacturer's guidelines.

25.8 INSTALLATION IN BUILDINGS

GENERAL

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 2300 mm. 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 300 m length, unless as specified or specifically approved.

25.9 CABLE FIXINGS ABOVE FLOOR LEVEL

On Cable ladders:

Cables shall be secured to the cable ladder by means of minimum 12.7mm cable ties at intervals not exceeding 1500mm for horizontal runs and 750mm for vertical runs.

Mounted on unistrut supports:

- The intervals of the supports shall be such that no cable sagging occurs, but minimum interval shall be 750mm. Cables shall be secured with the appropriate size cable K or U clamp onto the unistrut support.
- Mounting directly onto wall
- Appropriate cable saddles shall be used to secure the cable to the wall, at minimum 750mm intervals.
- Single core cables comprising of three phase circuit shall be laid throughout in trefoil formation, each cable touching. They shall be fixed with hardwood blocks or purpose made cleats supported on steelwork or proprietary rails segregated from all other cables and located in a protected situation.

25.10 CABLES IN CONCRETE TRENCHES

In concrete trenches cables shall be laid side by side on the bottom of the trench without cross-overs. 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.

25.11 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 effectively seal the duct from ingress of vermin, etc.

26 LIGHTING LAYOUT

26.1 General

The Contractor will be responsible for the supply and delivery of luminaires, including lamps. The Contractor shall be required to allow for the administration, attending to timeous delivery, for storage on site, for handling all items and replacements, etc. and tenderers shall include their cost for this attendance and the cost for profit and handling on the supply of luminaires.

All fluorescent lamps shall comply with the SANS 1041 as revised and shall be 4 300°K cool white.

NB: All C.F.L luminaries shall be fitted with the appropriate lamp holders, lamps, provided with electronic ballast and power factor correction units bearing the S.A.B.S mark “No Name Brand” luminaires will not be accepted for this installation.

NB: Approval for alternative light fittings than those specified can only be done during tender. Alternatives offered after closing will not be considered.

26.2 Installation

The layout of the fittings as indicated on the drawings must be adhered too as far as possible. The positions in which the light fittings are mounted shall be verified on site and fittings shall normally be mounted symmetrically in relation to ceiling patterns and/or building lines.

Should the arrangement of the ceiling or architectural features be such that the layout of fittings, as shown on drawings cannot be adhered to or should it be found that points would come in close proximity to beams, columns, cover strips or other obstructions, then the matter shall be referred to the Engineer.

All luminaires must be complete with lamps, which must be delivered to site separately.

26.3 Samples

Samples of the luminaires or other equipment shall be provided for inspection on request.

NB: No name brands are not acceptable.

The Contractor is to ensure that all luminaires are to be equipped with all fittings and accessories necessary for their complete installation.

In the case of the commodity complying with a compulsory specification, the manufacturer or agent shall furnish an Authorisation Mark. The new SABS Safety Specification will supersede all compulsory specifications.

26.4 Components

All components such as the lamp holders, ballasts, starters etc. must have the SABS mark.

26.5 Schedule of luminaires

ITEM	DESCRIPTI ON	LAMPS	TECHNICAL	GUARANTE E	ACCESSORIES	PHOTO
TYPE A1	REGENT LIGHTING SOLUTIONS Luxon Prism	40W LED	600 x 600mm RECESSED LIGHT FITTING BACKLIT LED 40W PRISMATIC DIFFUSER. Seamless aluminium extruded frame. 2.3mm PMMA for better light transmission. Powder coated. Flicker Free CCT: 4000K CRI : > 80	5 year guarantee	3m cabtyre complete with 5A plugtop	
TYPE A1E	REGENT LIGHTING SOLUTIONS Luxon Prism With emergency gear	40W LED	600 x 600mm RECESSED LIGHT FITTING BACKLIT LED 40W PRISMATIC DIFFUSER. Seamless aluminium extruded frame. 2.3mm PMMA for better light transmission. Powder coated. Flicker Free CCT: 4000K	5 year guarantee	3m cabtyre complete with 5A plugtop	

			CRI : > 80			
TYPE A2	REGENT LIGHTING SOLUTIONS Luxon Medical	40W LED	600 x 600mm RECESSED LIGHT FITTING MEDICAL LED 40W PRISMATIC DIFFUSER. Aluminium Housing. PMMA Diffuser. Powder coated. Flicker Free. CCT: 4000K CRI: > 90 UGR: < 19 COI: < 3.3 Ra: > 90 Photobiological class G0	5 year guarantee	3m cabtyre complete with 5A plugtop	
TYPE A2E	REGENT LIGHTING SOLUTIONS Luxon Medical With emergency gear	40W LED	600 x 600mm RECESSED LIGHT FITTING MEDICAL LED 40W PRISMATIC DIFFUSER. Aluminium Housing. PMMA Diffuser. Powder coated. Flicker Free. CCT: 4000K CRI: > 90 UGR: < 19	5 year guarantee	3m cabtyre complete with 5A plugtop	

			COI: < 3.3 Ra: > 90 Photobiological class G0			
TYPE A3	REGENT LIGHTING SOLUTIONS Luxon Prism	36W LED	1200 x 300mm RECESSED LIGHT FITTING BACKLIT LED 36W PRISMATIC DIFFUSER. Seamless aluminium extruded frame. 2.3mm PMMA for better light transmission. Powder coated. Flicker Free CCT: 4000K CRI : > 80	5 year guarantee	3m cabtyre complete with 5A plugtop.	
TYPE A3E	REGENT LIGHTING SOLUTIONS Luxon Prism With emergency gear	36W LED	1200 x 300mm RECESSED LIGHT FITTING BACKLIT LED 36W PRISMATIC DIFFUSER. Seamless aluminium extruded frame. 2.3mm PMMA for better light transmission. Powder coated. Flicker Free CCT: 4000K CRI : > 80	5 year guarantee	3m cabtyre complete with 5A plugtop.	

TYPE B1	REGENT LIGHTING SOLUTIONS Luxon Prism	40W LED	1200 x 600mm RECESSED LIGHT FITTING BACKLIT LED 40W PRISMATIC DIFFUSER. Seamless aluminium extruded frame. 2.3mm PMMA for better light transmission. Powder coated. Flicker Free CCT: 4000K CRI : > 80	5 year guarantee	3m cabtyre complete with 5A plugtop.	
TYPE D1	REGENT LIGHTING SOLUTIONS Mito	28W LED	220mm Diameter RECESSED 28W LED DIFFUSED DOWNLIGHT Aluminium Frame. Polycarbonate diffuser. Powder Coated. CCT: 4000K CRI: > 80		3m cabtyre complete with 5A plugtop.	
TYPE D1E	REGENT LIGHTING SOLUTIONS Mito With emergency gear	28W LED	220mm Diameter RECESSED 28W LED DIFFUSED DOWNLIGHT Aluminium Frame. Polycarbonate diffuser. Powder Coated. CCT: 4000K CRI: > 80		3m cabtyre complete with 5A plugtop.	

TYPE D2	REGENT LIGHTING SOLUTIONS MACO 70	10W LED	70mm Diameter RECESSED 10W LED DIFFUSED DOWNLIGHT 53 deg. BEAM ANGLE Die cast and extruded aluminium. Clear Diffuser. High quality black aluminium reflector cup. Beam 52 degrees. Powder Coated. CCT: 4000K CRI: 90		3m cabtyre complete with 5A plugtop.	
TYPE D2E	REGENT LIGHTING SOLUTIONS Maco 70 With emergency gear	10W LED	70mm Diameter RECESSED 10W LED DIFFUSED DOWNLIGHT 53 deg. BEAM ANGLE Die cast and extruded aluminium. Clear Diffuser. High quality black aluminium reflector cup. Beam 52 degrees. Powder Coated. CCT: 4000K CRI: 90		3m cabtyre complete with 5A plugtop.	

TYPE E1	BEKA SERIES 30 LED	13W LED	BEKA SERIES 30 13W LED SURFACE BULKHEAD LIGHT FITTING Base – High-pressure die-cast marine grade …. aluminium (EN 1706 AC-44300) Diffuser – High impact Acrylic (IK08) Opal non-discolouring high impact acrylic injection molded diffuser. Electrical Safety Class (IEC) Class 1 Surge protection: Yes - 10kV/10kA			
TYPE E1E	BEKA SERIES 30 LED With emergency gear	13W LED	BEKA SERIES 30 13W LED SURFACE BULKHEAD LIGHT FITTING Base – High-pressure die-cast marine grade …. aluminium (EN 1706 AC-44300) Diffuser – High impact Acrylic (IK08) Opal non-discolouring high impact acrylic injection molded diffuser. Electrical Safety			

			Class (IEC) Class 1 Surge protection: Yes - 10kV/10kA			
TYPE G1	REGENT LIGHTING SOLUTIONS Nimbus	33W LED	1278mm REGENT NIMBUS 33W LED MOISTURE PROOF SURFACE LIGHT FITTING ABS base with stainless steel clips, non corrosive. UV Stabilized polycarbonate diffuser. Internal satine acrylic diffuser. IP66. CCT: 4000K CRI: > 80	5 year guarantee		
TYPE G1E	REGENT LIGHTING SOLUTIONS Nimbus With emergency gear	33W LED	1278mm REGENT NIMBUS 33W LED MOISTURE PROOF SURFACE LIGHT FITTING ABS base with stainless steel clips, non corrosive. UV Stabilized polycarbonate diffuser. Internal satine acrylic diffuser. IP66. CCT: 4000K	5 year guarantee		

			CRI: > 80			
TYPE G2	REGENT LIGHTING SOLUTIONS Inani	35W LED	1200mm INANI 35W LED SURFACE LIGHT FITTING PMMA Housing. IP44. CCT: 4000K CRI: > 80			
TYPE G2E	REGENT LIGHTING SOLUTIONS Inani With emergency gear	35W LED	1200mm INANI 35W LED SURFACE LIGHT FITTING PMMA Housing. IP44. CCT: 4000K CRI: > 80			
TYPE G3	REGENT LIGHTING SOLUTIONS Inani	55W LED	1500mm INANI 55W LED SURFACE LIGHT FITTING PMMA Housing. IP44. CCT: 4000K CRI: > 80			

TYPE G3E	REGENT LIGHTING SOLUTIONS Inani With emergency gear	55W LED	1500mm INANI 55W LED SURFACE LIGHT FITTING PMMA Housing. IP44. CCT: 4000K CRI: > 80			
TYPE G4	ZLVP-1500	46W LED	1500mm EXPLOSOPM PROTECTED LINEAR 46W LED IP65 ZONE 2, 21 & 22			
TYPE G5	REGENT LIGHTING SOLUTIONS Lugo	55W LED	1500mm REGENT LUGO 55W SURFACE LIGHT FITTING LM6 die cast aluminium end cap and extruded aluminium body. Polycarbonate. High impact resistant, high durability, heat and electrical resistance and recyclable. CCT: 4000K CRI: > 80			

TYPE 1 POST TOP FITTING	6m GALVANISED STEEL POLE	46W LED	46W BEKA ZELA POST TOP LIGHT FITTING Symetrical light distribution. High impact Acrylic. 10KV Surge Protection. CCT: 4000K IP 66 CRI: > 70			
TYPE 2 & 3 STREET LIGHT FITTING	BEKA LEDLUME 3	143W LED	BEKA LEDLUME 3 143W LED STREET LIGHT Marine grade high-pressure die-cast aluminium. 5428 Optic. Polycarbonate Protector. 10KV Surge Protection. CCT: 4000K IP 66 CRI: > 70			

26.6 Lighting zones

At project completion the contractor is to provide written and diagrammatic confirmation stating how the lighting system has been installed and wired and noting any deviation from the design.

27 LIGHT SWITCHES AND SOCKET OUTLETS

27.1 GENERAL

This section covers the requirements for switches and socket outlets for installation under normal conditions. The light switches and socket outlets shall be as Crabtree Classic range or other approved only.

a) Switches shall comply with SANS 1663 as amended and shall bear the SABS mark.

b) Socket outlets shall comply with SANS 164 as amended and shall bear the SABS mark.

27.2 FLUSH COVER PLATES

Cover plates shall conform to SANS 1663 and SANS 1085 and shall bear the SABS mark.

Cover plates shall be finished in ivory baked enamel unless otherwise specified and shall have bevelled edges which overlap the box in order to mask rough wall finishes.

Cover plates shall not be cut unless specifically authorised by the Engineer.

All boxes and cover plates shall be installed parallel to and in line with relevant horizontal and vertical planes.

27.3 FLUSH AND SURFACE MOUNTED SWITCHES

All light switches shall be installed 1400 mm above finished floor level and 100 mm from the doorframe unless otherwise specified. Mounting heights given shall be measured from the finished floor level to the centre of the switch.

Unless otherwise specified, switches shall be 250 V, 16 A rated and shall be of the tumbler operated microgap type.

All switches shall be suitable for mounting in 100 mm x 50 mm x 50 mm galvanised steel boxes.

Switches controlling different circuits shall be installed in separate switch boxes.

Where more than one switch is required at any one-position multiple-gang units shall be used and installed in a common switch box.

27.4 WATERTIGHT SWITCHES

Watertight switches shall be installed where exposed to the weather or installed in damp areas.

Watertight switches shall be 16 ampere, single pole and suitable for surface mounting unless otherwise specified.

27.5 SOCKET OUTLETS

Switched socket outlets shall be suitable for use with 230 V, 50 Hz systems, switches and socket outlets shall be rated not more than 16A unless otherwise specified.

Flush, switched socket outlets shall consist of a 16A switch and 3-pin plug receptacle with shuttered live and neutral sockets, the earth socket operating the shutters. The unit shall be suitable for mounting in a standard 100 x 100 x 50 mm box.

Normal (Ordinary) switch socket outlets SSO's shall be white and suitable for mounting in 100 x 100 x 50mm boxes or in power skirting/floor trunking/power poles.

These shall be wired with 4mm² PVC conductors and be protected against overload by 20A single pole (SP) circuit breakers and for inadvertent contact by earth leakage protection relays.

Maximum of 8 SSO's per circuit breaker and a maximum of 4 circuit breakers per earth leakage relay shall be installed.

Socket outlets for surface mounting shall consist of units equal to the flush mounted units, but contained in a purpose made pressed steel box, conforming to SANS 164 and SANS 1085 where applicable.

27.6 MOUNTING HEIGHTS

Mounting heights given shall be measured from the finished floor level to the centre of the socket outlet. Unless otherwise specified socket outlets shall be installed at the following heights above finished floor levels:

- Flush mounted in general 350 mm
- Surface mounted in general 1400 mm
- Kitchens, stores and print rooms 1200 mm
- Plantroom & workshops, 1400 mm

27.7 3-PHASE SWITCHED SOCKET OUTLETS

a) The 3-phase outlets shall consist of the 16A, 25A, 40A or 63A type switched socket outlets as specified in the detail specification and shall be of the 5-pin type or equivalent, complete with base and matching insert.

b) The construction shall be such that the plug can only be inserted the correct way and when switched off. (Mechanical interlock)

c) The plug-in opening shall have a spring-loaded cover to prevent accidental contact with live parts.

d) Make of the plug shall be as specified in the detail specification.

e) The outlets shall comply with SANS 1239

Dedicated switch socket outlets shall be red coloured with a flat earth pin and suitable for mounting in power skirting, floor trunking or power poles. These shall be wired with 4mm² PVC conductors and be protected with 20A circuit breakers with slow trip curve no earth leakage protection.

Earthing of SSO's shall be by means of insulated copper conductors.

27.8 LIGHTING SWITCHES

General purpose lighting switches shall be 16 ampere rating as required suitable for mounting in single or multi-gang plates and boxes, complete with cover plates.

27.9 LOCAL ISOLATORS

General-purpose local isolators are to be double or triple pole SABS approved. They shall be surface or flush mounted in metal boxes complete with cover plates.

Isolators shall be rated to the size of the protection feeding the equipment as shown on the relevant single line diagrams.

Welding plugs shall be protected by earth leakage relays and shall be wired by means of 4mm², 4-core "Norsk" cable and a 4mm² earth wire.

28 CONDUITING

The installation shall be in conduit throughout, unless otherwise specified. No open wiring in roof spaces or elsewhere will be permitted.

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 National Standards.

a) Screwed metallic conduit and accessories: SANS 1065 Part 1 and 2.
b) Plain-end metallic conduit and accessories: SANS 1065 Part 1 and 2.
c) Non-metallic conduit: SANS 950

The installation shall be in galvanised steel conduit unless otherwise stated. All conduit shall be concealed in the building work where possible.

Should for some reason it not be possible to conceal conduit in the building work and conduit must be surface-mounted, only galvanized conduit may be used.

The conduit shall be supported and fixed with saddles with a maximum spacing of 1m, even in roof spaces. (Refer to SANS 10142). The contractor shall supply and install ALL ADDITIONAL SUPPORTING TIMBERS REQUIRED.

The conduit shall be clear of moisture and debris before wiring is commenced.

Chasing must be limited to the absolute minimum. No chasing by hammer and chisel will be accepted. Slots for conduits must be cut where necessary.

CONDUIT IN ROOF SPACES

In roof spaces, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,0 m by means of saddles screwed to the roof timbers.

Nails or cramps will not be allowed. Unsightly, poor planned conduit installations will not be accepted and shall be replaced by the contractor at his own expense.

CONDUIT IN CONCRETE SLABS

In order not to delay building operations, the contractor must ensure that all conduits and other electrical equipment, which are to be cast in the concrete columns and slabs, are installed in good time.

The contractor shall have a representative in attendance at all times when the casting of concrete takes place.

Draw boxes, expansion joint boxes and round conduit boxes are to be provided where necessary.

Before any concrete slab is cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

PRESSED STEEL SWITCH BOXES

All switch boxes are to be manufactured from heavy gauge sheet metal and should be galvanized. The boxes are to be fitted with the necessary number of lugs to suit the number of switch units for which the box is intended.

Lugs are to be drilled and tapped at 82 mm centres suitable for fixing either flush switch or standard flush plug units. Fixing screws must be provided.

The dimensions of the single gang boxes are to be approximately 50 mm wide by 50 mm deep by 100 mm long, with one knock-out at each end and at the back and at least two knock-outs in each side.

The dimensions of double gang boxes are to be approximately 50 mm deep by 100 mm long by 100 mm wide, with two knock-outs in each end and at least two knock-outs in the back and in each side.

The boxes must comply with SANS 518 of 1959.

All knock-outs are to be 20 mm in diameter, suitable for 20 mm electrical conduit.

Only steel lock nuts of thick gauge with milled sides shall be used. Cadmium plated bolts and nuts shall be used. Where installation is exposed to the weather brass bolts and nuts shall be used.

Conduits shall be terminated by means of a brass bush and two lock nuts. The conduit end shall only project far enough through the hole to accommodate the bush and lock nut.

Only approved couplings shall be used. All conduit ends shall be reamed and all joints tightly screwed, locknuts shall be provided to ensure a mechanically strong joint and electrical continuity.

All joints shall be treated again to prevent them from rusting in damp areas, coastal areas and where the installation is exposed to the weather for any length of time. Earth continuity shall be maintained throughout the complete installation.

Galvanised steel draw wires shall be installed in all unwired conduits, e.g. spare conduits, telephone, intercom or other installation services.

Pre-fabricated bends or elbows will not be allowed except where specially approved. All bends shall have a radius of at least five times the outside diameter of the conduit. Conduit showing signs of flattening or cracking shall be rejected.

29 WIRING CHANNELS, CABLE TRAYS AND LADDERS

The wiring channels shall be of "O-Line" or "Electroduct" type or approved equivalent. It shall be manufactured of hot dip galvanised rolled steel.

Wiring cable trays and ladders shall comply with SANS 763 with respect of finishes. PVC trays where stated shall be rigid unplasticised.

The Contractor shall supply and install all wiring channels, cable trays and/or ladders as specified or as required including the necessary supports, clamps, hangers, fixing materials, bends angles, junctions, reducers, T-pieces etc. He shall further liaise with the Main Contractor for the provision of holes and access. All wiring channels, cable trays or ladders shall be properly earthed.

SUPPORTS

Trays and ladders shall be supported at the following maximum intervals:

a)	1,6 mm thick metal trays with 12 mm return	-	1m spacing
b)	Metal trays with folded over return and 50 mm upstand	-	1,22m spacing
c)	2,4mm thick metal trays, and 75mm return	-	1,5m spacing
d)	Metal cable ladders	-	1,5m spacing
e)	3,0 mm thick PVC trays with 40 mm return	-	1,0m spacing
f)	4,0 mm thick PVC trays with 60 mm return	-	1,5m spacing

In addition trays and ladders shall be supported at each bend, offset and T-Junction. The above spacing of supports is applicable to both vertical and horizontal installation of trays and ladders.

WIRING TRAYS

JOINTS

All joints shall be aligned and secured by means of standard connection pieces that are pop-riveted to both adjoining sections. Adjoining sections shall butt tightly. Covers shall fit tightly across the joint. All joints/terminations shall be made electrically continuous.

EXPANSION JOINTS

Where channels cross expansion joints suitable expansion joints shall be provided in the channels by means of fish plates pop-riveted to the channel on one side of the expansion joint and floating freely in the channel on the other side of the expansion joint. Such expansion joints shall be made electrically continuous by installing a coiled conductor of suitable size across the joint.

SUPPORT FOR CONDUCTORS

All conductors in inverted cable channels shall be retained by means of standard clips or spacer bars at approximately 1m centres.

FINISHES

Burrs and sharp edges shall be removed and the inside edges of all joints shall be lined with rubber protective lining or other suitable rubberised or plastic compound to prevent laceration of the conductor insulation.

All holes through, which conductors pass shall be fitted with grommets.

VERMIN PROOFING

All wireways shall be made vermin proof. Holes shall be covered by means of screwed metal plugs or by means of metal strips that are pop-riveted to the channel.

CABLE TRAYS AND LADDERS

JOINTS

Joints shall be made smooth without rough edges etc., that may damage the cable. Joints shall as far as possible be arranged to occur at supports. Where joints do not coincide with supports, joints shall be made by means of wrap-around pieces of the same thickness of the tray and at least 200mm long. The two cable tray ends shall butt tightly in the centre of the splice, the splice shall be bolted to each cable tray by means of at least 4 round head bolts, nuts and washers on each side of the joint. Splices with the same finish as the tray shall be provided at joints which do coincide with supports.

EXPANSION JOINTS

Where cable trays or ladders cross expansion joints, the trays or ladders must form a gap of at least 25 mm between the two sections. Cables installed across expansion joints, must have enough slack to accommodate the expansion of the building.

EARTHING

Bare copper conductors or straps of sufficient length to accommodate expansion and contraction shall be installed across all expansion joints, also to joints where continuity cannot be guaranteed. These additional conductors shall always be installed in outdoor conditions or coastal regions.

FIXING

Trays and cable ladders shall be bolted to supports by at least two bolts per support.

It is the responsibility of the Contractor to ensure that adequate fixing is provided and the manufacturer's instructions shall be strictly adhered to. Intervals between brackets above 1,5m shall not be acceptable. Cable trays and ladders that work loose shall be rectified at his own expense.

The fixing shall take into account conditions on site during installation.

COVER PLATES

Where possible the suppliers' standard metal or PVC cover plates shall be used. All cover plates shall be neatly and securely fitted.

Steel cover plate finishes shall be the same as for the channels.

WIRING CHANNEL CAPACITIES

The overall cross sectional areas of all conductors, including insulation, shall not exceed 45% of the total internal cross sectional area of the trunking whilst in the case of ducting, this figure shall be 40%.

FIXING OF CHANNELS

The Contractor shall supply and install all hangers, supports or fixings as required for the channels. Channels shall be supported at maximum intervals of 1,5m or as otherwise specified. Channel runs shall be carefully planned to avoid clashes with other services and to ensure that all covers can be removed after completion of the entire installation. Standard clamps, hangers etc. shall be used as required. Where it is not possible to support the channels at the specified intervals, they shall be supported in a sound manner to the satisfaction of the Engineer.

INSTALLATION IN CONCRETE

Channels shall be filled with suitable fillers to prevent the ingress of cement and shall be securely fixed in position to the shuttering.

ACCESSORIES

All accessories i.e. hangers, cover brackets, etc. shall be standard items and in general have the same finish as the channels. Purpose made accessories shall not be acceptable.

30 TRUNKING WIRE WAYS

This section describes the following types of wiring trunking:-

- Standard wiring trunking
- Lighting channel
- Power skirting, dado and bench-top trunking
- Under floor trunking

30.1 Standard Wiring Trunking

a) Wiring trunking and accessories shall be fabricated from folded or cold-rolled sheet steel. All bends, tees, stop-ends etc., shall be supplied by the trunking manufacturer. No accessory shall be made up where a manufactured accessory is available.

b) Any made up accessories shall be neatly fabricated and shall be brazed or strongly pop-riveted at joining edges.

c) Accessories and sections of trunking shall be coupled with coupling pieces and earth bonded together with copper bonding links. In addition, the links shall be bonded to the trunking main earth or largest circuit earth wire with a jumper of at least 2,5mm².

d) The maximum number of circuit and earth wires that may be installed into any trunking shall be such that the total overall cross-sectional area of the wiring including the insulation does not exceed 45% of the free area of the trunking.

e) With the exception of under floor trunking and loosely filled “opening-up” trunking, wiring retainers shall be installed every meter of run and at other positions as required.

f) The trunking shall be installed in a neat and workmanlike manner on ceilings, walls, plant machinery etc., as indicated in the drawings.

g) All standard trunking used in industrial applications shall be finished in the colour code appropriate to the service.

h) Where channel passes through a “fire-wall” the channel lid shall be cut 100mm either side of the penetration and the wall entry around the channel shall be sealed by the building contractor. The Contractor shall supply and install suitable fire-barriers inside the channel. These shall consist of intumescent or other approved fire resistant material, as supplied by PH Protection

Plaster Systems (Pty) Ltd of Johannesburg, Pyro-Cote cc of Durban, or equal and approved and installed in accordance with the supplier's recommendations.

30.2 Lighting Channel

General

a) Lighting channel and accessories shall be "Cabstrut" or equal and approved, and shall be manufactured from cold-rolled steel sheet and galvanized.

b) Unless otherwise required the dimensions of the channel shall be 76mm x 76mm.

c) Lighting fittings or pendant drop conduits shall be fixed directly to "opening-down" channel using special connecting nipples as supplied by the channel manufacturer. Alternatively, fittings may be fixed to the solid underside of channel installed "opening-up" using bushed entries and screws, nuts and washers. Self tapping screws shall not be used.

d) Conduit connections to wiring channels shall be terminated directly into the channel using a screwed and bushed entry. Alternatively, where channels are fixed surface directly to a soffit, entry may be effected from a flush conduit box through a bushed hole in the back of the channel.

Surface Installations

a) Self supporting lighting channel shall be manufactured from cold-rolled steel of thickness at least 2,5mm, and shall be fixed in such a manner that the maximum deflection recommended by the channel manufacturer is not exceeded with all wiring and fittings installed.

b) Fixings shall be by stirrups supported from structural members via threaded steel rod of at least 10mm diameter, or 20mm diameter conduit. Alternative or additional supports shall be affected by girder clamps etc. Cartridge pin fixings shall not be permitted without the prior written approval of the Engineer.

c) Where required, channel installed directly to a soffit shall be fixed at intervals not exceeding 1m subject to a minimum of two substantial fixings to every accessory or section of channel. Channel fixed in this fashion may be not less than 1,6mm thick.

d) Clip-in lidding of plastic or of zinc-coated metal, as specified, shall be installed over all faces of the channel left open after the installation of fittings etc.

Flush Installation

a) Lighting channel installed flush, either in, or forming an integral part of, a suspended ceiling, shall be manufactured from minimum cold-rolled or folded sheet steel of thickness not less than 1,6mm.

b) Where the channel is cast into concrete, fastening straps shall be provided every 600mm as supplied by the manufacturer of the channel. The channel shall be firmly fixed to the shuttering by galvanized steel wire lashing or by screws fixed through the concrete insert lugs. The channel shall be suitably sealed against the ingress of vibrated concrete by the use of dampened paper or expanded polystyrene inserts.

c) Where the ceiling finish is “off-shutter”, narrow clip-in plastic or metal lid shall be used. This shall be grey for non-painted ceilings and white for painted ceilings. Wire lashings may not be used for fixing channels to shuttering in “off-shutter” areas.

d) Where plaster finish is to be applied, the plaster shall be taken up to the edges of the channel. Overlapping metal lidding finished white shall be used, fixed over the opening by means of special extension screws into fixing nuts installed in the channel.

e) For suspended-ceiling lighting channels, the channels will be supplied and installed by the ceiling erector, unless otherwise specified.

White plastic clip-in lidding shall be used for all suspended-ceiling lighting channel. The Contractor shall supply and fit the lidding unless otherwise specified.

f) In the case of mullion partitioning the mullion may be utilized as a wiring channel where specified. For other types of partitioning, conduit switch-drops shall be used. Any entry into the lighting channel shall be suitably bushed to obviate abrasion of wiring.

30.3 Power Skirting and Dado Height Trunking

General

a) Power skirting and dado height trunking shall, unless otherwise specified, be formed from folded and welded pre-galvanized sheet steel of thickness not less than 1,2mm, to form two or three equal compartments designed for power services, socket outlets etc., (upper compartment) and communications/data services (lower compartment(s)). The power skirting shall be finished in baked enamel of colour(s) as stated in the Detailed Specification. The paintwork shall be in accordance with 12.4.1 (h) with due account being taken of the pre-galvanizing. The trunking shall be 150-225mm high x 50-55mm deep with fixed partitions to divide it into two or three compartments. The compartments shall each be provided with separate removable covers.

b) Where a building module is applicable, the power compartment shall have provision for 16 A switched socket outlets at the module interval, or where the module interval exceeds 2m, twice every module interval. Socket outlet positions shall be centered between the window mullion or column modules. At the mullion or column position, a permanently fixed 250mm wide cover shall be provided across all compartments to permit the erection of partitions etc., without interfering with accessibility into the power skirting.

c) Socket outlets shall be 16 A 3-pin and shall be attached to a fixing grid or mounting bracket in the trunking body. The cover shall be pre-punched to accept the socket outlet and shall be fixed both to the trunking body and socket outlet fixing grid. Wiring terminals shall be of the recessed type, or alternatively fitted with an insulated cover, to prevent accidental contact with bare earth wiring that may be installed or disturbed while adjacent circuits are alive.

d) Where the trunking is a non-modular type, the punched socket outlet cover shall normally be 250mm long. Where it is of the modular type, the power section cover between the over-lapping covers shall be in one piece. Irrespective of whether socket outlets are indicated or not, full facilities including blanked off pre-punched covers shall be provided at the spacing’s specified herein.

Unless otherwise required, provisions for telephone and data outlets shall comprise a blank plate, or plates, mounted in line with socket outlets.

Installation

a) Power skirting shall, unless otherwise required, be installed surface against the wall at finished floor level. Where vinyl tiles or other fixed finish is to be laid, the power skirting shall be laid on top of the tiles. Where carpeting is specified, the power skirting shall be installed onto the screed before the installation of carpets.

b) Dado trunking shall be installed surface on the wall at 900mm above finished floor level (to underside), or as otherwise specified.

c) Fixings, suitable for the particular application, shall be provided at intervals not exceeding 1m. subject to a minimum of two substantial fixings to each accessory or section of trunking.

d) Conduit entry into power skirting installed along brick or concrete walling shall be effected via a bushed entry from a conduit box or standard 100mm x 50mm switch box mounted in the wall behind the respective compartment.

e) Conduit entry into power skirting installed along sheet metal curtain walling or similar shall be effected via a bushed entry from a conduit box, or similar, mounted in the floor under the power skirting. Wiring to the upper compartment(s) shall pass through a short conduit link within the lower communication(s) compartment(s). The conduit links shall be installed towards the back of the lower compartment(s) to afford adequate space for wiring to pass.

f) The trunking main earth wire immediately adjacent to the socket outlet positions including the socket outlet earth jumper, shall be suitably sleeved at the tee-off to prevent accidental contact with live terminals.

g) All covers shall be adequately bonded to earth either through the fixing screws or a separate earth wire jumper fixed to an earthing stud brazed, at the manufacturer's works, to the lid. Where necessary, power skirting covers shall be specially ordered to include earthing studs.

30.4 Bench-Top Trunking

a) Where called for, bench-top socket outlet trunking shall be installed along bench tops etc in workshops and laboratories. The general construction, socket outlet mounting and installation procedure shall be similar to power skirting or dado trunking. However, SSOs in single compartment trunking shall have the socket outlet portion rotated through 45º or 90º to allow clearance for plug-top flex. Details of compartments, size etc, and shall be as detailed in the drawings or specified in the Detailed Specification.

30.5 Under floor Trunking

General

a) Several types of under floor trunking are available and in the main, the choice depends upon certain structural restraints as floor type, screed thickness etc. Therefore the exact type to be used will be specified in the Detailed Specification or drawings.

b) Unless otherwise specified, the trunking shall be manufactured from pre-galvanized folded sheet steel and shall be single, double or triple compartment as specified.

c) Pre-formed outlets, suitably blanked off, shall be provided at intervals to suit the particular application.

d) Flush floor level junction boxes shall have a removable trafficable cover and shall be designed to accept a portion of the floor tile, carpet or similar. The Contractor must liaise with the Main Contractor to determine the thickness of the floor finish.

e) Multi-channel junction boxes shall be so designed that the compartmentalization is continued through these accessories.

f) Socket outlets, telephone outlets and data outlets shall be provided where required in surface floor level pedestals or recessed floor boxes as specified. Suitable barriers shall be included to segregate different classes of services.

Installation

a) Trunking designed to be fully built into the screed shall be fixed to the slab surface by suitable straps or clips. A topping of at least 50mm of screed cover the trunking shall be applied. Where a cover of less than 50mm, but exceeding 25mm occurs, expanded metal shall be applied over the trunking to act as a screed binder. Where less than 25mm of screed topping occurs, the trunking shall be installed into the concrete slab to achieve at least the minimum cover. The written permission of the Engineer shall be obtained in each case.

b) Trunking designed to be set flush with the screed surface shall be installed straight and level on a mortar bedding on the slab. The trunking shall be slightly dove-tailed in section or shall have other suitable means to ensure that the trunking will remain firmly fixed into the screed. The Contractor shall obtain the screed finish datum line from the building contractor for leveling trunking and junction boxes.

31 WIRING

Except where otherwise specified all wiring shall be carried out with PVC insulated, stranded copper conductors and bare stranded copper earth wires, complying with SANS 1507 and the installation shall comply with SANS 10142-1 as amended.

All wiring shall be installed in conduit, trunking or ducting as specified. Open wiring will not be accepted.

The wiring of any circuit shall only be carried out after the whole of the conduit installation for that particular circuit has been installed and fixed in position. No wires shall be drawn through before the conduit has been thoroughly cleaned of all debris and moisture and that the building work is at a stage that there is no likelihood of the ingress of dirt and moisture.

It should also be possible for wires to be drawn through the completed conduit installation without any undue strain.

Wires drawn into conduits etc., shall be of sufficient length to allow the connection of fittings, appliances, etc.

As a minimum, light circuits shall be wired with 2,5mm^2 and plug circuits with 4 mm^2 conductors, except as otherwise specified.

Wiring shall be sized to carry the load of the circuit as shown plus an allowance of 10% for future connections and in accordance with the overall voltage drop requirements of the Wiring Regulations. The same allowance shall be made when determining the wiring capacity of each conduit run. Attention is drawn to the application of grouping factors to the rating of wires in conduit and trunking.

All conductors shall be colour coded to facilitate identification of the circuit and switch wiring, black for neutral conductors only and green for insulated earth conductors. Three phase circuits shall be colour coded to identify phases.

All wiring shall be carried out by means of the loop-in system. Jointing of conductors shall not be permitted.

Where conductors of more than one circuit are installed in wireways, the conductors of each circuit shall be PVC taped together at intervals of one metre. Appropriate circuit grouping factors must be applied to prevent overheating. A common, unbroken suitable sized earth conductor may be installed into the wireways and crimped ferrule connections shall be used for subsidiary earth conductors to the various outlets.

With the exception of three phase outlets, circuits of different phases shall not be drawn into the same switch or outlet boxes.

In order to support the mass of the conductors installed in vertical wireways these conductors shall be secured at intervals not exceeding 5m by means of suitable clamps.

The end strands of all wires, whether single or looped, to be connected to the connection terminals of light fittings or any equipment are to be tightly twisted together. There shall be no cutting away of wire strands.

Protective edge strips shall be provided to avoid damage to conductor insulation when drawn into wiring trunking etc. The Engineer shall reject any conductor with such damage. These conductors shall then be replaced at the contractor’s own expense.

32 EARTHING OF GENERAL ELECTRICAL INSTALLATIONS

The total earthing system of any electrical installation shall be in accordance with SANS 10142. Earth conductors shall be stranded copper, with or without green PVC insulation and in accordance with SABS 1507.

Sizes of earth conductors shall be in accordance with the requirements as set out in SANS 10142.

32.1 COMMON EARTH

Common earth conductors may be used where various circuits are installed in the same wiring channel. In such cases the sizes of earth conductors shall be as specified in the SANS 10142. Earth conductors for individual circuits branching from the ring main shall be

connected to the common earth conductor with T-ferrules or soldered. The common earth shall not be broken.

NON-METALLIC CONDUIT

When non-metallic conduit is used, stranded copper earth conductors shall be installed in all conduits and shall be securely connected to all metal appliances and equipment.

SUB-DISTRIBUTION BOARDS

A separate bare stranded earth conductor shall be provided from the earth bar in each sub-distribution board to the earth busbar in the Main M.V. distribution board. These conductors shall be installed along the same routes or in the same conduit as the supply conductors/cables. If cables are used, the earth conductor shall be strapped to the cable at regular intervals, not exceeding 1,5m.

WATER PIPES

Cold water mains shall be connected with solid 12mm x 1,6mm copper strap to the earth busbar in the Main Distribution Board. All other hot and cold water pipes shall be connected with 12mm x 0,8mm perforated or solid copper strap (not conductors) to the nearest distribution board. The strap shall be fixed to the pipework with brass nuts and bolts and against walls with brass screws at 150mm centres.

In all cases where water pipes are positioned within 1,6m of distribution boards an earth connection consisting of copper strapping shall be installed between the pipework and the board. In vertical building ducts accommodating both water pipes and electrical cables, all the pipes shall be earthed at each distribution board.

ROOFS

Steel roofs, gutters and structures shall be earthed by means of 12mm x 0,8mm copper strapping (not conductors) fixed with galvanised bolts and nuts. Self-tapping screws will not be accepted. A bare 10mm2 copper conductor shall be installed over the full length of the ceiling void fixed to the top purlin and connected to the main earth bar of each distribution board. The roof and gutters shall be connected at 15m intervals to this conductor by means of a 12 x 0,8mm copper strap.

33 LIGHTNING PROTECTION

This item covers the supply, delivery and installation of a complete lightning conductor system and shall comply in all aspects with the requirements set in the SANS IEC61024-1-2 : Protection of structure against lightning Part 1-2 : General Principles – Guide B – Design, installation, maintenance and inspection, maintenance and inspection of lightning protection systems and SANS 10313.

IT IS A SPECIFIC REQUIREMENT OF THIS CONTRACT THAT THIS PART OF THE INSTALLATION SHALL BE DONE BY SPECIALISTS WHO ARE CONVERSANT WITH THIS TYPE OF WORK.

GENERAL

The terms Contract, Works, Works or Installation shall mean the contract works as specified in this contract.

The Contractor shall carry out the complete contract works as indicated in and in accordance with the specification and bill of quantities and shall provide and install all items necessary for the proper functioning of the installation, even though such items may not specifically be referred to in the specification and bill of quantities.

The terminology in this section have the same meaning as in SABS IEC 61024-1-2 : 1998.

All materials and equipment used in the installation shall be of recent design and manufacture and of the best quality available and shall, wherever possible, carry the latest mark of the South African Bureau of Standards.

The Contractor shall submit workshop drawings to the Engineer prior to any works being completed.

The Contractor shall make allowance for all scaffolding which he may require for the execution of his work.

DRAWINGS

CONTRACT DRAWINGS

The drawings accompanying this specification are as stipulated in part hereof. The working drawings of the Building Contract shall, however, consist of:

- The electrical drawings
- The Architect’s drawings
- The Structural Engineer’s drawings, as applicable
- The Engineer’s drawings of other disciplines, as applicable
- The drawings of other service installations that are relevant for co-ordination and installation purposes.
- The installation drawings of other sub-contractors, where applicable.

All drawings and layouts shall be regarded as diagrammatic and all positions and dimensions shown on drawings shall be verified on site. The Contractor before starting any section of the work is to check for any discrepancy between the drawings as issued by the Engineer and those issued by Architect. The matter shall be referred to the Engineer for clarification. No extra will be allowed for alterations or making good resulting from lack of verification.

SHOP DRAWINGS

A complete set of all shop drawings shall be submitted to the Engineer for permission to proceed and to demonstrate compliance with the contract specification.

These drawings shall indicate the complete design of the proposed installation, including the method and materials employed in effecting earth terminations, down conductor systems, air terminations, etc.

Permission to proceed with the shop drawings by the Engineer does not relieve the Contractor of his responsibility for compliance with the specification, nor does it relieve him of his responsibility for errors or omissions in shop drawings.

SITE SURVEY

The Tenderer shall survey the premises prior to submitting his tender to establish, in particular, the position of existing services the soil resistivity and, in general, any other prevailing conditions so as to include in his tender for the entire installation.

TESTS AND INSPECTIONS

The Contractor shall arrange for all necessary installation tests and inspections required.

The Contractor shall attend on the Engineer during all site/equipment inspections and tests and shall advise the Engineer in good time of the proposed completion of works in order that these may be inspected prior to installation. All tests and inspections by the Engineer shall be to his satisfaction.

A permanent testing point shall be provided between each down conductor and its associated earth conductor, consisting of a recessed 100 x 100mm conduit box and coverplate engraved “Lightning Protection Test Point”.

The following test records shall be submitted to the Engineer:

- Earth resistance at each test point, duly recorded on as-built drawings.
- Continuity of each trench.
- Earth resistance of main substation earth bar and clean earth bar also recorded on as-built drawings.
- Final test certificate.

COMPONENTS

CONDUCTORS

Where conductors are required, they shall comply with the requirements as prescribed herein after.

The conductors shall consist of 70mm² PVC insulated copper stranded conductors from the earth electrode to the test link and shall be protected from subterranean level to the test link.

The test link shall be connected to abovementioned conductor in a suitable surface-mounted fibre cement box with a coverplate above ground level.

EARTHING ELECTRODES

Earthing electrodes shall be of the expandable vertical 16mm diameter copper bar type consisting of copper (for soft ground only) or copper covered steel or phosphor bronze. Where use is made of the copper covered steel bars the two metals shall be provided with an interlocking crystal connection between the metals in order to prevent moisture penetration. Where it is necessary to connect two metals together, a non-ferriferous, corrosion proof connecting piece shall be used to prevent moisture penetration in the joint.

Earthing electrodes shall be installed in positions as indicated on the drawings and shall be at least 1200mm long.

All trenching, drilling, blasting and backfilling, etc. will be by the Contractor. Due care shall be taken to ensure that no clashes occur in respect of other external services. Should the Tenderer wish to exclude this item for any reason, this shall be specifically stated in his Tender, including the exact extent of works to be effected by others. The Contractor shall still be responsible for the co-ordination in respect of other external services.

The Contractor shall allow for the painting of all air termination conductors fixed to the roof the applicable colour to match the respective roof finish.

ALTERNATIVE CONDUCTOR MATERIAL

Although this document in various places refers to aluminium or alloy conductors, the tenderer is at liberty to use alternative conductor material however, in all cases the cross-sectional area of the alternative conductors shall not be smaller than the specified values. Also the prescriptions regarding connections to non-similar material shall be adjusted accordingly.

AIR TERMINATIONS

Air Terminations and connections between air terminations shall generally consist of Aluminium Alloy Straps 20 x 3mm, or 8mm dia. Aluminium Alloy rods, supported by Aluminium Alloy or other approved holding down brackets secured onto the structure by means of stainless steel screws at intervals of lengths not exceeding 1,5m.

Note:

The requirements of the Code regarding insulation between Aluminium conductors and concrete surfaces must be strictly adhere to.

Adequate provision must be made for expansion of the air termination conductors to the satisfaction of the Engineer/Representative.

DOWN CONDUCTORS

The minimum cross-sectional area of down conductors shall not be less than 50mm² and the diameter of circular sections conductors not less than 9,5mm. Down pipes shall not be used as down conductors.

EARTH TERMINATION

Earth termination in the form of extensible driven vertical rods shall be of copper (for sort ground only), copper clad steel of phosphor bronze having a nominal diameter of 16mm.

Copper clad steel rods shall have a molecular bond between the two metals to prevent moisture ingress. Where it is necessary to join earth rods together, a non-ferrous corrosion resistant coupling device should be used which prevents ingress of moisture into the joint.

JOINTS

Where it is necessary to join lengths of circular section conductor, as suitable ferrule should be used which is crimped securely into position. In the case of flat conductor the joint should be made by either double riveting using aluminium rivets, two stainless steel bolts and nuts, or other approved method. Each joint made using dissimilar metals should be thoroughly cleaned before assembly and subsequently rendered watertight by painting or covering an inert tenacious material.

BONDS

Where it is necessary to bond the aluminium conductor to any other metallic surface, this should be done by bolting or riveting. Care should be taken to prevent electrolytic corrosion in that the joints should be thoroughly cleaned and subsequently sealed as described in joints.

CONDUCTOR HOLDING DOWN BRACKETS

The conductor should be mounted in aluminium alloy guides conforming with the material specification which allows free longitudinal movement of the conductor to cater for expansion and contraction of the system due to temperature variation. The guides should be attached to the structure by screwing and plugging using two screws manufactured from stainless steel.

34 IT/NETWORK SYSTEM

This item covers the design, supply, delivery and installation of a complete IT/Network system and shall comply in all aspects with the requirements of the client and applicable SANS and ICASA regulations.

IT IS A SPECIFIC REQUIREMENT OF THIS CONTRACT THAT THIS PART OF THE INSTALLATION SHALL BE DONE BY SPECIALISTS WHO ARE CONVERSANT WITH THIS TYPE OF WORK.

GENERAL

A provisional sum has been allowed in the bill of quantities and the contractor is required to after consultation process between the professional team and client's IT department to confirm the scope of works, to provide 3 (three) quotations from reputable specialists sub-contractors with a proven track record for similar such installations. The client reserves the right to reject any quotation.

35 TELEPHONE SYSTEM

This item covers the design, supply, delivery and installation of a complete Telephone system and shall comply in all aspects with the requirements of the client and applicable SANS and ICASA regulations.

IT IS A SPECIFIC REQUIREMENT OF THIS CONTRACT THAT THIS PART OF THE INSTALLATION SHALL BE DONE BY SPECIALISTS WHO ARE CONVERSANT WITH THIS TYPE OF WORK.

GENERAL

A provisional sum has been allowed in the bill of quantities and the contractor is required to after consultation process between the professional team and client's IT department to confirm the scope of works, to provide 3 (three) quotations from reputable specialists sub-contractors with a proven track record for similar such installations. The client reserves the right to reject any quotation.

36 CCTV/ACCESS CONTROL

This item covers the design, supply, delivery and installation of a complete CCTV/Access control system and shall comply in all aspects with the requirements of the client and applicable SANS and ICASA regulations.

IT IS A SPECIFIC REQUIREMENT OF THIS CONTRACT THAT THIS PART OF THE INSTALLATION SHALL BE DONE BY SPECIALISTS WHO ARE CONVERSANT WITH THIS TYPE OF WORK.

GENERAL

A provisional sum has been allowed in the bill of quantities and the contractor is required to after consultation process between the professional team and client's Security department to confirm the scope of works, to provide 3 (three) quotations from reputable specialists sub-contractors with a proven track record for similar such installations. The client reserves the right to reject any quotation.

37 FIRE DETECTION SYSTEM

This item covers the design, supply, delivery and installation of a complete fire detection system and shall comply in all aspects with the requirements of the SANS 10139: Fire detection and alarm systems for buildings — System design, installation and servicing latest revision.

IT IS A SPECIFIC REQUIREMENT OF THIS CONTRACT THAT THIS PART OF THE INSTALLATION SHALL BE DONE BY SPECIALISTS WHO ARE CONVERSANT WITH THIS TYPE OF WORK.

GENERAL

The contractor is required to consult with the professional team and client in this regard.

38 VOICE EVACUATION SYSTEM

This item covers the design, supply, delivery and installation of a complete fire detection system and shall comply in all aspects with the requirements of the SANS 10139: Fire detection and alarm systems for buildings — System design, installation and servicing latest revision.

IT IS A SPECIFIC REQUIREMENT OF THIS CONTRACT THAT THIS PART OF THE INSTALLATION SHALL BE DONE BY SPECIALISTS WHO ARE CONVERSANT WITH THIS TYPE OF WORK.

GENERAL

The system shall be compatible with the existing campus's system and be integrated with the main system. The contractor is required to consult with the professional team and client's Security department in this regard.

39 STANDBY GENERATING SET

1 GENERATING SET

The scope of works for standby generating set covers the design, manufacture, assembly, supply, delivery, off-loading, storage, installation, commissioning, testing, handing over in first class working order and maintenance and materials for the diesel generating set as required and shall include all required ancillary equipment necessary and associated works to comply with the requirements.

This installation consists of the following:

a) The plant generally shall comprise unless otherwise stated, of a 1 x 88kVA diesel engine coupled to an alternator mounted on a common base housing a 8-hour fuel tank, a set of starting batteries, automatic charging unit, interconnecting cables, a control panel housing the generator M.C.C.B. and all necessary switchgear, including the changeover equipment and "on load" bypass switch and a AMF generator automatic mains failure controller.

b) The contractor shall provide a minimum 150mm thick reinforced concrete base on which the generating set will be located.

c) Minor external electrical work to bring the proposed generating sets into operational working order.

d) First filling of diesel fuel for the generator under this contract.

i) Testing & commissioning of the complete electrical installation and issuing of a certificate of compliance.

The Tenderer's attention is drawn to the fact that he must include in his tender price for all equipment, material, labour and additional costs. In order to carry out the installation in its entirety and to complete it in accordance with the Specification and applicable drawings and to the satisfaction of the Engineer.

Plant housing

The set shall be of the free standing type, suitable for installation outside. The canopy shall be manufactured from 1.6 mm galvanised sheet. Lockable hinged doors (heavy duty hinges are required) and louvres to suit, shall be supplied. This canopy must fit onto the sets base and shall be painted with an etching primer then finished with two coats of "twin pack" **STONE GREY** paint. The canopy shall be sound proofed and capable of providing 30 to 40 decibels of suppression where required.

The plinths / slabs for the generator sets forms part of this contract and the positions will be confirmed on site.

Plant duties

The diesel generating plant and its ancillary equipment shall normally operate as an automatic mains failure unit. It shall be capable of delivering its full rated output at any time and any ambient conditions likely to occur at the site. The generating set will not be required to be synchronized with the main supply.

System

The system to which the plant is to be connected is 3 phase, 4 wire, 400 volt between phases and 230 volt between phase and neutral, with a frequency of 50 Hz.

Rating

The rating of the diesel generating set shall be based on operation of the set when equipped with all necessary accessories such as radiator fan, air cleaners, lubricating oil pump, fuel transfer pump, fuel injection pump, water circulating pump, and battery charging alternator.

The generator set shall be capable of delivering the specified output continuously under the site conditions without overheating. The engine shall be capable of delivering an output of 110% of the specified output for one hour in any period of 12 hours consecutive running in accordance with BS5514.

1.1 DIESEL ENGINE

1.1.1 Type

The engine shall be of the multi cylinder, four stroke cycle, cold starting, direct injection, compression ignition type, suitable for operation on diesel fuel.

1.1.2 Cooling System

The engine shall be of the water cooled type and the cooling system shall be of sufficient capacity to cool the engine when the set is delivering its full rated load in the ambient conditions specified in the geographical data clause.

The engine shall be equipped with a heavy duty type radiator complete with engine driven fan and centrifugal water circulating pump and a thermostat to maintain the engine at the makers recommended temperature level.

A thermostatically controlled immersion heater shall be provided and fitted in the engine cooling circuit to ensure easy starting of the engine at any ambient temperature.

The heater shall be so fitted that it can easily be withdrawn without having to drain the system.

The heater shall be suitable for a 220 volt 50 Hz supply.

1.1.3 Speed

The engine speed shall not exceed 1 500 R.P.M. at normal full load conditions.

1.1.4 Fuel

The engine shall be capable of satisfactory performance on a commercial grade of distilled petroleum fuel oil such as No. 2 fuel oil. (Commercial grade diesel fuel 500ppm sulphur content).

1.1.5 Rating

The engine shall be suitable for continuous running at the specified speed, delivering its rated output at the specified site conditions.

In addition the engine shall be capable of delivering 110 % load for one hour, after the set has been running at full load for a period of six hours and shall, after the overload period of one hour be capable

of maintaining the rated output continuously without any undue mechanical strain, overheating, incomplete fuel combustion or other ill effects.

The engine shall have sufficient capacity to start up and shall within 15 seconds from mains failure, supply the full rated load at the specified voltages and frequency.

1.1.6 Governor

The engine shall be controlled by a governor to maintain governed speed for 50 Hz operation.

Class A1 governing in accordance with B.S. 5514 as amended is required.

1.1.7 Fuel System

The day tank shall be fitted with a suitable filter, gauge, removable inspection cover, drain, filler cap, low level and extra low shutdown alarm sensors. These shall supply an audible and visible signal on the control panel. A hand operated “wing pump” with a suitable length of oil resistant hose of the “push lock” type shall be supplied to fill the day tank from 200 litre drums.

Interconnecting supply and return pipes between the day tank and farm tank shall be copper and an isolating valve must be installed in the supply line. These pipes shall be suitably installed and protected.

1.1.8 Lubricating

The engine shall be provided with a forced feed lubricating system with a gear type lubricated oil pump for supplying oil under pressure to the main bearings, crank pin bearings, pistons, piston pins, timing gears, camshaft bearings, valve rocker mechanism and all other moving parts.

Full flow replaceable element type oil filters, conveniently located for servicing, shall be provided. Filters shall be provided with a spring loaded by-pass valve to ensure circulation if the filters become clogged.

1.1.9 Cylinder Liners

The engine shall be provided with removable wet or dry type cylinder liners of close grained alloy iron.

1.1.10 Air Cleaners

The engine shall be provided with one or more dry type air cleaners which shall provide positive air filtration.

1.1.11 Exhaust System

The engine shall be fitted with an efficient stainless steel exhaust system. Flexible bellows shall be fitted between the exhaust outlet and the silencer. The flexible piping must on no account be used to form a bend or compensate for misalignment. The super residential silencer shall be located on the canopy roof and shall be of the highly efficient type suitable for use in residential areas and shall be capable of providing 30 to 40 decibels of suppression.

The silencer and discharge piping shall be suitably supported. Internal (inside the canopy) exhaust pipe shall be suitably lagged then clad in polished stainless steel sheet.

1.1.12 Flywheel

The flywheel shall be designed to limit the cyclic irregularities to within the limits laid down in B.S.5514 as amended.

1.1.13 Engine Starting

The engine shall be equipped with a 12 volt starting system of sufficient capacity to crank the engine at a speed, which will allow starting of the engine.

The starting equipment shall include a 12 volt D.C. starter motor engaging directly on the flywheel ring gear. A heavy duty battery charging alternator and maintenance free batteries of the Delco type shall be supplied. The batteries shall be mounted in a battery box.

The batteries shall be connected to the engine with suitably rated P.V.C. insulated flexible leads.

The batteries shall have sufficient capacity to provide three automatic attempts to start immediately followed by three manual attempts without any appreciable drop in voltage. The automatic attempts to start shall each be of not less than 10 seconds duration with 10 second intervals between and the manual attempts shall be based on the same cranking period.

A device shall be provided to limit the cranking time of each automatic attempt to start, to the 10 seconds specified above and to provide three automatic attempts after which the automatic starting mechanism will cut out until manually reset and at the same time sound an audible alarm and illuminate the L.E.D. on the AMF controller. The engine driven battery charging alternator shall have sufficient capacity to recharge the batteries back to normal starting requirements in not more than six hours.

A battery charging unit of the trickle charge type shall be provided to maintain the batteries at full capacity. The charging equipment shall be connected so that the battery is normally charged from the mains, but is also charged under mains failure conditions from the diesel generating plant and if required via an inhibitor relay to prevent dual charging. The unit shall be complete with voltmeter, push button test, D.C. and A.C. protective gear. The charging unit shall be incorporated in the diesel generator control cabinet.

1.1.14 Engine Instruments

The following instruments with suitable limit markings shall be provided on the generator panel:

a) Water temperature gauge. The gauge shall be calibrated at the lower part of the temperature range, so that when the engine is inoperative the temperature of the water is readable when heated by the immersion heater only. The temperature range shall extend beyond the operating range of the engine.

b) Lubricating oil pressure gauge.

1.1.15 Safety Controls

The engine shall be equipped with the safety controls as specified.

1.1.16 Engine/Alternator Coupling and Base

The engine and alternator shall be direct coupled and arranged for operation at 400/230 volt, 50Hz & 1500 RPM.

A steel fabricated base-frame with anti-vibration mounts between the engine / alternator combination and base shall be provided and must be able to be placed directly on the floor.

1.2 RADIATOR EXTRACT DUCTING

A galvanised duct shall be provided and installed between the radiator face and outlet louvre to positively duct the hot expelled air out of the canopy.

1.3 A.C. GENERATOR

1.3.1 Rating

The generator shall be a 400/230 volt, 3 phase, 4 wire 50 Hz machine rated at 0.8 power factor.

The generator rating shall be applicable for continuous service application.

1.3.2 Construction and Manufacture

The generator shall be a revolving field type, coupled directly to the engine flywheel through a flexible disc for positive alignment. The generator housing shall bolt directly to the engine flywheel housing and shall be equipped with a heavy duty ball bearing support for the rotor. The motor shall be dynamically balanced up to 25 % over speed.

The generator shall be of heavy duty compact design. Insulation shall be Class H as recognised by B.S.5514.

The generator field excitation shall be performed by a rotating exciter mounted on the generator motor shaft through a brushless rotating diode system. The voltage regulator shall be of the static-magnetic type with silicon diode control. It shall be mounted on the top or side of the generator and enclosed in a drip proof enclosure. A built in voltage adjusting rheostat shall provide 10 % voltage adjustment.

1.3.3 Performance

The generator shall be capable of continuously delivering the specified full rated load and of providing a 10 % overload for the period and in the manner specified for the engine.

1.3.4 Wave Form

The shape for the voltage and current wave shall be within the limits laid down by B.S. 5000.

1.3.5 Voltage Regulation and Response

The alternator shall be self-regulated and shall incorporate an automatic voltage regulator.

The voltage regulation shall not exceed ±2½%, from no load to full load, including cold to hot variations at any power factor between 0,8 lagging and unity and inclusive of speed variations within the stated limits.

Upon application of full load at a power factor of 0,8 lagging the alternator voltage shall recover to within 2½% of the steady state value within approximately 300 milliseconds.

Upon application of any load specified in transient, maximum voltage dip shall not exceed 20% of the nominal voltage when measured at the alternator terminals.

1.3.6 Windings

The generator stator windings shall be star connected with the star point brought out and connected to the neutral terminal in the terminal box on the generator to provide a 400/230 volt supply.

1.3.7 Terminal Box

The terminal box shall be sized to suit the interconnecting cables between the alternator and canopy mounted AMF panel.

1.3.8 Radio and T.V. Interference

The generating set shall be suitably suppressed within the limits of B.S. 800 against radio and television interference.

1.4 DIESEL GENERATOR CONTROL PANEL

1.4.1 Type and Construction

The panel shall be designed for the control of the diesel generating set with instrumentation and protective devices to meet both manual and automatic mode requirements.

The control panel shall be of robust construction, floor mounted, totally enclosed and dust proof.

It shall be of folded 1,6 mm thick cold rolled sheet steel construction suitable for front entry through hinged doors. Internal chassis plates, circuit breaker pans and gland plates shall be provided. Special attention shall be given to vermin proofing and dust sealing.

Prior to painting all steelwork must be thoroughly degreased and de-rusted and then primed with a zinc chromate primer. All internal steel chassis plates, gland plates and switchgear brackets shall be painted with white powder epoxy paint and all exterior steel surfaces finished with orange powder epoxy paint.

1.4.2 Bus-Bars, Wiring, Switchgear, Etc.

All bus-bars and wiring shall be adequately rated and suitably supported, and control wiring shall be neatly laced and numbered with durable plastic ferrules, for easy tracing. Suitable terminals are to be provided for incoming and outgoing cables. Suitably sized holes shall be punched in the gland plates for the required number of cable terminations for both incoming and outgoing cables. The cables shall be secured to the gland plate by means of cable glands.

other approved. The gland plate shall be suitably braced to prevent distortion after the cables are glanded thereto.

Circuit breakers are to be of moulded case construction.

All instrumentation shall be of 1,5 % accuracy and their performance shall comply with B.S. 89.

The instruments shall be flush mounted and the dial dimensions shall be 96 mm x 96 mm.

Bidders must give an assurance with their tender that replacements for the equipment, switchgear and instruments used in the construction of the panel are readily available from stock held in the Republic of South Africa.

1.5 CONTROL PANEL

The AMF control panel is to be situated inside the canopy

The Standby Generator set Contractor is to install all interconnecting cables between the alternator and set mounted control panel.

1.5.1 CONTROL PANEL COMPONENTS

1.5.2 Components

a) 1 x suitably sized TP Generator Air Circuit Breaker. The A.C.B. shall be rated to suit the generator offered and shall have both adjustable thermal and instantaneous overload elements.

b) 1 x T.P. Mains isolator suitably rated with two operating positions labelled "OFF" and "ON". The main incoming cable shall be terminated at this point.

c) 1 x Set of TP automatic change-over isolators with motor operated mechanisms suitably rated and with appropriate auxiliary and control contacts for generators rated above 88 kVA. The electrical and mechanical interlocking arrangements of these change-over isolators shall be to the approval of the Engineer:

d) 1 x Set of suitably rated “ON LOAD” By-pass switches

e) 3 x CT's suitably scaled.

f) HRC fuses for meters.

g) Load, neutral and earth bus-bars.

1.5.3 Control Section

Automatic constant voltage battery charger.

Control C/B for instruments.

Control relays for change over contacts.

12 Volt fuel relays.

Terminal strips.

1.5.4 Door Mounted Components

a) 1 x AMF 120 MK 4 Generator Controller

b) 3 x Flush mounted M.D.I. 96 x 96mm dial ammeters suitably scaled

c) 1 x Flush mounted 96 x 96 mm dial voltmeter, 0 - 500VAC.

d) 1 x Flush mounted voltmeter selector switch with off, phase to phase and phase to neutral positions.

e) 1 x Flush mounted 96 x 96 mm dial, frequency meter, scaled 47 - 50 - 53 Hertz.

f) 1 x Flush mounted voltmeter 0 -30VDC - Battery volts.

g) 1 x Flush mounted running hour meter.

h) 1 x Manual start push button.

i) 1 x Manual stop push button.

j) 1 x Emergency stop push button - "Latching type".

k) 1 x Engine alternator charge indication.

1.5.5 Control Equipment Requirement

Control systems may not consist of the electromagnetic relay type. Only the AMF solid state programmable systems complying with the following specification will be accepted.

The solid state control systems shall be of South African Manufacture, be available “off the shelf” and shall have a proven local operating history of at least five years. Imported or specially made solid state control systems or engine control and/or management systems will not be acceptable under any circumstances. The control system shall consist of a single unit including all indicators/switches and allow for quick installation using locking connectors.

The solid state controller and associated systems wiring shall be to the control system manufacturer’s guidelines and shall be adequately protected against transient over voltages arising from lightning effects, switching surges, power system surges or mains and alternator borne noise/interference. Full details of the suppression systems are to be provided at tender. Wiring to and from the solid state programmable controller is to be screened as necessary to prevent electrostatic and magnetic interference from adjacent wiring/systems.

1.5.6 SPECIFICATION

1.5.7 FRONT PANEL INDICATORS

CONDITION	ALARM	SHUTDOWN
HIGH TEMPERATURE	X	X
LOW OIL PRESSURE	X	X

OVERSPEED	X	X
UNDERSPEED	X	X
MANUAL/TEST MODE		
HEATER FAULT	X	
LOW FUEL	X	
NO FUEL	X	X
LOW WATER	X	X
LOW BULK TANK/SPARE2	X	
MODEM REMOTE START		
START FAIL	X	X
MANUAL START		
EMERGENCY STOP	X	X
MAINS PHASE ROTATION FAULT		
HIGH MAINS VOLTS		
LOW MAINS VOLTS		
MAINS ON		
MAINS ON LOAD		
ALTERNATOR ON		
ALTERNATOR ON LOAD		
ALTERNATOR PHASE ROTATION FAULT	X	X
HIGH ALTERNATOR VOLTS	X	X
LOW ALTERNATOR VOLTS	X	X
BATTERY VOLTS FAULT	X	X
ALTERNATOR CHARGE FAULT	X	
CONTROL SYSTEM ON		

1.5.8 **FRONT PANEL SWITCHES**

The following switches shall be included on the control system front panel.

- Lamp test push button
- Alarm mute push button
- Four position mode selector switch: “off/reset, auto, manual, test”

1.6 PLANT OPERATION

The mode selector switch functions shall be as follows:

OFF/RESET: Control system off and alarm condition reset.

AUTO: Automatic starting and stopping of the set dependant on the mains supply

MANUAL: Starting and stopping activated manually (two panel mount push-buttons) for maintenance purposes. In this mode the load will not be transferred in the event of a mains failure.

TEST: The set will start automatically in this position. The load will be taken by the alternator in the event of a mains failure.

1.6.1 LOGGING OF EVENTS

All events relating to the status of the generator set shall be logged with date and time in a non-volatile memory (which can retain information for a period of 6 months in the absence of power to the controller) and the user shall be able to obtain a hard copy on site.

1.6.2 USER PROGRAMMABLE

The controller shall be user programmable on site via a menu system with clear prompts for the required data

1.6.3 KEYBOARD AND PRINTER

The optional plug in printer and keyboard used to obtain a hard copy of the log and to program the control system must be able to operate from internal rechargeable batteries or 12-24VDC, allowing operation in the event a mains supply is not available.

1.6.4 CONTROL SYSTEM DC SUPPLY VOLTAGE

The control system must be able to operate with a minimum DC supply voltage of 4 volts (without making use of either an internal or an external auxiliary battery) to allow cranking and starting under conditions of low battery capacity.

1.7 ELECTRICAL

1.7.1 Cable Feeders

The main supply cable and the control cables to and from the diesel generator set AMF panel will be supplied and installed by others.

1.7.2 Terminations

The cables are to be made off with suitable cable glands. The cable glands at the control panel shall be secured to the gland plate in the base section of the panel and at the generator end to the terminal box.

The cable conductors shall be terminated with suitably rated pressure crimped cable lugs.

1.7.3 Earthing

The neutral point of the generator shall be solidly connected, by means of an appropriate size of insulated earth conductor, to the earth bar in alternator and in the panel. All plant, ancillary equipment and steel work in the stand-by plant canopy shall be suitably bonded together with an appropriate size of bare copper tape which shall also be connected to the earth bar.

1.7.4 Phase Rotation

The Contractor shall ensure that the mains and generator phase rotations are identical.

1.8 PAINTING

The set and canopy shall be painted with best quality “Twin Pack" epoxy paint.

The control panel shall be powder coated (red).

1.9 TESTING

1.9.1 Testing At Contractor's Premises

a) An acceptance test shall be carried out at the Contractor's works to establish that the diesel generating plant and its ancillary equipment meets with the requirements of the specification. The Contractor shall give the consultant at least seven days' notice prior to testing the plant. In the event of the plant failing the test and having to be re-tested, at some future date, all expenses (including travelling) incurred by the consultant in attending the second test will be to the Contractor's account.

b) Simulate a mains failure to automatically start the plant from cold to test its ability to attain full rated speed and voltage and assume the full load in the specified time of fifteen seconds.

c) Test run the plant at full load for a period of one hour.

d) Immediately after the above specified run, without stopping the plant, run it for a further hour at 110 % load.

e) Test the plant with regards to voltage dip, voltage and frequency recovery, with a sudden application of various loads.

f) Test the plant for its ability to assume full rated load immediately on failure of the normal supply.

g) Test and demonstrate (by simulation only where actual Conditions could damage the plant and its ancillary equipment) the correct operation of the engine safety controls and alarms together with other alarms as specified.

h) Any other tests the client may consider necessary to establish that the diesel generator and its ancillary equipment as a whole is functioning correctly and in accordance with the specification.

i) The Contractor shall provide necessary instruments and equipment for carrying out the tests. The test equipment shall be capable of producing 100 % load for one hour and 110 % load for a further hour continuously without interruption. The test load shall be adjustable and balanced over three phases.

j) The instrumentation shall be capable of recording and producing printed data pertaining to transient voltage dips, recovery time, applied load, etc.

1.9.2 Tests on Site

On completion of the installation of the plant, the following test shall be carried out:

a) Automatic starting and stopping with load change over. The load in this instance will be provided by the client.

b) Test by simulation only of the operation of the engine protection and alarm devices

c) Any other tests which the consultant may require on site.

NOTICES:

Warning Notice

The Contractor shall provide and install in a conspicuous position a clearly legible and indelible notice 450 x 450mm made from non-deteriorating material, preferably plastic with red letters on a white background worded to read as follows:

DANGER

THIS ENGINE WILL START WITHOUT NOTICE. TURN STATUS SELECTOR SWITCH ON CONTROL PANEL TO "OFF" POSITION BEFORE WORKING ON THE PLANT.

1.10 OPERATING AND MAINTENANCE MANUALS, ETC.

The Contractor shall supply three complete comprehensive sets of operating and maintenance manuals complete with schematic control diagrams and complete spare parts list for both engine and generator. The above manuals are to be handed to the authorised representative on completion of the installation.

In addition a complete schematic diagram of the power and control circuitry is to be left inside the control panel.

NOTE:

Under no circumstances will first delivery be taken of the plant unless these requirements have been completed.

1.11 DRAWINGS

Within one month of the receipt of order the successful Bidder shall submit prints of each of the following drawings for approval:

a) General arrangement of the stand-by plant switchboard front panel.

b) Schematic of the complete electrical systems, including starter motor, battery and automatic battery charger.

c) Dimensioned layout of all plant in the canopy.

1.12 SPARE PARTS

Bidders must give with their tender an assurance that spare parts for the plant offered by them as a whole are readily available within the Republic of South Africa and to state where these are available for a period of at least 10 years.

1.13 GUARANTEE AND MAINTENANCE

1.13.1 General

The Contractor shall guarantee and maintain the Contract Works for a period of twelve months after first delivery of the plant. During the maintenance period the Contract Works shall be maintained as specified by the Contractor and any defective material, equipment or workmanship (excepting proven, wilful or accidental damage, or fair wear and tear) shall be made good with all possible speed at the Contractor's expense and to the satisfaction of the client.

1.13.2 Making Good

When called upon by the client the Contractor shall make good on site and shall bear all expense incidental thereto including making good of work by others, arising out of removal or reinstallation of equipment. All work arising from the implementation of the guarantee or maintenance of equipment shall be carried out at times which will not result in any undue inconvenience to users of the equipment or occupants of premises.

If any defects are not remedied within a reasonable time the client may proceed to do the work at the Contractor's risk and expense, but without prejudice to any other rights which the client may have against the Contractor.

1.13.3 Latent Defects and Failure to Comply with Specification

The client reserves the right to demand the replacement or making good by the Contractor at his own expense of any part of the Contract which is shown to have any latent defects or not to have complied with the Specification, notwithstanding that such work has been taken over or that the guarantee period has expired.

1.13.4 Qualification by Bidder

Should any specified materials or equipment in the Bidder's opinion be of inferior quality, or be unsuitably employed, rated or loaded, the Bidder shall prior to the submission of his tender advise the Project Leader accordingly. His failure to do so shall mean that he guarantees the work including all materials or equipment as specified.

1.14 MAINTENANCE

At quarterly intervals during the guarantee period of twelve months the Contractor shall adjust and maintain the standby plant and its ancillary equipment in proper working order. As a minimum requirement he shall:

a) Check and top-up if necessary, the fluid levels in the radiator, engine sump, fuel oil tank and batteries.

b) Test runs the standby plant and ancillary equipment for a period of 15 minutes.

c) Wipe down the standby plant and its ancillary equipment and report on any evidence of any fluid leaks or other defects.

d) Fill in the standby plant logbook.

The cost of such inspections, maintenance, adjustments, repairs, etc., shall be included in the tender price, but the cost of renewing any part which may become worn through fair wear and tear, or damaged beyond the control of the Contractor (provided this is not due to unsuitable design) shall be excluded.

If during the guarantee and maintenance period the standby plant is not in working order for any reason for which the Contractor can be held responsible, then the Contractor will be notified and immediate steps shall be taken by him to remedy the defects. Should the standby plant defects be so frequent as to become objectionable or should the equipment otherwise prove unsatisfactory during the guarantee period of twelve months, the Contractor shall, if called upon by the client, at his own expense replaces the whole or such parts thereof as the client may deem necessary with equipment to be specified by the client. Approval - tacit or otherwise - of the equipment installed shall be considered as provisional only and shall not invalidate the client's right as indicated above.

40 MAINTENANCE PERIOD

The maintenance period of 12 months from handover is detailed in the contract conditions and contract preliminaries. It is however a further requirement of this contract that three months after handover of the installation, all faulty lamps and tubes shall be replaced by the Contractor at no additional cost to the Employer. The replacement parts such as tubes, lamps, starters, ballast, etc., will be supplied and delivered by the Contractor and he shall include in his tender price for all other costs associated with this requirement.

It is a further requirement of this contract that the Contractor with local contractors to perform the maintenance function on his behalf during the maintenance period. Details of this arrangement shall be provided within 14 days of acceptance of the contract. It should furthermore be noted

that the maintenance requirements entail a 24-hour call-out 7 days a week during the maintenance period and in all cases, a response time of less than one hour is required.

41 ITEMS FOR COMMENT

The right is reserved to reject any equipment which does not, in the opinion of the Engineer, conform to specification or which is of an inferior grade. Should such equipment be rejected, the Contractor shall at his own expense provide for alternative equipment and tenderers are thus warned to ensure that all equipment offered is in strict accordance with the requirements of this specification.

In certain cases the Contractor may be required to submit samples and where necessary, tests will be performed to establish the quality of the material offered.

42 CONTRACT ADMINISTRATION, COMPLETION, TESTING AND COMMISSIONING

42.1 SUPERVISION

Work must under all circumstances be supervised by a qualified and experienced representative of the Contractor who must be the holder of an electrical installation certificate. The representative must be authorized by the Contractor and must be able to receive instructions on behalf of the Contractor.

42.2 CERTIFICATE OF COMPLIANCE BY AN ACCREDITED PERSON

On completion of the electrical installation, the Contractor shall complete the Certificate of Compliance for the electrical installation in the form of Annexure 1 as described in the Occupational Health and Safety Act (latest version) and obtainable from the Electrical Contracting Board of South Africa. The form must be handed to the Engineer at first delivery.

42.3 QUALITY CONTROL DURING THE EXECUTION OF THE CONTRACT

The Contractor or his authorized representative to ensure that all work is executed in accordance with the drawings; specifications and regulations shall carry out day by day inspections of the Works. The Engineer will monitor these inspections.

42.4 STANDARD OF WORKMANSHIP

All installation work in this contract is to be executed by qualified electricians and cable jointers in accordance with modern techniques. The Engineer shall have the right to reject any work which does not meet the specification or which is not in accordance with standard practice.

42.5 MAINTENANCE OF AS-BUILT DRAWINGS

During execution of the contract the Contractor shall update the drawings daily with all the relevant information.

At the end of the contract and prior to handover being accepted, the Contractor shall prepare as-built drawings of the installation. These drawings shall be a set of the latest drawings issued by the Engineer on which the Contractor shall highlight all changes. The Contractor shall take great care to ensure that all underground services are shown in the correct places.

The Contractor shall also issue three (3) sets of drawings, wiring diagrams, service and instruction manuals for equipment supplied by him and these will have to be acceptable to the Engineer prior to handover being approved.

The As Built drawings shall be handed to the Engineer at first delivery. Retention money normally due before commencement of the maintenance period will not be released until the As Built drawings have been prepared to the satisfaction of the Engineer.

42.6 PRELIMINARY TESTING OF MAJOR EQUIPMENT

All terms of major equipment are, where feasible, to be factory tested prior to delivery to site, and results of such tests, in a format to be agreed in advance, are to be produced before the equipment is delivered.

All such tests are to be in accordance with the relevant codes of practice, and with any other requirements as set out in this document.

42.7 COMPLETION OF INSTALLATION

Before the commencement of any test or commissioning procedures, the Contractor is to ensure that all nuts and bolts are securely fastened, and that paintwork on all items supplied has been touched up where damage has occurred.

42.8 INSPECTION AND TESTING

On completion of the entire installation or any particular section thereof, as may be decided by the Engineer, tests shall be carried out in full accordance with the current edition of the “Code of Practice for the Wiring of Premises”, in the presence of the Engineer.

The Contractor should note that, where applicable, at least the following tests must be carried out: -

- Insulation test
- Continuity test
- Loop Line Earth Line Impedance test
- Polarity test
- Earth Leakage Circuit Breaker test
- Earth termination test

Any further tests as deemed necessary by the Engineer.

The Contractor shall provide all instrumentation necessary for testing.

The results of the above tests must be clearly recorded, signed and handed to the Engineer together with a Certificate of Compliance and any other form or forms as required by the Employer.

42.9 DOCUMENTATION

The following documentation is required and shall be provided by the Contractor:

Set of schematic wiring and function diagrams.

Operating and maintenance instructions on equipment

Guarantees ceded to Employer.

Once the Engineer has inspected the complete installation and satisfied himself that all testing has been completed and the contract (electrical, telephone and data installation) is complete in all respects, will he issue a letter to the Employer stating installation is complete.

42.10 LABELLING

All switchgear and equipment installed in the switchboards, plus isolator boxes, cables, etc., shall be clearly labelled as indicated elsewhere in this specification and schedules.

42.11 TRAINING OF INSTITUTIONAL STAFF

Where applicable, allowance is to be made by the Contractor for the training of Institutional Staff in the setting up and operation of the various items of equipment supplied under the contract.

42.12 TESTING AND COMMISSIONING DOCUMENTATION

On completion of the testing and commissioning, the following documents shall be compiled and presented to the Engineer:

- Certificate/s of Compliance and other form/s as required by the Engineer and Employer.
- Drawings of the installation marked up “As-Built” as described elsewhere.
- Completed set of test and commissioning sheets.
- First delivery will not be taken unless above mentioned items are complied with.

43 PRACTICAL TESTING

Practical completion shall rake place only after the whole installation has been accepted by the engineer and;

a) All damage that may have been done by the Electrical Contractor or other parties in the process of the installation has been repaired and made good
b) All tests of the general building’s electrical installation have been done and tests results have been submitted to the Engineer,
c) The completed Certificate of Compliance for Electrical installation have been submitted to the Engineer,
d) The completed Certificate of Compliance for Lighting Protection System installation have been submitted to the Engineer,
e) All equipment guarantees, if any, have been submitted to the Engineer,
f) Correct As-Built drawings have been submitted and accepted by the Engineer,
g) The building has been cleared of all debris and electrical waste materials and left in a neat and tidy condition,
h) All three phases have been balanced and witnessed by the Engineer. This may require the Electrical Contractor to return to site when the building is occupied to take current measurements and rebalance phases.

44 FINAL COMPLETION

Final Completion shall be taken on expiration of the maintenance period which is stated in the Contract Data calculated from the date of taking the Practical Completion.

The final payment will not be approved without the submission of all the above information under 29 and accepted by the Engineer.

45 TESTING AND INSPECTION

The Contractor shall inspect, test and commission the entire installation in conjunction with and to the satisfaction of the Engineer and in the presence of the Engineer in accordance to the SANS10142: Wiring Code. The Contractor shall make all arrangements for testing and inspection, the costs thereof being included in the tender price.

The Engineer reserves the right to witness all tests. The Contractor shall advise the Engineer in writing of all results and furnish copies of all certificates.

Load balancing shall be undertaken by the Contractor in conjunction with the Engineer. Where conductors are altered to achieve satisfactory results, they shall be re-laced by the Contractor.

The Contractor shall provide all the necessary instruments for the proper testing of the complete installation. If there is reason to doubt the accuracy of such instruments, the Contractor shall take the necessary action to prove their accuracy.

If the results of the first delivery tests are favourable and the installation is found to be in order, there will be no charge for the test. If the test is found to be unfavourable, a levy of R1000-00 will be charged to the Contractor for each subsequent test in the form of a Variation Order omitting such costs from his contract price.

The Contractor shall ensure that the installation is complete in every respect and that there are no major defects prior to notifying the Engineer (in writing) of a first delivery inspection.

Should there be any minor defects upon final inspection, the Engineer will terminate that inspection and request that an additional final inspection be arranged by the Contractor.

MPOLWENI CLINIC: CONSTRUCTION OF NEW VERY SMALL CLINIC WITH STAFF ACCOMMODATION

COMMUNICATION SYSTEM INSTALLATION

PART F : PROJECT SPECIFICATION

PART F : PROJECT SPECIFICATION

INDEX

1. GENERAL

This Project Specification must be read together with the Electrical Specifications Parts A - E for electrical works.

This Project Specification together with the drawings describes the scope of works to be executed in terms of this documentation and takes precedence over the Standard Technical Specification.

2. SCOPE OF CONTRACT

The scope of the Communication works described in detail in this document and drawings covers the supply, delivery, off-loading, storage, installation, commissioning, testing, handing over and free maintenance for the period stated in the tender document of all specified equipment and materials for the communications installation as required for the new Mpolweni Clinic: Construction of new very small clinic with staff Accommodation.

The installation shall be suitable for operation in Mpolweni at an altitude of approximately 700 metres above sea level with a maximum atmospheric temperature of 40°C and a minimum temperature of –10°C.

The onus is on the tenderer to ascertain any local conditions or peculiarities which might affect the contract, and which are not shown on the drawings.

The scope of work comprises the following:

i. Block A: Guardhouse

ii. Block B: Admin & Main Central Area

iii. Block C: Emergency and Support Services

iv. Block D: Services and Stores

v. Block E: Preventative & Promotive

vi. Block F: Acute Care

vii. Block G: Chronic Care

viii. Block H: Youth and Outreach

ix. Block K: 3 x Staff 01 Bedroom

x. Block L: Staff 02 Bedroom

3. GENERAL DESCRIPTION

The fire detection shall be an automatic addressable digital system with control and mimic panels in positions as shown on drawings. All newly built areas shall be serviced from the new panel.

The access control and intercom systems to be implemented shall be standalone though out and installed in positions shown on drawings. Equipment to be installed shall be presented for client approval.

4. PROJECT PROGRAM AND PHASING OF THE DELIVERY OF MATERIALS

In terms of the contract conditions, the communications sub-contractor shall liaise with the principal contractor and arrange his own program in accordance with the program for the building, in order that the electrical installation of the different sections or phases is completed when required.

Included in this document, is the client's *proposal* for the program and phasing of works. The contractor should duly consider this information in preparing his own version of the project program to be submitted as a returnable document.

It is a special requirement of this contract that the delivery of materials for which payment is required by the sub contractor, shall be affected in an orderly manner so as to place the smallest burden on the client, with regard to payment for materials. In order to comply with this requirement, careful preplanning of material deliveries by the electrical contractor will be required and supplier's delivery times will be crucial, not only to ensure that this requirement is met, but also to ensure that the construction activities are not delayed.

In an effort to avoid disputes regarding the sub contractor's claims for payment for material on site, it is a requirement that on a monthly basis, the material orders for that month shall be approved by the Engineer, prior to the orders being placed. It should however be noted that in no ways will this approval (or the lack thereof) be regarded as sufficient grounds for claims by the contractor for delays encountered, as a result of late delivery of materials.

5. NATURE OF THE CONTRACT

This shall be a specialist sub-contract and the Communications Contractor shall enter into a contract with the Main Contractor.

6. GUTSI GENERAL DESCRIPTION (NURSE CALL)

The nurse system enables the patient to call a nurse for assistance from his bed or from a bath, shower and toilet. The system also enables the STAFF to call for assistance (EMERGENCY CALL) from any bed and treatment room etc.

When a patient nurse call or staff emergency call is enabled the system must produce an intermittent AUDIBLE chimes tone at the nurses station or/and duty room.

Four different sounding tones must be produced for normal Patient call, Bathroom call, Emergency (nurse assistance) call and Cardiac Arrest call (Code Blue).

The system must also provide a VISUAL indication, at the nurse station (LCD Display Panel), above the door in the passage of the activated unit (Over-door Light), and at the actual activated unit (reassurance LED).

The system must be so designed that any call may ONLY be RESET at the point of origin.

The system must automatically activate a nurse call when the Hand Held Unit (Handset) or Pear Push unit is accidently pulled out from the Bed Head Unit.

The Bed Head Unit must be compatible with Hand Held Unit & Pear Push. (Inter-changeable)

The duty station Display (Gutsi) must keep a record of all events occurring at its own section (dept eg: Maternity). A Central Monitoring Display would keep records of all events – optional.

The system must be purpose made and aesthetically pleasing with components (call & reset units etc) manufactured from matching injection moulded ABS plastic. A system made up of push buttons etc mounted directly onto standard electrical plates will not be accepted.

7. GUTSI SYSTEM COMPONENTS

7.1 LCD TOUCH SCREEN PANEL (1 PER SECTION)

The Panel will consist of a 10" LCD Graphic Display which may be wall or desk mounted. The Panel must be loaded with a Graphic accurately displaying the ward's layout with all the bed and room numbers. The bed and bathroom icons must be green in colour and change to red whenever a call is activated. The Display must be capable of displaying multiple screens and automatically switch to the relevant screen when a call is activated. The Display must include the data logging configuration for the particular section and be viewable on the screen. The recorded data must be easily downloadable onto a flash drive in CSV format to be viewed on any PC using Microsoft excel.
A USB socket for plugging in a flash drive for downloading data must be accessible.

7.2 CENTRAL MONITORING DISPLAY (OPTIONAL)

This Panel will provide the same functionality as duty station Panel accept that it must log all the events for all sections.

7.3 SEALED LED ILLUMINATED PEAR PUSH UNIT (1.5M, PP)

The PP unit consists of an impulse Red push button and LED sealed inside a pear shaped moulded plastic housing attached to a 1.5m 4 core 0.5mm double insulated curly cable. A UB4 plug is factory sealed onto the end of the cable. Part of the Pear shaped housing must be opaque to allow the LED to illuminate when activated to re-assure the patient that a call has been registered. The cable, housing and plug must be white in colour. The PP must automatically activate a nurse call when accidently pulled out from the Bed Head Unit.

7.4 PATIENT HAND HELD UNIT WITH NURSE CALL / LIGHT CONTROL & TV REMOTE CONTROL (Model: HHU H08, UB4)

The patient hand held unit is a modern and robust unit with a control keypad or push buttons for the various functions. The functions of the switches are depicted by symbols that are internationally recognised. The TV is controlled via an infrared link that is externally wired

from the TV Connector PCB housed inside the Bed Head Trunking or ceiling space. Audio is provided via a headphone that is connected to the headphone socket on the handset.
The following shall be incorporated on the handset:

Unit functions:
a. Nurse call push button
b. Nurse call reassurance LED
c. Television on/ off
d. Television Channel select: Up / Down
e. Sound volume setting: Up / Down
f. Light on/ off for over bed reading light
g. A Cradle for hanging the handset (slide in type)
h. Socket for connecting headphone jack (TV and radio Audio from TV)
i. Unit Compatible with any TV
j. STD Straight cord with UB4 plug

7.5 BEDHEAD UNIT WITH EMERGENCY CALL / RESET WITH INLINE UB4 SOCKET FOR HHU OR PP (Model: BHU R02, UB4)

The purpose made nurse Bed call unit may be mounted in a standard 100x100 or 100x50 electrical box or flush mountable in an aluminium Bed Head Trunking

BHU functions:

a. Emergency call push button
b. Nurse call/ emergency call common RESET push button
c. Nurse call/ emergency call common reassurance LED
d. Automatic Nurse Activation when HHU or PP is pulled out.
e. Plug-in Socket (USB-type) on a 150mm flexible white cable for connecting to the patient Hand Held Unit or Pear Push.

The unit must be designed so that no damage will be caused to the unit by accidentally pulling out the HHU or PP unit from any direction.

7.6 CONNECTOR PCB WITH TV CONTROL (Model: PCB-TVC-0)

The Connector PCB contains the relevant software to control the TV via the IR LED. It also serves as a termination point for Bed Head Unit, on-suite Bathroom, Overdoor light unit, Infra-red LED & TV audio. The PCB may be housed in the Bed Head Trunking or in the ceiling space by the TV.

Connector PCB functions:

a. Provides TV Control signals (via IR LED)
b. Termination of all cables per bedroom & bathroom

The Connector PCB is available with or without Light Relay.

7.7 EMERGENCY CALL/ CANCEL UNIT (FOR TREATMENT ROOM, ECU) (Model: PCB-TVC-0)

The purpose made Emergency call/ cancel unit may be mounted in a standard 100x100 or 100x50 electrical box or flush mountable in a Bed Head Trunking.

The purpose made ABS plastic clip-in Emergency Call unit must include:
An EMERGENCY CALL switch for nurse assistance
A RESET switch
Re-assurance LED

7.8 BATHROOM IMPULSE PUSH CALL UNIT (PSC) (Model: CLL M03 IPS)

The purpose made Impulse Push call unit may be mounted in a standard 100x100 or 100x50 electrical boxes. The ABS plastic clip-in Call unit must include:
A large keypad type switch with locating nipple
Re-assurance LEDs
Used in conjunction with the bathroom reset unit

7.9 BATHROOM IMPULSE PULL CALL UNIT (PLC)

The purpose made Impulse pull call unit may be mounted in a standard 100x100 or 100x50 electrical box. The ABS plastic clip-in Call unit with a Blue label must include:
A strong impulse micro switch attached to a 2.2m nylon string
Re-assurance LEDs
Used in conjunction with the bathroom reset unit

7.10 BATHROOM RESET UNITS (RES) (Model: RES M04 000)

The purpose made Reset unit may be mounted in a standard 100x100 or 100x50 electrical box. The ABS plastic clip-in Reset unit must include:
A large keypad type reset switch.
Re-assurance LEDs

7.11 OVER DOOR LIGHT

The purpose made over door light unit may be mounted in a standard 100x100 or 100x50 electrical box or directly onto the ceiling tile & fastened onto a round end box in the ceiling space. The OD light contains 4 hi bright LEDs mounted on a clip-in plastic. The barrel shaped white lens becomes red when activated.

7.12 IP PLC TERMINATION BOX (KRONE JUNCTION BOX & CHIMES PCB - 1 PER SECTION)

The J/B must be centrally located preferably near the duty station and accessible for ease of maintenance. The J/B must consist of a Krone plastic box housing the IP-PLC Monitoring Control modules, krone frame & disconnect modules, the Chimes PCB and 24V4A SWM Power Supply. The cables for all devices to be terminated at the J/B neatly onto the krone disconnect modules.

7.13 CABLES

7.13.1 Cables – Nurse Call with TV Control

Cable requirements as follows:

a. An individual 4pair CAT5 UTP cable from each SINGLE or 2 BEDROOM (Connector-TV PC Board) back to the central Junction Box. Loop CAT5 cable to 2nd Connector board in case of 2 bed ward.
b. 2 x 4pair CAT5 cables from each 4 BEDROOM (Connector-TV PC Boards) back to the central junction box. (1 CAT5 cable per 2bed)
c. A 4pair CAT5 cable from each BHU to its corresponding CONNECTOR-TV PC BOARD. (Connector Board may be mounted in Bed Head Trunking or in Ceiling space)
d. An 8core Comms cable from each on-suite bathroom RESET to the closest bed's Connector-TV PC Board
e. An 8core (0.5mm) comms cable from each bathroom CALL unit to its corresponding RESET unit outside.
f. A 4core comms (0.5mm) cable from the OVER DOOR light back to the corresponding room's Connector-TV PC Board.
g. A 2pr (0.22mm) mylar screened cable from the CONNECTOR-TV PC BOARD to the TV for IR control & TV audio. Terminate the IR LED to 1st pair & rest the LED under the TV inside the fibre glass bracket. Terminate an RCA or Jack plug to 2nd pair & plug into back of TV for TV audio. TV Audio must be isolated from nurse call system via transformer (600 to 600 Ohms).
h. A CAT 5 cable from the J/B to the Gutsi Panel (LCD display).
i. A Krone Junction Box per Section (eg surgical ward) is required for terminating all cables.

7.13.2 Cables – Nurse Call (No TV)

Cable requirements as follows:

a. An individual 4pair CAT5 UTP cable from each SINGLE or 2 BEDROOM (BHU) back to the central Junction Box.
b. 2 x 4pair CAT5 cables from each 4 BEDROOM (at BHU's) back to the central junction box. (1 CAT5 cable per 2bed)
c. A 4pair CAT5 or 8core Comms cable from each on-suite bathroom RESET to the closest bed unit or JB
d. An 8core comms cable from each bathroom CALL unit to its corresponding RESET unit outside.
e. A 4core comms cable from the OVER DOOR light back to the nearest bed unit.
f. A CAT 5 cable from the J/B to the Gutsi Panel (LCD display).
g. A Krone Junction Box per Section (eg surgical ward) is required for terminating all cables.

7.14 SYSTEM OPERATION OVERVIEW

*The following happens when a call is activated from a **PEAR PUSH or HAND HELD UNIT** plugged into the bed call unit:*

The re-assurance LED in the Bed call unit and HAND HELD or PEAR PUSH illuminates
The Over door light outside the corresponding room illuminates
The chimes unit will sound & continue until the call is reset at originated unit.

The corresponding bed at the monitoring Display will change from green to red and a call will be logged in the data base.
All LEDs & tones will stop when the call is reset (from the activated unit).

*The following happens when a call is activated from an **Emergency call** or **bed call** unit (not the pear push or hand held unit):*

The re-assurance LED in the Bed call unit, HAND HELD or PEAR PUSH unit will flash ON & OFF (1 second intervals)
The Over door light outside the corresponding room will flash ON & OFF (1 second intervals)
The Emergency Tone will sound & continue until the call is reset.
The corresponding bed at the Gutsi LCD Graphic Display will change from green to flashing red and an emergency call will be logged in the data base.
All LEDs & tones will stop when the call is reset (at the activated unit).

*The following happens when a call is activated from a **BATHROOM PULL** or **PUSH call** unit:*
The re-assurance LED in the Bathroom call unit illuminates
The Over door light outside the corresponding room illuminates
The re-assurance LED in the Corresponding RESET unit illuminates
The Bathroom tone will sound & continue until the call is reset.
The corresponding bathroom at the Gutsi LCD Graphic Display will change from green to red and a call will be logged in the data base.
All LEDs & tones will stop when the call is reset at the activated RESET unit.

8. DSTV SYSTEM GENERAL DESCRIPTION

The purpose of this document is to describe the equipment and installation specifications for the DSTV signal distribution in hospitals in order to ensure that all DSTV installations conform to the same standard in lay-out, equipment used, cabling, etc. and to ensure that all the Multichoice terms and conditions are adhered to as stipulated in the contract between Multichoice and the client.

This document covers the equipment, installation and operation of the DSTV equipment in hospitals, including the floor standing cabinet containing all the necessary equipment to receive the DSTV signal and the transmission of this signal throughout a coaxial cable network to the TV outlet points. This document also describes specifications regarding the DSTV channels available from Multichoice as per the clients agreement with them and the specifications regarding DSTV in doctor's rooms.

Television sets and the mounting thereof are not included in this specification as the configuration and installation is dependent on technology and what is available in the market place.

9. TV SYSTEM DESIGN

9.1 CONFIGURATION

The DSTV signal distribution system in a hospital is configured as follows:

a. The satellite signal is received by the dish and LNB. The LNB transmits the horizontal and vertical signals via two coaxial RG6 cables to a multi-switch.
b. The multi-switch combines the horizontal and vertical signals and then splits it into a number (based on the size of the multi-switch) of similar signals for the individual decoders.
c. Each decoder is set to a dedicated DSTV channel and the decoded signal from each decoder is sent to a modulator. The modulators are connected in series. Each modulator is set to a different channel (frequency) and the modulator adjusts the frequency of the incoming decoder signal to the set modulator frequency and then combines the signal from the previous modulator with the signal of the decoder connected to it.
d. A FM antenna transmits radio signals to four radio receivers (each set on the required radio channel) and each radio receiver transfers a signal to a modulator. The signals are combined as discussed in point e).
e. The output of the different banks of modulators can be combined by means of a combiner, or the output of one modulator bank can be used as the input to the next modulator bank.
f. The signal from the last modulator or the combiner is send to the hospital via a distribution network consisting of coaxial cable, taps and splitters. See the schematic drawing, DSTV CABINET DESIGN SPECIFICATIONS (at the end of this document) for the detail configuration of the system.
g. For long runs a launch amp may be used. It is recommended to place the launch amp as close to the head end as possible as to prevent the amplifier form amplifying any noise that may enter the system downstream.
h. Suitably sized taps are used to reduce the signal strength as required, e.g. a 15 dB tap will reduce a 75dB signal to the required 60dB. Splitters are used to split signals.
i. Where an additional channel is only required in a specific ward, e.g. children's channel in Paediatrics, or an educational DVD channel in Obstetrics, the signal from the head-end is fed through an Alcad modulator situated in the IT cabinet in the specific ward. The decoder or DVD player is connected to this modulator. See the schematic drawing, ADDITIONAL CHANNEL FOR SPECIFIC WARD (at the end of this document) for the detail configuration of such a channel.

Figure 1: Spaun 2212F multi-switch

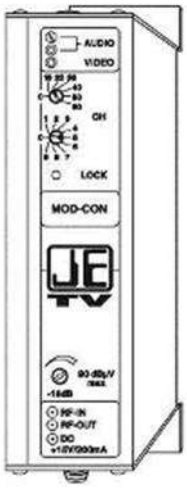


Figure 2: JE MOD-CON modulator
(Separate power supply)

Figure 3: ALCAD modulator
(Power supply included)

Figure 4: -15dB, 4-way Tap

Figure 5: 2-way splitter

Figure 6: Spaun HLV40/65 FPE launch amplifier

9.2 SET-UP

Each modulator is set to a specific broadcasting system and channel (frequency band). In

order to prevent interference between channels, only every second channel is used when setting up the modulators. Note that modulators usually can only handle VHF or UHF, not both and therefore must be specified correctly when ordered.
In South Africa, the International Telecommunication Union´s (ITU) broadcasting System I is used. It consists of the following channels:

In the VHF band (ITU System I):

Channel	Video carrier (MHz)	Audio carrier (MHz)
1	43.25	49.25
2	52.25	58.25
3	60.25	66.25
4	175.25	181.25
5	183.25	189.25
6	191.25	197.25
7	199.25	205.25
8	207.25	213.25
9	215.25	221.25
10	223.25	229.25
11	231.25	237.25
12	239.25	245.25
13	247.25	253.25

In the UHF band (ITU System I):

Channel	Video carrier (MHz)	Audio carrier (MHz)
21	471.25	477.25
22	479.25	485.25
23	487.25	493.25
24	495.25	501.25
25	503.25	509.25
26	511.25	517.25
27	519.25	525.25
28	527.25	533.25
29	535.25	541.25
30	543.25	549.25
31	551.25	557.25
32	559.25	565.25
33	567.25	573.25
34	575.25	581.25
35	583.25	589.25
36	591.25	597.25
37	599.25	605.25
38	607.25	613.25
39	615.25	621.25
40	623.25	629.25
41	631.25	637.25
42	639.25	645.25
43	647.25	653.25
44	655.25	661.25

45	663.25	669.25
46	671.25	677.25
47	679.25	685.25
48	687.25	693.25
49	695.25	701.25
50	703.25	709.25
51	711.25	717.25
52	719.25	725.25
53	727.25	733.25
54	735.25	741.25
55	743.25	749.25
56	751.25	757.25
57	759.25	765.25
58	767.25	773.25
59	775.25	781.25
60	783.25	789.25
61	791.25	797.25
62	799.25	805.25
63	807.25	813.25
64	815.25	821.25
65	823.25	829.25
66	831.25	837.25
67	839.25	845.25
68	847.25	853.25
69	855.25	861.25

10. TV SPECIFICATIONS & REQUIREMENTS FOR HARDWARE

10.1 SATELLITE DISH

a. Dish size: Ø 100cm
b. The construction material of the dish shall withstand corrosion i.e. fibreglass, aluminium, etc.
c. The dish shall be mounted on a heavy duty galvanised bracket.
d. The dish shall be mounted as close as practically possible to the equipment room.
e. The dish shall be earthed to the facilities main earth point according to SANS10142-1.
f. A twin LNB shall be used unless specified otherwise.
g. RG6 coaxial cabling from the satellite dish shall run together in conduit separate from electrical cabling to the equipment room. Any exposed cable lengths are to be wrapped in black or white 3M Scotchcast Splicing Tape. This is to prevent UV damage to the cable which may result in moisture entering the cable and negatively affecting the signal.

10.2 FM ANTENNA

a. The FM antenna must be mounted in a suitable location for best reception of signals.
b. The antenna shall be earthed according to the electrical regulation SANS 10142-1.
c. RG6 coaxial cabling from the antenna shall run in conduit separate from electrical

cabling to the equipment room. Any exposed cable lengths are to be wrapped in black or white 3M Scotchcast Splicing Tape. This is to prevent UV damage to the cable which may result in moisture entering the cable and negatively affecting the signal.

10.3 EQUIPMENT CABINET

a. Cabinet type and size: 19", 48U IT cabinet complete with cooling fans, cable management system and shelves for the decoders.
b. The cabinet containing the DSTV equipment shall be installed to allow for service and maintenance to the equipment.
c. The signal and power cabling shall be separately run in wire ways.
d. All splitters and taps shall be fixed to the cabinet and earthed to the chassis.

10.4 GENERAL

a. Cabling must be installed in conduit or on cable trays from the antennas to the head end equipment as per the cabling specification.
b. The head end equipment i.e. decoders, modulators, PSU, etc. must be neatly mounted inside the cabinet.
c. Adequate ventilation shall be allowed between equipment.
d. Signal strength of **60 dBµV** with a signal-to-noise ratio of better than 40 dB must be standard at every TV outlet.
e. End-of-line resistors (75 ohm) must be installed on all open or unused points, including open points on multi-switches, taps, splitters, etc. Open points may create entering points for signal noise.
f. When joining a cable, only make use of good quality F-type barrel connectors.
g. Never sharply bend the coaxial cable. This can damage the internal shield. Any spot where the shield is not continues may create an entering point for signal noise.
h. Only use good quality F-type connectors. Always make sure the coaxial cable shield is in contact with the connector to ensure one continues shield.
i. Only use good quality TV connectors. (Do not use plastic connectors that do not have appropriate shielding)
j. Limit the number of joints and connectors in a cable. Each joint or connection can easily create a loss of about 3dB, or even more.

Figure 7: 75 ohm EOL resistor

Figure 8: F-type barrel connector (Female)

Figure 9: F-type connector

Figure 10: TV connector (Twist onto cable)

11. GENERAL DESCRIPTION OF THE REQUIRED AUTOMATIC ADDRESSABLE ANALOGUE FIRE DETECTION SYSTEM

The fire detection system shall comprise of one analogue addressable control panel located in the Reception Office. This analogue addressable control panel is connected by a fire resistant 2-core transmission medium to the field devices, including fire detection devices, alarm devices and control devices located throughout the protected building as shown on the drawings.

A passive mimic display covered by removable 2mm thick transparent acrylic ("Perspex") or equivalent panel indicating all the zones must be installed next to the analogue addressable panel.

The mimic shall provide a floor plan layout of the zone related to the relevant analogue addressable control panel indicating at least the following:

[i] Device number.
[ii] Device type.
[iii] Room area description and number.
[iv] Zone number.

All equipment shall be labelled by means of a unique numbering system for ease of identification. All wiring and cabling shall be marked with PVC cable markers of proprietary manufacture. Each conductor shall have a unique number and the same number shall appear at both ends of the conductor. Wiring numbers shall appear on all as-built drawings.

All wiring will be installed in conduit. All conduit, wire ways, outlet boxes, etcetera will be provided by the electrical contractor

12. FIRE DETECTION GENERAL REQUIREMENTS

Tenderers shall supply full detail of the equipment offered at tender stage and shall make full allowance for the design, supply, wiring, installation and commissioning of the total system. Approval of equipment shall only be considered after samples have been approved and/or a working installation inspected. The cost of this inspection shall be for the Contractors account.

All the detectors and alarms for the Fire Detection systems shall be installed where indicated on the drawings.

For calculating of his tender price, the Tenderer must take the following into consideration:

i. It is essential that a layout showing the equipment positions and any changes that the Contractor requires, shall be submitted for approval within two weeks after the tender has been awarded. Changes at a later stage required by the Contractor, due to bad planning at this point in time, shall be for his own account.

ii. During the time of installation, there will be a number of other Contractors and workers on site and Tenderers must make ample allowance for co-ordination with others.

iii. The Contractor has to co-ordinate his program with the building program and shall ensure that under no circumstances are any delays caused due to his interfering with the building program or for that matter with any other Contractor on site.

Supply and install the complete fire detection system to comply with the current applicable provisions of the following standards:

a. Local electric codes

b. SANS 10139: Edition 3: Fire detection and alarm systems for buildings - system design, installation and servicing.

c. SANS 322: Edition 1: Fire detection and alarm systems for hospitals.

d. {i} SANS 50054-2/EN 54-2 (SABS EN 54-2), Fire detection and fire alarm systems - Part 2: Control and indicating equipment.

{ii} SANS 50054-3/EN 54-3, Fire detection and fire alarm systems - Part 3: Fire alarm devices - Sounders.

{iii} SANS 50054-4/EN 54-4, Fire detection and fire alarm systems - Part 4: Power supply equipment.

{iv} SANS 50054-5/EN 54-5, Fire detection and fire alarm systems - Part 5: Heat detectors - Point detectors.

{v} SANS 50054-7/EN 54-7, Fire detection and fire alarm systems - Part 7: Smoke detectors - Point detectors using scattered lights, transmitted light or ionization.

{vi} SANS 50054-11/EN 54-11 (SABS EN 54-11), Fire detection and fire alarm systems - Part 11: Manual call points.

13. REQUIREMENTS OF THE FIRE DETECTION SYSTEM

13.1 GENERAL INFORMATION

This part of the specification is for the supply, delivery, installation, testing and commissioning of a Fire Detection System and must be read in conjunction with the General Specification. Where it deviates from any of the specifications listed or accepted as general practice those deviations must be brought to the Engineer’s attention at tender stage.

13.2 EQUIPMENT MANUFACTURERS

All references to manufacturers, supplies, model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.

Equivalent equipment from other manufacturers or suppliers may be submitted for that specified providing the submittals are of the same or higher quality, standards and performance and conforms to this specification.

13.3 EQUIPMENT AND MATERIAL REQUIREMENTS

All equipment and material shall be new and unused.

All equipment and material shall be designed for continuous duty without undue heating or degradation of function or performance.

All equipment, materials, accessories, and other facilities covered by this specification or noted on the contract drawings shall be the best suited for their intended use and shall be provided by a single manufacturer or, if provided by different manufacturers, recognised as compatible by both manufacturers (written proof/statement shall be provided by the manufacturers).

13.4 TERMINOLOGY

The functions of the equipment or components of the equipment shall be indicated by means of identification labels.

Identification shall preferably be in the form of universally accepted symbols.

The terminology shall be in the English language.

The Contractor shall submit a complete schedule of symbols and/or terms of the identification of equipment to the Engineer for approval before any labels are engraved and installed.

13.5 ENGRAVING OF LOOSE EQUIPMENT

All loose equipment and tools supplied under this specification shall be indelibly engraved in a suitable position with the words Mpolweni Clinic.

13.6 BASIC SYSTEM

The system shall be a commonly known "addressable system", i.e. with addressable detectors and break glass units.

13.7 SYSTEM REQUIREMENTS

The following are the basic system requirements, which requirements are the minimum and not exhaustive.

i. The system needs to function properly, so that a fire in any place in the building can be detected before it gets out of hand and before extensive damage is caused.

ii. Detectors shall be optimally spaced and break glass units positioned for easy access along escape routes, while audible and visual sirens shall be spaced for total coverage.

iii. The system shall be designed in such a way that it is simple to operate and that no adjustments shall be required after installation.

iv. The equipment shall preferably be manufactured in the RSA and equivalent replacement equipment shall also be available in the RSA.

v. Equipment shall have been installed in the RSA in a similar installation as the one specified and shall have operated reliably and satisfactory for at least one year.

vi. All components for the system offered and installed shall be available for a period of at least 10 years from the date of the contract. A certificate of guarantee to this effect shall be submitted by the supplier of such components.

vii. If the system offered is software driven then the software program shall be burnt into EPROM, after all parties agree that the system is operating in a satisfactory manner. Backups of software shall be supplied to the Employer for future use.

viii. Devices shall be grouped into zones as indicated on the drawings and each zone shall be wired separately. A wiring fault in one zone shall thus not disable any other zone or device throughout the building.

ix. Spare capacity of 20% shall be allowed for in the design of the control panels, loops, zones, etcetera.

14. FIRE DETECTION SYSTEM OPERATION

14.1 ACCESS CODES

The system shall be designed to operate at 4 security levels. These levels are defined as follows:

Level 1: No access code required - normal operator functions
Level 2: Access code required - maintenance functions access
Level 3: Access code required - commissioning functions access
Level 4: Access code required - supervisor functions access

Access codes shall be allocated and entered into the panel by the Supervisor, who shall have the ability to change codes at any time. Facilities shall be provided for entering operator names against each access code.

14.2 OPERATION

The system shall be designed to operate with the minimum of operator training. Basic fire alarm functions shall be completely self-explanatory, and shall be understood by a person

with no training. The occurrence of a fire alarm shall indicate all relevant text and zone information without operator intervention.

Neither the operation of a fire or fault signal, nor a keyboard operation carried out by an operator, shall inhibit or delay in any way the receipt of additional alarms.

Should any part of the system be isolated, disabled, or placed in maintenance mode, a lamp on the front of the panel shall illuminate to indicate the abnormal status of the system.

14.3 FIRE OPERATION

An alarm received from a fire sensor or other device shall cause the following actions to occur immediately.

{a} Common Fire lamps to illuminate
{b} Zone/super zone lamp to illuminate
{c} Display to indicate in text:
  {i} FIRE
  {ii} Zone Number
  {iii} Detector Number
  {iv} Exact location
{d} Panel buzzer to sound continuously
{e} Common sounders to operate
{f} Zone sounders to operate
{g} Required control functions to operate
{h} Remote text or lamp displays to operate
{i} Graphics computers to indicate alarm status
{j} Fire Brigade/Central Station signal to operate

Pressing the "Accept" key must silence the alarms, except the panel buzzer, which must sound intermittently for 0.5 seconds, every 20 seconds.

Pressing the "Reset" button shall reset the system to normal monitoring status.

Should an alarm condition still exist after resetting, the above sequence of events shall be repeated.

14.4 FAULT OPERATION

A fault signal received from a fire sensor or other device, or from the panel or battery charger, shall cause the following to occur immediately, where appropriate.

{a} Common Fault lamps to illuminate
{b} Zone/super zone lamp to illuminate
{c} Display to indicate in text:
  {i} **FAULT DESCRIPTION**
  {ii} Zone Number
  {iii} Detector Number
  {iv} Exact location
{d} Panel buzzer to sound continuously
{e} Common sounders to operate

{f} Required control functions to operate
{g} Remote text or lamp displays to operate
{h} Graphics computers to indicate alarm status

Pressing the "Accept" button must silence the alarms. The visual alarms are to remain. In the event of more than one fault signal occurring simultaneously, then the text display must rotate between the alarms.

Should a fire alarm occur while a fault is displayed, then the fire alarm must replace the fault signal, which must restore after the fire alarm has reset.

Pressing the "Reset" key shall restore the system to normal. Should a fault condition still exist, then the above sequence of events shall be repeated

15. FIRE DETECTION SOFTWARE CONTROL

15.1 GENERAL

The system shall at all times be under software control.

15.2 AUTO CONFIGURATION

Upon switch-on, the panel shall, automatically and without manual intervention, go into a fully operational status. Automatic configuration shall include:

{a} Be fully functional (Fire and Fault)
{b} All device addresses present to be recorded in memory
{c} All device types to be recorded in memory
{d} Devices to be automatically calibrated
{e} Common fire lamps must operate
{f} Common sounder outputs (2) must operate
{g} Common fault output must operate
{h} Display must operate

15.3 MANUAL PROGRAMMING

Additional configuration data in order to tailor the system to the specific application must be able to be programmed into the system. It shall be possible to program the system via the panel keypad, and by means of an external computer. In both cases, it shall be possible to save the program to disk.

15.4 STORAGE OF SOFTWARE

All software, both the operating program and the configuration data, shall be held in solid state memories. In particular, software shall not be held on magnetic tapes, disks, or any device requiring mechanical moving parts.

15.4.1 Operating Programs

The operating program must be held in permanent, non-volatile, read-only, EPROM

memory, which shall not be erasable or alterable. Each EPROM shall be permanently labelled with a part number, and a version and issue number, which shall be traceable to a software manual. The operating program shall provide all auto-start and self-programming features to provide an operational system, without any manual programming, as described above.

15.4.2 Configuration Data

All Configuration data shall be stored in non-volatile, EPROM read-only memory, which can be electrically erased for editing purposes. The EPROM used shall retain all programmed data, even when the system is completely powered down.

Printed circuit mounted batteries, such as lithium cells, for retaining memory contents, are not acceptable. All configuration data must be able to be edited through the keyboard.

16. FIRE DETECTION ADDRESS LINE

16.1 POLLING SYSTEM

The fire detection system is to incorporate a polling system, which polls each sensor individually and transmits information from each sensor to the control unit, or instructions from the control unit to each sensor.

The panel software shall make all decisions based upon the information received from each sensor and line device. No sensor or other line device shall make alarm decisions on its own.

The panel is to instruct each sensor or line device in an alarm state to switch on it's LED, and, where applicable, it's remote LED. Even when a sensor is in alarm state, it shall continue to send variable information to the control unit, indicating changes in the smoke or heat level.

The idle value of each sensor shall be individually monitored and updated at regular intervals by the panel software, in order to compensate for contamination and environmental conditions.

System polling time shall be 3 seconds or less for each complete scan of all devices attached. Polling time shall remain at a fixed time irrespective of the number of devices attached to a line. The panel software must be able to send self-test instructions to each fire sensor, and monitor the results.

16.2 SENSOR WIRING

A 2-wire circuit shall be used for power and communication between the panel and the sensors. Up to 127 sensors and line devices must be able to be connected to each line. It must be possible to add additional devices anywhere in the line at a later date without affecting the addresses of existing sensors, or existing system configuration.

The wiring shall be arranged as a class "A" return loop and the system must be able to feed from both ends of the loop in the event of a wiring fault. The circuit must be able to accept

tee-off's with full monitoring.

Field wiring must be protected from open and short circuits by means of line isolators. These isolators must sense a short circuit, and disconnect the portion of line with the wiring fault. Up to 16 line isolators must be able to connect with each line.

The system must be able to operate with up to 3000 metres of 2-core wiring. This represents a total of 6,000 metres of individual conductor length. Wiring must be screened, and must be sized to comply with the systems manufacturer's requirements. All screens must be continuous, and must be earthed at the control panel only.

The system manufacturer shall provide a Wiring Manual, and the Tenderer shall prove that the proposed wiring complies with the system requirements.

16.3 SYSTEM CONTROL

All communication shall be under the control of the control panel, which shall sequentially poll each device in turn and authorise communication.

No device shall communicate with the control panel without authority. The control unit must be able to read information from a device or send instructions to a device.

16.4 DEVICE ADDRESS

Each device on the address line shall be uniquely identifiable by the control unit. This must be achieved by pre-setting the address of each device by means of a address selective switch.

Removal of a sensor head or base from the ceiling shall not affect any other sensors in the system, which must continue to function normally. The address selective switch shall be rated for the life of the system.

To ensure long-term reliability, the address selective switch shall be located in the sensor head.

The address setting must be unaffected by distortion caused by uneven ceilings, and must be guaranteed to retain it's address for the life of the system.

A dual-tab system must be used with the address of each sensor being labelled on both the sensor head and base, arranged so that it is possible to see at a glance that the head and base match.

16.5 DEVICE IDENTIFICATION

The identification of each type of address unit and each type of sensor (i.e. ionisation sensor, heat sensor, sprinkler switch, etc.) must be transmitted to the panel on each polling scan.

16.6 DEVICE STATUS

The condition of each sensor or other line device, including the state of it's circuit, it's calibration and the level of contamination must be transmitted to the panel on each polling

scan.

16.7 NUMBER OF DEVICES IN ALARM

There shall be no limit to the number of devices which may be in alarm simultaneously.

When a sensor is in alarm, a led in it's base shall flash. In this state, it's variable analogue output must continue to function, and it shall continue to report it's analogue status to the panel.

17. FIRE DETECTION SYSTEM FEATURES

17.1 ALARM DECISIONS

All alarm decisions shall be taken by the control panel after checking the data from each device several times. No decisions shall be taken by any sensors.

Fire alarm response times for automatic sensors shall be less than 10 seconds. Manual call points must cause a response in 3 seconds. Fault and maintenance signal response times, including pre-alarm decisions, must take between 20 and 100 seconds, depending upon the type of event being monitored.

It must be responsible to program an alarm verification feature to individual sensors or devices. In these cases, the above times are from the verification of the alarm.

17.2 DEVICE SENSITIVITY

Sensitivity of each sensor is to be individually adjustable from the control panel.

Four levels of adjustment are required for each device. All sensitivities shall comply with the requirements of specifications BS5839, BS5445, and EN54.

17.3 ALARM VERIFICATION

A facility shall be provided in the panel software for applying an Alarm Verification (AVF) feature to individual sensors, zones of sensors, or globally to all sensors.

Upon receipt of an alarm, the AVF feature shall check that the alarm remains for 20 seconds before confirming it.

The default state shall be "AVF off".

17.4 AUTO CALIBRATION

The system shall check and automatically adjust the calibration of each analogue sensor on a regular basis, to compensate for changes caused by environmental contamination, voltage fluctuations, and ageing. This action shall take place every 24 hours and shall ensure that the sensitivity of each device remains constant, even when contaminated.

When the maximum calibration adjustment of a sensor is reached, the panel must indicate a

"Maintenance Required" signal for that sensor. The type, calibration, sensitivity and status of each sensor must be able to be displayed at the panel on the LCD display.

17.5 SENSOR SELF-TEST

Analogue sensors shall incorporate a built-in self-test function, which can be activated by the control panel. Every 24 hours, all sensors must be instructed to carry out the self-test routine.

The self-test feature in the sensors must be so arranged that it simulates the ingress of smoke, and causes the sensor to respond appropriately. The panel is to monitor the result from each sensor, and pass or fail each unit based upon a software algorithm.

The test shall involve the operation of all active components in each smoke sensor, and must not use secondary components reserved for the test function, as this would defeat the purpose of the test. After the test is done, the panel must print out a list of any devices, which failed the test. Reporting on devices, which passed the test, is not required.

Manual initiation of the self-test via the panel keyboard shall be possible.

17.6 LINE MONITORING

Addressable lines shall be monitored for short circuit, open circuit and earth leakage.

A single open circuit shall result in all devices continuing to operate normally, with the panel indicating a line fault.

A single short circuit shall cause a maximum of 20 devices (sensors or call points) in the system to be disabled, with all remaining sensors functioning normally. This is to be achieved by the use of line isolator units. The panel must indicate a line fault, and must report the addresses and location of the disabled devices.

17.7 LINE ISOLATORS

Line isolators shall be located at intervals on the sensor line. In the event of a line short circuit, the isolators on each side of the short must open, and isolate the faulty section of wiring.

The system shall be able to support up to 16 line isolators per loop.

All isolators shall be under software control. In maintenance mode, it must be possible to open or close isolators manually from the panel for test purposes.

17.8 PANEL CAPACITY

The capacity of each address line shall be 127 addressable devices. These shall be input devices, such as smoke sensors, or output devices, such as sounders or relays.

The capacity of a control panel shall be four (4) lines, providing up to 508 addressable devices. It must be possible for panels to be interconnected to provide additional lines, as required. Each panel must support up to 512 addressable programmable switched outputs.

These shall be either voltage-free contacts, solid-state outputs, or 24 volt monitored sounder outputs, or a combination of these types.

It shall also be possible for one satellite panel to control the outputs in another satellite panel.

17.9 DEVICE TYPES

Control units shall be able to accept the following addressable devices on the address lines.

{a} Ionisation smoke sensors
{b} Optical smoke sensors
{c} Heat sensors
{d} Break-glass "call-point" units
{e} Line relays
{f} Line sounder drivers
{g} Interface units
{h} Line isolators
{i} Conventional detectors
{j} Extinguishing Gas control unit
{k} Very early warning Smoke detectors
{l} Linear beam smoke detectors
{m} Ionisation sensors - Intrinsically safe
{n} Heat Sensors - Intrinsically safe
{o} Interface units - Intrinsically safe
{p} Manual call points - Intrinsically safe

17.10 DEVICE IDENTIFICATION

During initial start-up, the panel must automatically identify every device on the address lines and record this information in memory. The following devices must be recognised by the panel:

{a} Ionisation sensor (analogue)
{b} Optical smoke sensor (analogue)
{c} Heat sensor (analogue)
{d} Break-glass "call-point" unit
{e} Sprinkler flow switch
{f} General interface
{g} Security interface
{h} Conventional detector interface
{i} Gas control unit
{j} Very early warning Smoke detectors
{k} Line relays
{l} Linear beam smoke detectors
{m} Line sounder drivers
{n} Ionisation sensor (analogue) - Intrinsically safe
{o} Heat smoke sensor (analogue) - Intrinsically safe
{p} Break-glass "call-point" unit - Intrinsically safe
{q} Interface unit - Intrinsically safe

The panel must then check the sensor and device types on every subsequent scan, and indicate a type-fault signal should a device at a particular address be changed to a different type.

17.11 DEVICE STATUS

Each addressable device must be polled by the panel at least every 3 seconds. Analogue status and equipment condition shall be read and stored in the panel on every scan.

Software algorithms shall assess the varying status of each device, and indicate the following conditions:

{a} For Analogue Addressable Sensors:

- {i} Sensor healthy/Status normal
- {ii} Fire alarm
- {iii} Pre-alarm
- {iv} Sensor contaminated
- {v} Sensor faulty
- {vi} Incorrect type of sensor
- {vii} Faulty calibration
- {viii} Sensor removed

{b} For Addressable Interface Units:

- {i} Device healthy/Contact status normal
- {ii} Fire alarm
- {iii} Fault: Contact wiring open circuit
- {iv} Fault: Contact wiring short circuit
- {v} Fault: Interface unit circuit
- {vi} Incorrect type of interface unit
- {vii} Interface unit removed

17.12 ALARM AND MAINTENANCE THRESHOLDS

The alarm thresholds of each analogue sensor shall be adjusted individually and automatically in accordance with it's idle status so that the sensitivity of each sensor will remain constant even when contaminated, or subject to fluctuating supply conditions. The above shall also include pre-alarm thresholds, and maintenance signal thresholds.

17.13 SENSOR CONTAMINATED SIGNAL

Should a sensor become contaminated to the point where the software can no longer re-calibrate the device, the panel must indicate a "maintenance required" signal for that particular sensor. This shall be an unambiguous signal, separate from the "pre-alarm" signal.

The software shall have the facility for the "Maintenance" status to be displayed automatically, or alternatively, to be logged to memory, for later printout by a service technician.

17.14 SENSOR "NEAR-SERVICE" REPORT

The software shall cater for a facility for identifying sensors that are within 10% of being contaminated. It shall also be possible to print a report upon request.

17.15 PROCESSOR MONITORING

A hardware "watchdog" circuit shall be provided on the central processor module. In the event of a microprocessor failure, the watchdog must cause an auto reset of the microprocessor.

Failure of the processor to restart shall cause a "Processor Failed" lamp to illuminate, and a buzzer to sound continuously.

The panel shall incorporate a permanent counter which records the number of "watchdog" restarts.

18. FIRE DETECTION SIGNALLING & ANNUNCIATION

18.1 GENERAL

Fire, Fault, Maintenance and Pre-alarm signals shall be indicated visually and audibly in the control unit.

The indications must be arranged so that the different warnings are clearly distinguished. (ie amber for fault, red for alarm).

The internal audible signalling device may be the same for all alarms, but either tone variation or time switching shall be used to differentiate fire and fault signals.

Outputs shall be provided for audible alarms, control functions and connection for printer. In addition, outputs shall be provided for remote text display units, and remote operation units.

18.2 ZONING

The panel shall have 128 zones indicated digitally, and 29 zones indicated by means of LEDs. It must be possible to expand the zone LEDs to 128. The zones must be fully fielded programmable.

It must be possible to randomly allocate, by software, any device or sensor, from any line, to any zone.

18.3 PANEL INDICATORS

All visual indicators shall be LEDs and no incandescent lamps are to be used.

The following LEDs must be provided:

{a} 29 - Zone Fire
{b} 4 - Definable Alarm
{c} 1 - Supply Healthy
{d} 1 - Supply Faulty
{e} 2 - Common Alarm
{f} 1 - Pre-Alarm
{g} 1 - Common Fault
{h} 1 - Maintenance
{i} 1 - Processor Failed
{j} 1 - Device Isolated

18.4 PANEL DISPLAY

The panel shall have a plasma display of 2 lines, each 40 characters in width.

This is to be a bright text display, clearly visible from a distance of 4 metres. In addition, the text must be able to be clearly read from an angle of 45 degrees to the left or right of centre.

The first line must give the following information:

{a} Alarm Type
{b} Zone Number
{c} Sensor/Device Number

The second line must be field programmable to provide a user-defined message for each sensor. The panel must have memory capacity for a message of 40 characters for each sensor connected to the system.

18.5 PANEL CONTROLS

The panel shall incorporate a touch-button keypad with the following functions:

{a} Numeric keyboard
{b} System Reset button
{c} Alarm Accept button
{d} Alarm Sound button
{e} Lamp Test function
{f} Function buttons for maintenance/commissioning.

18.6 COMMON OUTPUTS

The control panel is to be fitted with a number of common outputs, as described below. These outputs must operate in the event of a signal from any sensor or device on the system.

18.6.1 Alarm Sounder Outputs (fire)

The panel must incorporate 2 common monitored sounder outputs for bells or electronic sounders. These outputs must operate on receipt of a fire signal from any source, and must go off when the "Accept" button is pressed.

The sounder field wiring must be monitored for open/short circuit.

Each output must be rated 1,0 Amp at 24 volts dc.

18.6.2 Alarm Contact Outputs (Fire)

One common voltage-free changeover contact shall be provided. This must operate on a "fire" condition, and is to remain "on" until the system is reset.

The contacts shall be rated at 2 amps at 24 volts dc.

18.6.3 Alarm Contacts (Fault)

One common voltage-free changeover contact shall be provided. This must operate on receipt of a fault signal from any source, and is to remain "on" until the system is reset.

The contacts shall be rated at 2 amps at 24 volts dc.

18.7 PROGRAMMABLE OUTPUTS

Each panel shall be able to operate up to 512 software-programmable outputs. It shall be possible to mix different type of outputs to obtain the functions required.

These outputs are for system configuration and must be able to be programmed to operate from any zone, sensor or function, individually or in any combination.

It shall also be possible to program the outputs to include functions such as time delays, de-energise on system reset, de-energise on alarm accept, co-incidence operation, steady operation or pulsing operation.

18.7.1 Programmable Relays

These shall be software programmed relays with voltage-free single pole change-over contacts.

The relay contacts are to be silver plated, and rated at 2 amps at 24 volts dc.

18.7.2 Programmable Sounder Circuits

These shall be software programmed monitored outputs for operating audible alarms such as bells or sounders.

These outputs are to monitor the sounder field wiring for open and short circuit. Each output must provide 24 volts dc, at 1.0 amp, for driving the sounders.

18.7.3 Programmable Output Switches

These shall be software-programmed open-collector transistor outputs for operating low current devices such as lamps, LEDs and relays.

Each transistor output must be rated at 50 milli-amps at 24 volts dc.

18.8 DATA OUTPUTS PORTS

The panel shall have parallel and serial data outputs with compatible software for the operation of auxiliary system devices such as remote display panels, remote mimics and graphics computers, and printers.

Each panel must support up to 8 data ports, as described below.

18.8.1 RS232 Ports

These shall be serial ports conforming to the RS232C standard, suitable for communication up to 10 metres. Baud rate, word size, stop bits and parity shall be adjustable.

Communication shall be bi-directional, and support handshaking.

18.8.2 RS485 Ports

These shall be serial ports conforming to the RS485 standard, suitable for communication up to 2000 metres. Baud rate, word size, stop bits and parity shall be adjustable.

Communication shall be bi-directional, and support verification.

18.8.3 RS422 Ports

These shall be serial ports conforming to the RS422 standard, suitable for communication up to 2000 metres. Baud rate, word size, stop bits and parity shall be adjustable.

Communication shall be bi-directional, and support verification.

19. FIRE DETECTION NETWORKING

The networking capabilities of the system shall be such that up to 32 control panels may be connected via RS485 medium of optical medium. It shall be possible to remove and add to the network to allow for easy expansion of the system.

The network shall use an industry standard protocol such as ARCNET or ETHERNET to ensure that no data is corrupted.

The network shall be able to provide:

- Inter-panel Input / Output Programming
- Remote Uploading / Downloading of System Configurations to individual panels
- Remote Maintenance Features
- RS232 Nodes ;for connection to Graphics Packages, Building Management Systems

and modems

- Global Repeater Panel
- Peripheral Panels

20. FIRE DETECTION ALARM MANAGEMENT

20.1 GENERAL

The system shall have extensive alarm management facilities built into the software, to provide flexible configuration to suit the present application as well as for future updates to the building.

All alarm management and configuration functions shall be under software control, and must be able to be programmed and edited directly through the panel keyboard.

In addition to the above, facilities shall be provided for programming on a desktop computer, and for saving configuration programming to disk.
Programming must be held in memory, even during a panel power-down.

20.2 OUTPUT DEVICES

The following optional output devices must be available to connect to the system to provide the required control functions.

{a} Programmable panel relays
{b} Programmable panel transistor outputs
{c} Programmable panel sounder outputs
{d} Programmable line relays
{e} Programmable line sounder drivers
{f} Programmable line gas control units

20.3 INPUT/OUTPUT MAPPING

The system must support 254 inputs, 512 outputs, and 200 input-output programmed software links. It must be possible to program the outputs to be randomly allocated for operation of any of the following:

{a} Any Zone
{b} Any Sensor
{c} Any Line Device
{d} Any Panel function
{e} Any Panel operating button
{f} Any combination of the above

20.3.1 Coincidence Operation

It shall be possible to program any of the outputs so that it must only operate upon an alarm from any 2 sensors in the programmed group.

20.3.2 Silencing Operation

It shall be possible to program any of the outputs to operate in either "silencing" mode or "non-silencing" mode.

In "silencing" mode, the relay or output shall deactivate when the "Alarm Accept" button is pressed, or when the "Reset" button is pressed.

In "Non-silencing" mode, the relay or output shall be deactivated only when the "Reset" button is pressed.

20.3.3 Activation Delay

It shall be possible to program any of the outputs to activate after a delay period from receipt of the control signal.
This delay shall be 0 - 17 minutes, in 1 second acceleration.

21. FIRE DETECTION SENSORS & LINE DEVICES

21.1 GENERAL

Sensors and other line devices shall operate on a 2 wire circuit for both power and two-way communication between the device and the panel. Each device or sensor must be uniquely identifiable by the control panel. This is to be achieved by pre-setting the address in the sensor head.

All sensor circuits shall be conformally coated to provide protection from moisture and dust.

Sensors shall mount to a twist-lock base. The base shall be common to all sensor types and it shall be possible to interchange sensors from one base to another without special tools or equipment.

Both surface mount and recess mount bases must be available.

21.2 IONISATION SENSOR

The ionisation fire and smoke sensor shall be an addressable analogue unit which continuously measures the products of combustion in the air, and gives a proportional analogue output. It shall meet the requirements of specification EN54 Part 7.

The sensitivity of each sensor shall be individually adjustable from the control panel. It shall be possible to measure and display each sensor's sensitivity at the control panel.

When contamination causes a sensor's sensitivity to shift, the panel shall recalibrate to compensate. When contamination becomes excessive, the panel shall indicate a "sensor maintenance required" signal.

The sensor shall be a dual-chamber type fully compensated for temperature, humidity and barometric changes. The radioactive source shall be less than 1 micro-curie of Americium 241, and shall comply with all Atomic Energy Agency requirements.

A light emitting diode (LED) on the base must illuminate when a sensor is in alarm. Terminals shall be provided for remote LED indication.

21.3 OPTICAL SMOKE SENSOR

The optical smoke sensor shall be an addressable analogue unit which continuously measures the smoke level in the air, and gives a proportional analogue output. It shall comply with the requirements of specification EN54 Part 7.

The sensitivity of each sensor shall be individually adjustable from the control panel. It shall be possible to measure and display each sensor's sensitivity at the control panel.

When contamination causes a sensor's sensitivity to shift, the panel shall recalibrate to compensate. When contamination becomes excessive, the panel shall indicate a "sensor maintenance required" signal.

The sensor shall be an optical light scattering type sensitive to visible smoke and to be stable under all environmental conditions. The internal test and calibration circuits shall use the same optical elements as the smoke sensing circuits, to ensure reliability. A light emitting diode (LED) on the base must illuminate when a sensor is in alarm. Terminals shall be provided for remote LED indication.

21.4 HEAT SENSOR

The heat sensor shall be an addressable analogue unit which continuously measures the temperature of the air, and gives a proportional analogue output.

It shall comply with the requirements of specification EN54 Part 5. The sensitivity of each sensor shall be individually adjustable from the control panel. It shall be possible to measure and display each sensor's sensitivity at the control panel. Sensitivity must be 58°C – 82°C.

It shall be possible to set each heat sensor individually into "standard" mode, or "rate-of-rise" mode, from the control panel via the keyboard.

A light emitting diode (LED) on the base must illuminate when a sensor is in alarm. Terminals shall be provided for remote LED indication.

21.5 CALL POINT UNITS

The call point shall be an addressable "Break-glass" unit which mounts to a wall mounting box. Breaking a glass panel shall operate the alarm.

Call points must bear the legend "FIRE - BREAK GLASS", and shall be moulded in red plastic. Dimensions shall be 80 x 80 mm, and the unit shall be suitable for surface or semi-flush mounting.

A light emitting diode (LED) must illuminate when a call point is in alarm.

Removal of a call point shall not cause disconnection of the wiring, and shall not interfere with the remaining devices on the on the line.

21.6 INTERFACE UNITS

The interface unit shall be an addressable device which plugs in to a pre-wired wall mounting box. It shall monitor the status of an external voltage free contact.

The interface units are to be suitable for connection to an external contact (or contacts) by means of a pair of wires.

The wires between the interface and the contact are to be monitored for short circuit and open circuit. The interface unit must be able to report to the panel whether the contact is open or closed, and whether the wiring is in a normal, open or short circuit state.

In addition, interface units must report the type of contact being monitored i.e. Fire, Sprinkler, Auxiliary, etc. Interface units are to be mounted in a moulded plastic box, size 115 x 115 mm, and are to be suitable for surface or semi-flush mounting.

A light emitting diode (LED) must illuminate when an interface unit is in alarm. Terminals must be provided for a remote LED.

Removal of an interface unit shall not cause disconnection of the wiring, and shall not interfere with the remaining devices on the line.

21.7 CONVENTIONAL DETECTOR INTERFACES

The conventional detector interface unit shall be an addressable device which plugs in to a pre-wired wall mounting box. It shall connect conventional fire sensors of all types into the addressable fire detection system.

Conventional sensor interface units shall operate on a 4 wire circuit, two wires for the addressable system and two wires providing power for the conventional sensors.

Each interface unit is to be suitable for connection to up to 20 conventional sensors by means of a pair of wires. The wires between the interface and the sensors are to be monitored for open circuit, and sensor removal. The interface unit must be able to report to the panel whether the sensor is in a normal or alarm condition, whether the sensor is removed, and whether the wiring is in a normal, open circuit or short state.

Interface units are to be mounted in a moulded plastic box, size 115 x 115 mm, and are to be suitable for surface or semi-flush mounting.

A light emitting diode (LED) must illuminate when an interface unit is in alarm. Terminals must be provided for a remote led.

Removal of an interface unit shall not cause disconnection of the wiring and shall not interfere with the remaining devices on the line.

21.8 LINE ISOLATOR

The line isolator shall be designed to connect into the sensor line, and monitor the line for short circuit. In the event of a short circuit occurring, the line isolators on each side of the short circuit are to disconnect and isolate that portion of line from the system enabling the remainder of the system to function normally.

Each line isolator shall be under software control of the panel, but must not remove a line address from the system. It must be possible to selectively open or close line isolators from the panel when in maintenance mode.

Line isolators shall mount to a twist-lock base. Bases shall be available in surface or recessed models.

A light emitting diode (LED) must illuminate when an isolator is in an open or isolated condition.

21.9 INTRINSICALLY SAFE ANALOGUE SENSORS

A range of intrinsically safe analogue addressable sensors and line devices must be available for connection to the system address line. These devices must be approved by a certified test laboratory.

The following devices must be available:

{a} Intrinsically safe analogue ionisation smoke sensor
{b} Intrinsically safe analogue heat fire sensor
{c} Intrinsically safe addressable interface unit
{d} Intrinsically safe addressable manual call point unit

22. FIRE DETECTION MAINTENANCE FUNCTIONS

The system shall continuously monitor the condition of every field sensor or device, and all wiring, and give a signal should any failure or calibration error occur.

The system shall be self-testing and self-adjusting. Extensive maintenance and test facilities are to be built into the software for the use of field maintenance technicians.

22.1 AUTOMATIC MONITORING

Each device shall be continuously monitored for the following:

{a} Existence on line
{b} Calibration
{c} Contamination
{d} Circuit failure
{e} Device type
{f} Line noise
{g} Short circuit
{h} Open circuit
{i} Earth leakage

Should any of these parameters be out of specification, the panel shall give a fault signal, and a text description of the nature of the fault, as well as the location of the faulty device.

22.2 VISUAL MONITORING

It shall be possible to visually monitor on the display screen, the status, in real-time, of each device connected to the system. All information transmitted from each device to the control panel shall be able to be called to the screen, and watched as it changes; for example, with the entry of smoke into the sensor or the change of a sensor from one type to another.

22.3 ARCHIVE FACILITY

The system shall be able to store the last 500 events. It shall be possible to print out these events selectively as either fire alarm events, fault events or panel operations.

22.4 DEVICE STATUS REPORT

It shall be possible to print out, upon demand, a technical level analogue status report of all devices and sensors attached to the system.

For each device, this report shall give the following information:

{a} Calibration references
{b} Base type
{c} Head type
{d} Analogue status

22.5 SYSTEM CONFIGURATION REPORTS

It shall be possible to print out, upon demand, the following information about each zone and device:

{a} Device numbers
{b} Device types
{c} Zoning
{d} Input-output mapping
{e} Device messages

22.6 ZONE TEST MODE

It shall be possible to set the panel into a mode which will allow one person to test all sensors in a zone, without inhibiting any other zones.

Should an alarm occur in any zone other than the one being tested, then the panel is to cancel the test and respond to the alarm in the normal manner. If smoke remains in a sensor for longer than 90 seconds, the panel shall cancel the test and respond to the alarm in the normal manner.

When in this mode, all sensors in the defined zone will be tested using smoke, heat or fire on. The panel is not to operate any relays or audible alarms, and is to record in memory each alarm as it occurs. At the end of the test, the panel shall print out, upon request, all

devices that operated, and a list of all devices that did not operate.

22.7 ISOLATION OF INPUTS

It shall be possible to isolate any sensor or device, or any zone of sensors or devices. This shall be done via the panel keypad, and shall be subject to the entering of an access code.

It must be possible to connect key switches to the panel, programmed to isolate devices by address or zone, for those devices that are regularly isolated.

An isolated device must not cause any alarm or fault signal to be generated in the panel.

Isolating a device must not affect or inhibit any other device on the line.

If any device or group of devices is isolated, a lamp on the front of the panel, stating "isolated" must illuminate.

22.8 ISOLATION OF OUTPUTS

It shall be possible to isolate, for maintenance purposes, any or all of the system outputs. This shall be done via the panel keypad, and shall be subject to the entering of an access code.

If any device or group of devices is isolated, a lamp on the front of the panel, stating "isolated" must illuminate.

If sounder outputs are isolated, the panel buzzer must operate continuously until the sounder outputs are re-instated.

23. ACCESS CONTROL & VIDEO/INTERCOM COMMUNICATIONS

Access Control & Intercom outlets, points and infrastructure thereof, will be installed by the electrical contractor and must be coordinated between both parties and presented to the Engineer two weeks after the tender is awarded. The Engineer has made certain allowance for outlets and points as indicated on drawings and the tenderer may use this as a basis to work from.

23.1 ACCESS CONTROL

A specialist contractor, specializing in the field of security access control shall install the system.

The infrastructure shall comprise mainly of new wall/round boxes & 25mm conduits from wall/round boxes allowing for wire ways between equipment.

A typical access controlled door will consist of a power supply unit, plugged into a local 16A SSO, a Key Pad reader and release button on non-secure sides of the door, as well as a magnetic lock including suitable brackets and door closers.

The Access Controlled door shall open under fire alarm conditions as well as under cardiac

arrest alarm, caused by a relay unit wired between magnetic lock and power supply unit.

23.2 VIDEO/INTERCOM COMMUNICATIONS

The video intercom unit shall be standalone system with remote receiver and viewing screen at nurse's stations and installed according to the manufacturer's instructions.

The infrastructure shall comprise mainly of new wall/round boxes & 25mm conduits from wall/round boxes allowing for wire ways between equipment. Possible alteration to joinery should be indicated formally within one week after appointment of the contract.

The various units are located as shown on drawings, with the slave units actuating items such as magnetic locks.

24. WIRE WAYS

Conduit, sleeves and draw boxes shall be provided by others, however it is the responsibility of the contractor to ensure that this installation is to HIS requirements. He will thus submit a conduit layout within two weeks after the tender has been awarded and shall be responsible, during the construction stage, to ensure that the conduit system is installed to his requirements regarding positions and height of outlet boxes. No claims shall be entertained at a later stage due to the wire ways not complying with the contractor's needs.

To ensure that this requirement is met it is essential that the contractor closely liaises with the electrical contractor and the wet works contractor.

It is also a requirement that Tenderers should indicate at tender stage whether they are satisfied with the basic layout as per the drawings.

25. MAINTENANCE REQUIREMENTS

The free maintenance period of 3 months from hand over is as detailed in the conditions of contract and contract preliminaries.

26. INSPECTION ON SITE

As much information as possible has been given, but in view of the nature of this service, Tenderers are advised to visit the site and thoroughly acquaint themselves with the nature and extent of the work to be done. Tenderers shall make allowance for items obviously intended and necessary for the proper completion of the work, although not specifically mentioned. The Tenderers must liaise with the electrical engineer to visit the site and acquaint themselves with the nature and extent of the removal and installation of the new equipment.

27. WORKING DRAWINGS & TECHNICAL INFORMATION (APPLICABLE TO ALL SYSTEMS)

27.1 GENERAL

Only the main equipment and devices have been shown on the drawings and specific wiring or cabling between equipment has not been shown.

It shall be the responsibility of the Contractor to ensure that the method of installing wiring or cabling, and the wiring used, between the equipment shall optimise the use of such equipment and that the optimum parameters specified can be obtained.

27.2 SUBMITTALS DURING TENDER PERIOD

All Tenderers shall submit the following information with their tenders:

{a} Outline drawings showing the dimensions (size), loops, zones and configurations of all equipment in the spaces allocated to these equipment.

{b} Any information that may have a direct effect on the architectural or structural features of the building, which features may upon the proposal of the Contractor be subject to modification.

{c} Certification of ISO compliance for the equipment and cabling that will be used during the execution of the contract.

{d} Brochures and specifications of all equipment offered for the execution of the contract.

{e} Brochures and specifications of all software offered for the execution of the contract.

{f} Full details regarding the proposed training to be given on the hardware, software and the operation and maintenance of the systems.

{g} A letter of compliance also indicating which of the items offered does not comply with this specification and what the differences are and the implications thereof.

27.3 SUBMITTALS DURING CONTRACT PERIOD

The Contractor shall submit complete documentation showing the type, size, rate, style, catalogue number, manufacturer's names, photos, and/or catalogue data sheets for all items offered enabling the Engineer to ensure compliance of the equipment with this specification.

This information shall be submitted to the Engineer within fourteen (14) calendar days after award of this contract and shall be subject to his approval.

Equipment must not be ordered without this approval.

Furthermore, the Contractor shall submit for approval the complete layout of the entire system, showing wiring and all equipment.

All equipment proposed as equal to that specified herein, shall conform to the standards herein.

For equipment other than specified, the Contractor shall supply proof that such substitute

equipment does in fact equal or exceed the features, functions, performance and quality of the specified equipment. However, the Engineer shall have the final decision of acceptance and his decision shall be final.

27.4 APPROVAL OF DRAWINGS

The approval of drawings shall not relieve the Contractor of his responsibility to supply the installation according to the requirements of this specification or to obtain the highest quality of craftsmanship possible.

27.5 MAINTENANCE OF AS-BUILT DRAWING

During execution of the contract, the Contractor shall update the drawings daily with all the relevant information.

At the end of the contract and prior to hand-over being accepted, the Contractor shall prepare as-built drawings of the installation. These drawings shall be a set of the latest drawings issued by the Engineer on which the Contractor shall highlight all changes.

The Contractor shall also issue three (3) sets of any other drawings, wiring diagrams, service and instruction manuals for equipment supplied by him and these will have to be acceptable to the Engineer prior to hand-over being approved.

28. ITEMS FOR APPROVAL

Where this specification refers to a specific brand name or "equal and approved" or "other approved type" and alternative equipment is offered in lieu of that specified, then written approval must be obtained from the Engineer before such equipment is installed.

The right is reserved to reject any equipment which does not, in the opinion of the Engineer, conform to specification or which is of an inferior grade. Should such equipment be rejected, the electrical contractor shall at his own expense provide for alternative equipment and Tenderers are thus warned to ensure that all equipment offered is in strict accordance with the requirements of this specification.

In certain cases the electrical contractor may be required to submit samples and where necessary, tests will be performed to establish the quality of the material offered.

29. CLIENT'S STANDARDS & GUIDELINES

It is accepted that the Contractor tendering on this project has previously worked on similar projects for DEPARTMENT OF HEALTH INFRASTRUCTURE and is therefore well experienced with regards to the DEPARTMENT OF HEALTH INFRASTRUCTURE'S standards and guidelines.

The contractor is hereby instructed to read this whole tender document and specification in conjunction with the DEPARTMENT OF HEALTH INFRASTRUCTURE standards and guidelines. The Contractor will always adhere to these standards and guidelines and should

any content in this specification or any other part of this document be in conflict with these standards and guidelines, the Engineer is to be consulted immediately for a decision. Although every effort has been made to conform to these standards and guidelines, certain site or project conditions do not always allow for this and compromises have been agreed with the end user.

Copies of the DEPARTMENT OF HEALTH INFRASTRUCTURE guidelines can be requested from the Engineer timeously prior to tender closing should the Tenderer require it.

30. CONTRACT ADMINISTRATION, COMPLETION, TESTING & COMMISSIONING

32.1 Quality Control During the Execution of the Contract:

Day by day inspections of the Works shall be carried out by the contractor or his authorised representative to ensure that all work is executed in accordance with the drawings, specifications and regulations. These inspections will be monitored by the Engineer or his duly authorised representative.

If the quality of the installation suffers due to a lack of supervision, then the Engineer will appoint a site agent to ensure that a high standard of workmanship is maintained. The full cost of such a step shall be for the electrical contractor's account.

32.2 Standard of Workmanship:

All installation work in this contract is to be executed by qualified installers in accordance with modern techniques. The Engineer shall have the right to reject any work which does not meet with his approval or which is not in accordance with standard practice.

32.3 Maintenance of As-Built Drawings:

During execution of the contract the contractor shall update the drawings daily with all the relevant information.

At the end of the contract and prior to hand over being accepted, the contractor shall prepare as built drawings of the installation. These drawings shall be a set of the latest drawings issued by the Engineer on which the contractor shall highlight all changes. The contractor shall take great care to ensure that all underground services are shown in the correct places.

The contractor shall also issue three (3) sets of any other drawings, wiring diagrams, service and instruction manuals for equipment supplied by him and these will have to be acceptable to the Engineer prior to hand over being approved.

32.4 Preliminary Testing of Major Equipment:

All items of major equipment are, where feasible, to be factory tested prior to delivery to site, and results of such tests, in a format to be agreed in advance, are to be produced before the equipment is delivered.

All such tests are to be in accordance with the relevant codes of practice, and with any other requirements as set out in this document.

32.5 **Completion of Installation:**

Before the commencement of any test or commissioning procedures, the contractor is to ensure that all nuts and bolts are securely fastened, and that paint work on all items supplied has been touched up where damage has occurred.

32.5 **Inspection and Testing:**

On completion of the entire installation or any particular section thereof, as may be decided by the Engineer, tests shall be carried out in the presence of the Engineer or his authorised Representative.

The contractor should note that, where applicable, at least the following tests must be carried out:

All instrumentation necessary for testing shall be provided by the Contractor.

The results of the above tests must be clearly recorded, signed and handed to the Engineer or his authorised Representative together with a Certificate of Compliance and any other form or forms as required by the Client.

32.6 **Documentation:**

The following documentation is required and shall be provided by the contractor:

(a) Set of schematic wiring and function diagrams.

(b) Operating and maintenance instructions on equipment.

(c) Guarantees ceded to the Client.

(d) Check & Commissioning sheets

(e) Asset registers

Once the Engineer has inspected the complete installation and satisfied himself that all testing has been completed and the contract is complete in all respects, will he issue a letter to the Client stating that first delivery has been taken. Once the retention period has expired, the installation shall be inspected for final delivery.

32.7 **Labelling:**

All switchgear and equipment installed in the switchboards, plus isolator boxes, cables, etc., shall be clearly labelled as indicated elsewhere in this specification and schedules.

32.6 **Training of Institutional Staff:**

Where applicable, allowance is to be made by the Contractor for the training of Institutional Staff in the setting up and operation of the various items of equipment supplied under the contract.

32.6 **Testing and Commissioning Documentation:**

On completion of the testing and commissioning, the following documents shall be compiled and presented to the Engineer.

(a) A Certificate of Compliance and other form/s as required by the Engineer and Client.

(b) Drawings of the installation marked up "As Built" as described elsewhere.

(c) Completed set of test and commissioning sheets.

(d) Check sheets

MPOLWENI CLINIC: CONSTRUCTION OF NEW VERY SMALL CLINIC WITH STAFF ACCOMMODATION

ICT NETWORK CABLING INSTALLATION

PART G : PROJECT SPECIFICATION

PART G : PROJECT SPECIFICATION

INDEX

1. GENERAL

This Project Specification must be read together with the Electrical Specifications Parts A - E for electrical works.

This Project Specification together with the drawings describe the scope of works to be executed in terms of this documentation and takes precedence over the Standard Technical Specification.

2. SCOPE OF CONTRACT

The scope of the ICT works described in detail in this document and drawings covers the supply, delivery, off-loading, storage, installation, commissioning, testing, handing over and free maintenance for the period stated in the tender document of all specified equipment and materials for the electrical installation as required for the new Mpolweni Clinic: Construction of new very small clinic with staff Accommodation.

The installation shall be suitable for operation in Mpolweni at an altitude of approximately 700 metres above sea level with a maximum atmospheric temperature of 40°C and a minimum temperature of –10°C.

The onus is on the tenderer to ascertain any local conditions or peculiarities which might affect the contract, and which are not shown on the drawings.

The scope of work comprises the following:

i. Block A: Guardhouse

ii. Block B: Admin & Main Central Area

iii. Block C: Emergency and Support Services

iv. Block D: Services and Stores

v. Block E: Preventative & Promotive

vi. Block F: Acute Care

vii. Block G: Chronic Care

viii. Block H: Youth and Outreach

ix. Block K: 3 x Staff 01 Bedroom

x. Block L: Staff 02 Bedroom

3. INTRODUCTION

The function of communication cabling is to link various pieces of equipment to one another either directly or via a data distribution patch panel at a site and with other sites as required to create a safe and reliable information highway. This cabling is category 6a F-UTP

(Foiled Unshielded Twisted Pair) and is maintained according to the strategic maintenance policy.
All uplinks to be 12-Core OM4 fibre LC (Screw in Type Connecter) to LC, following different routes.

4. PROJECT PROGRAM AND PHASING OF THE DELIVERY OF MATERIALS

In terms of the contract conditions, the sub-contractor shall liaise with the principal contractor and arrange his own program in accordance with the program for the building, in order that the ICT installation of the different sections or phases is completed when required.

Included in this document, is the client's *proposal* for the program and phasing of works. The contractor should duly consider this information in preparing his own version of the project program to be submitted as a returnable document.

It is a special requirement of this contract that the delivery of materials for which payment is required by the sub contractor, shall be affected in an orderly manner so as to place the smallest burden on the client, with regard to payment for materials. In order to comply with this requirement, careful preplanning of material deliveries by the electrical contractor will be required and supplier's delivery times will be crucial, not only to ensure that this requirement is met, but also to ensure that the construction activities are not delayed.

In an effort to avoid disputes regarding the ICT contractor's claims for payment for material on site, it is a requirement that on a monthly basis, the material orders for that month shall be approved by the Engineer, prior to the orders being placed. It should however be noted that in no ways will this approval (or the lack thereof) be regarded as sufficient grounds for claims by the contractor for delays encountered, as a result of late delivery of materials.

5. NATURE OF THE CONTRACT

This shall be a specialist sub-contract and the ICT Contractor shall enter into a contract with the Main Contractor.

6. OBJECTIVES

To ensure that the installation including termination points in different areas are properly marked, neat, safe, and accessible; that cables and points can be easily maintained.

7. GENERAL DESCRIPTION

The cabling is used as a medium for various methods of communication. All cabling must be installed in conduit (multiple conduits of 25mm to accommodate thickness of CAT6-FUTP cabling standards), trunking or on wire mesh trays in the roof spaces. Suitable containment is to be used in offices, wards and other areas where visible. Communication cabling and power cabling is to be kept separate in wire ways for safety and network performance reasons. All cabling must be marked at point of origin and the end point (See

cable identification below).

Only an approved, certified cabling installation vendor is allowed to install or repair network cabling.

8. PROCEDURE TO BE FOLLOWED BY INSTALLER

The contractor is to make an appointment with the responsible person on site prior to commencing the installation and not arrive without prior notification.

The Engineer together with the Client's Supervisor will be responsible for signing off the installation after ensuring that it complies with Client's standards. No installation will be signed off unless test results, patch list and proper labelling are provided.

9. CABLING STANDARDS FOR NETWORK CABLES

(i) Cabling for any new network device will be Category CAT6a-FUTP This is foiled unshielded twisted pair

(ii) Backbone Cabling for all uplinks must be 12-Core fibre OM4

(iii) The installation must conform to ISO/IEC 11801 Class E and on completion could be tested to ensure conformity to this standard

(iv) All termination points will be clearly marked (See cable identification below). Must be numeric and fit the housing

(v) A CAT 6a F-UTP fly-lead, 3 meters long will be left inserted into the wall plug at completion of the installation

(vi) A patch cable will be left in the patch panel socket of the new point

(vii) Velcro cable ties must be used where necessary to ensure neatness. Such ties must not distort the cable. The use of cable ties must be limited to those cables that are unlikely to be disturbed. It is advocated that Velcro cable tie is used in cabinets and other areas where cables and switches are likely to be changed. This makes it easier to trace cables and makes tidying up of cabling much easier and cannot damage cables

(viii) Cables must not be bent to a radius less than 50mm. The cable must not be stretched at any point and should not be manhandled during the installation process. (Wound around the installers hand and pulled)

(ix) The cable should lay parallel in the tray with the Identification numbering visible

(x) No cables are allowed to run exposed over the floor or in the ceiling

(xi) Wire mesh trays will be used for all main cable routes

(xii) Ducting will be used in the case of all externally exposed cables

(xiii) Wire mesh trays and ducting MUST be used where supplied

(xiv) The work area must be cleaned on completion of the work

(xv) All penetrations must be suitably sealed to comply with fire regulations

(xvi) All fire doors must be closed

10. CABLING IDENTIFICATION

There are various recognised systems of labels, tags and shrink-on sleeves for identifying cables. They are also available in various colours and printing configurations.
The contractor must specify what cable identification method will be used and this must be approved by the Engineer who will ensure that the method described meets the following criteria:

(i) Clearly legible with permanent printing.

(ii) Of such a nature that the fixation to the cable is permanent by adhesive, shrink-on or ties. The use of Uni-tags is not advocated as these are clip-on and can be removed.

(iii) Computer rooms, cabinets and distribution boards or patch panels:

- All equipment within such an area is to be accessible for maintenance and cleaning with sufficient slack on the cables to move the equipment out of the way if required.
- This slack should be provided as a strapped umbilical cord, secured in such a manner that the equipment could be moved for maintenance without endangering the continuity of supply or communication or the slack could be kept in the roof space.
- All data distribution patch panels/comms cabinets and computer equipment is to be cabled and identified in such a manner to facilitate easy tracing and as far as possible should not cross over or intertwine.
- Data distribution patch panel leads should be of uniform length to suit the position of the equipment and neatly installed and identified.
- All computer rooms are to be kept neat at all times. If additional services are required they are to be planned in conjunction with the Engineer.
- All recognised cable routes are to be depicted on a drawing and kept up to date by the appointed cabling contractor.

(iv) Under **NO** circumstances will a new cable be patched directly to a switch. The new point must terminate in a patch panel via a brush panel.

(v) The contractor to ensure that when a new cable is installed to replace a faulty cable, the old cable MUST be removed by the cabling contractor.

(vi) **All Wi-Fi AP (Access Point), edge cabinet and server room locations must be added to the master drawing of the site.** This will ensure that any cabling contractor as well as ICT can specify the correct cabling route and nearest switch location to minimise costs

11. INSPECTION ON SITE

As much information as possible has been given, but in view of the nature of this service, Tenderers are advised to visit the site and thoroughly acquaint themselves with the nature and extent of the work to be done. Tenderers shall make allowance for items obviously intended and necessary for the proper completion of the work, although not specifically mentioned. The Tenderers must liaise with the electrical engineer to visit the site and acquaint themselves with the nature and extent of the removal and installation of the new equipment.

12. MAINTENANCE REQUIREMENTS

The free maintenance period of 3 months from hand over is as detailed in the conditions of contract and contract preliminaries.

13. ITEMS FOR APPROVAL

Where this specification refers to a specific brand name or "equal and approved" or "other approved type" and alternative equipment is offered in lieu of that specified, then written approval must be obtained from the Engineer before such equipment is installed.

The right is reserved to reject any equipment which does not, in the opinion of the Engineer, conform to specification or which is of an inferior grade. Should such equipment be rejected, the electrical contractor shall at his own expense provide for alternative equipment and Tenderers are thus warned to ensure that all equipment offered is in strict accordance with the requirements of this specification.

In certain cases the contractor may be required to submit samples and where necessary, tests will be performed to establish the quality of the material offered.

13.1 SUBMITTALS DURING TENDER PERIOD

All Tenderers shall submit the following information with their tenders:

{a} Outline drawings showing the dimensions (size), loops, zones and configurations of all equipment in the spaces allocated to these equipment.

{b} Any information that may have a direct effect on the architectural or structural features of the building, which features may upon the proposal of the Contractor be subject to modification.

{c} Certification of ISO compliance for the equipment and cabling that will be used

during the execution of the contract.

{d} Brochures and specifications of all equipment offered for the execution of the contract.

{e} Brochures and specifications of all software offered for the execution of the contract.

{f} Full details regarding the proposed training to be given on the hardware, software and the operation and maintenance of the systems.

{g} A letter of compliance also indicating which of the items offered does not comply with this specification and what the differences are and the implications thereof.

13.2 SUBMITTALS DURING CONTRACT PERIOD

The Contractor shall submit complete documentation showing the type, size, rate, style, catalogue number, manufacturer's names, photos, and/or catalogue data sheets for all items offered enabling the Engineer to ensure compliance of the equipment with this specification.

This information shall be submitted to the Engineer within fourteen (14) calendar days after award of this contract and shall be subject to his approval.

Equipment must not be ordered without this approval.

Furthermore, the Contractor shall submit for approval the complete layout of the entire system, showing wiring and all equipment.

All equipment proposed as equal to that specified herein, shall conform to the standards herein.

For equipment other than specified, the Contractor shall supply proof that such substitute equipment does in fact equal or exceed the features, functions, performance and quality of the specified equipment. However, the Engineer shall have the final decision of acceptance and his decision shall be final.

14. STANDARDS & GUIDELINES

It is accepted that the Contractor tendering on this project has previously worked on similar projects for DEPARTMENT OF HEALTH INFRASTRUCTURE and is therefore well experienced with regards to the DEPARTMENT OF HEALTH INFRASTRUCTURE standards and guidelines.

The contractor is hereby instructed to read this whole tender document and specification in conjunction with the DEPARTMENT OF HEALTH INFRASTRUCTURE standards and guidelines. The Contractor will always adhere to these standards and guidelines and should any content in this specification or any other part of this document be in conflict with these standards and guidelines, the Engineer is to be consulted immediately for a decision. Although every effort has been made to conform to these standards and guidelines, certain site or project conditions do not always allow for this and compromises have been agreed

with the end user.

Copies of the DEPARTMENT OF HEALTH INFRASTRUCTURE guidelines can be requested from the Engineer timeously prior to tender closing should the Tenderer require it.

15. CONTRACT ADMINISTRATION, COMPLETION, TESTING & COMMISSIONING

32.1 Quality Control During the Execution of the Contract:

Day by day inspections of the Works shall be carried out by the contractor or his authorised representative to ensure that all work is executed in accordance with the drawings, specifications and regulations. These inspections will be monitored by the Engineer or his duly authorised representative.

If the quality of the installation suffers due to a lack of supervision, then the Engineer will appoint a site agent to ensure that a high standard of workmanship is maintained. The full cost of such a step shall be for the electrical contractor's account.

32.2 Standard of Workmanship:

All installation work in this contract is to be executed by qualified installers in accordance with modern techniques. The Engineer shall have the right to reject any work which does not meet with his approval or which is not in accordance with standard practice.

32.3 Maintenance of As-Built Drawings:

During execution of the contract the contractor shall update the drawings daily with all the relevant information.

At the end of the contract and prior to hand over being accepted, the contractor shall prepare as built drawings of the installation. These drawings shall be a set of the latest drawings issued by the Engineer on which the electrical contractor shall highlight all changes. The contractor shall take great care to ensure that all underground services are shown in the correct places.

The contractor shall also issue three (3) sets of any other drawings, wiring diagrams, service and instruction manuals for equipment supplied by him and these will have to be acceptable to the Engineer prior to hand over being approved.

32.4 Preliminary Testing of Major Equipment:

All items of major equipment are, where feasible, to be factory tested prior to delivery to site, and results of such tests, in a format to be agreed in advance, are to be produced before the equipment is delivered.

All such tests are to be in accordance with the relevant codes of practice, and with any other requirements as set out in this document.

32.5 **Completion of Installation:**

Before the commencement of any test or commissioning procedures, the electrical contractor is to ensure that all nuts and bolts are securely fastened, and that paint work on all items supplied has been touched up where damage has occurred.

32.5 **Inspection and Testing:**

On completion of the entire installation or any particular section thereof, as may be decided by the Engineer, tests shall be carried out in full accordance with the current edition of the " ISO/IEC 11801 Class E ", in the presence of the Engineer or his authorised Representative.

All instrumentation necessary for testing shall be provided by the Contractor.

The results of the above tests must be clearly recorded, signed and handed to the Engineer or his authorised Representative together with a Certificate of Compliance and any other form or forms as required by the Client.

32.6 **Documentation:**

The following documentation is required and shall be provided by the contractor:

(a) Set of schematic wiring and function diagrams.

(b) Operating and maintenance instructions on equipment.

(c) Guarantees ceded to the Client.

(d) Check & Commissioning sheets

(e) Patch lists

Once the Engineer has inspected the complete installation and satisfied himself that all testing has been completed and the contract is complete in all respects, will he issue a letter to the Client stating that first delivery has been taken. Once the retention period has expired, the installation shall be inspected for final delivery.

32.6 **Training of Institutional Staff:**

Where applicable, allowance is to be made by the Contractor for the training of Institutional Staff in the setting up and operation of the various items of equipment supplied under the contract.

32.6 **Testing and Commissioning Documentation:**

On completion of the testing and commissioning, the following documents shall be compiled and presented to the Engineer.

(a) A Certificate of Compliance and other form/s as required by the Engineer and Client.

(b) Drawings of the installation marked up "As Built" as described elsewhere.

(c) Completed set of test and commissioning sheets.

(d) Check sheets

(e) Patch lists

ANNEXURE 2

MPOLWENI CLINIC: CONSTRUCTION OF NEW VERY SMALL CLINIC WITH STAFF ACCOMMODATION

STANDARD

ELECTRICAL SPECIFICATION

SECTION D: LIGHTNING PROTECTION INSTALLATION

Index

SECTION D

D1 GENERAL SPECIFICATION

1. SATISFACTORY INSTALLATION

The whole of the installation shall be carried out in accordance with:

(a) The latest SANS: 10313: Protection against Lightning – Physical damage to structures and life hazard and in conjunction with SANS 62305.

(c) The Municipal By-Laws and any other special requirements as deemed necessary by the Local Supply Authority;

(d) Local Fire Regulations.

2. S.A.B.S. APPROVED DRAWINGS

SABS Approved drawings are not required for this project.

3. TEST ON COMPLETION

Upon completion of the lightning protection system, the following tests shall be witnessed by an appointed representative of the Employer. The results shall be recorded on suitable test certificates which must be signed by both the Contractor and the Employers representative. A sketch must be included on each test certificate indicating the positions of each earth electrode in relation to some permanent reference point. It must also indicate the positions at which tests were carried out, the type of test and the results of these tests.

3.1 **Earth Resistance Test**

The Earth Resistance Test shall involve measuring the resistance to earth of each rod-type electrode, or group of rod-type electrodes, or trench earth which would normally be connected to one down-conductor or earth terminal. This test must be made with the electrodes completely disconnected from any part of the structure or lightning protection system.

3.2 **Electrical Continuity Tests**

(a) **External Down-Conductors**

Electrical continuity between the lower ends of external down-conductors which must all be disconnected from the earthing system during the test shall not exceed 1 (one) ohm.

(b) Metallic Services

Electrical continuity between any metallic structures of services (e.g. rainwater pipes) which form an integral part of the lightning protection system shall not exceed 1 (one) ohm. These tests should be carried out with all other components of the lightning protection system disconnected from the component being tested.

4. DESCRIPTION OF MATERIAL

4.1 Air Terminals and Down-conductors

All conductors must be in accordance with the requirements of BSS 1474 or American Standards Specification 6063. All aluminium conductors shall have a cross-section area of not less than 30 mm^2 (domestic dwelling only) or 50 mm^2 for all other applications. The dimensions of flat section conductors to be 20 mm x 3 mm. Where conductors are mounted in stand-off guides, the cross-section area of the conductor must be not less than 70 mm^2 to give adequate mechanical strength.

4.2 Conductor Guides

The conductor must be mounted in aluminium alloy guides conforming with the material specification given in 4.1 above. The guides must allow for free longitudinal movement of the conductor to cater for expansion and contraction of the system caused by temperature variation. The minimum thickness of any part of the guide shall not be less than 3 mm. The guides must be securely attached to the structure using two stainless steel screws and plugs, the use of plated screws is not permitted.

The conductor system shall be supported in guides so that an air gap exists at all times between the aluminium and the surface of the structure, the guides being seated upon plastic or other similar insulating material. Should conductors be installed directly upon the surface of concrete or cement plaster, an insulating strip is to be installed over its whole length to prevent contact between the two surfaces. Guides shall be installed to support the conductor at intervals not exceeding 1,2 metres horizontally or 1,5 metres vertically.

N.B.: No part of an aluminium conductor system must be allowed to come into direct contact with concrete or cement plaster as this may cause the aluminium to corrode.

4.3 Expansion Loops

Where conductors are installed horizontally without deviation from a straight line over long distances, expansion loops must be provided at distances not exceeding 30 metres. These expansion loops must have a cross-sectional area which is at least equal to that of the conductor.

4.4 Protection of Down-conductors

Where external down-conductors are installed in areas which are readily accessible to the public, the lower ends of the conductors shall be enclosed in a semi-rigid insulating material. In the case of a circular section conductor this shall comprise a 2 metre length of 20 mm diameter P.V.C. conduit. This conduit shall be securely attached to the wall by means of galvanized steel saddles fixed with stainless steel screws and plugs, spaced at intervals not exceeding 1 m. Where a flat section conductor is used this shall be covered by a similar length of 25 mm P.V.C. conduit. The lower end of the conduit shall be positioned as close as practicable to ground level, i.e. immediately above an aluminium to copper joint. The ends of the conduit shall not be sealed.

4.5 Earthing Electrodes

Earthing electrodes must consist of either copper-clad steel rods not less than 12 mm in diameter and having a minimum copper thickness of 0,20 mm driven into the ground, or a 50 mm^2 (35 mm^2 for domestic dwellings) bare copper conductor buried in a trench, or a combination thereof. Where copper clad steel electrodes are used they must have a suitable bond between the steel core and copper exterior to prevent moisture ingress between the two metals. Where it is necessary to extend earth rods, an electrolytically compatible corrosion resistant, coupling device, which prevents ingress or moisture into the joint shall be used. The copper conductor below the down-conductor joint shall be covered by a semi-rigid P.V.C. conduit for a distance of approximately 200 mm above ground and 400 mm below ground.

4.6 Joints Above Ground

Circular section aluminium conductors shall be jointed by aluminium ferrules or lugs which are securely crimped into place. Aluminium lugs must be bolted together using 10 mm diameter aluminium bolts and washers. The material specification for these components must conform with that laid down in paragraph 4.1. Alternatively heavily tinned copper lugs and ferrules may be used. The lugs should be joined together by means of 10 mm diameter copper, brass or bronze bolts and washers. Care should be taken to inhibit corrosion where dissimilar metals are used by thoroughly cleaning the surfaces of the metal before assembly and subsequently sealing the joint with an inert tenacious compound or tape.

Flat section aluminium conductors shall be joined by double riveting, using aluminium rivets which comply with the material specification laid down in 4.1. Alternatively 2 x 6 mm diameter stainless steel bolts, nuts and washers may be used. Fold over type bends will not be permitted.

Down-conductors are to be terminated approximately 200 mm above finished ground level. Circular section aluminium is to be jointed to a 50 mm^2 (35 mm^2 in the case of domestic dwellings) stranded copper conductor by securely crimping in place two heavily tinned lugs and bolting these together using 10 mm diameter copper, brass or bronze nuts, bolts and washers.

N.B. : Under no circumstances shall aluminium conductors be buried in the ground.

4.7 Joints Below Ground

A joint in the stranded copper conductor which forms part of the earthing system must be made by using a crimped copper ferrule clamping (not lugs) using two copper line taps of suitable dimensions, or exothermic welding. The copper earth conductor must be joined to an earth rod by either clamping, using a standard earth rod clamp or copper line tap or by exothermic welding. Joints which are made between dissimilar metals (i.e. copper conductor to galvanized steel water main), must be thoroughly cleaned before assembly. They shall be rendered watertight using waterproof adhesive tape on a suitable compound for a minimum distance of 200 mm in all directions from the joint.

4.8 Bonds

Where it is necessary to bond the aluminium conductor to any other metallic surface, this must be done by bolting or riveting. When attaching aluminium to a dissimilar metal the joints are to be thoroughly cleaned and sealed to prevent corrosion.

5. GENERAL INSTALLATION PROCEDURE

5.1 Air Terminals for Non-metallic Pitched Roofs

Aluminium conductors are to be installed along all ridges of roofs and projections such as dormer windows, etc., terminating at the ends with conductors running downwards over the surface of the roof and the eaves. Non-metallic chimneys must be protected by means of a finial of sufficient length to cover the chimney within a 45° angle struck downwards from its point. Alternatively it should have a conductor installed in the form of a closed loop upon the upper surface. The conductors are to follow the outer contour of the stack and must be bonded at a convenient point to the nearest component of the air terminal system.

N.B. : This bond may run in a horizontal or downward direction, but under no circumstances must any part of it run above horizontal.

Conductors may be dead-ended (i.e. have one end free and unbonded), providing that the length of such a conductor does not exceed 10 metres and that the unbonded end is either at the same level or higher than the bonded end. This technique may be used where ridge conductors are installed over dormer windows, etc.

In all cases where metallic gutters have been installed along the eaves of a pitched roof, these must be bonded to the air terminal system. Where metallic gutters do not exist, however, a conductor must be installed over the surface of the roof at eaves level to which the remainder of the air terminal system is to be bonded, with the following exceptions :

(a) Where the maximum distance from the ground level to the eaves of the building is less than 4 metres and the pitch of the roof is more than 1 in 2 (27° from the horizontal).

(b) Where the maximum distances from ground level to the eaves is less then 7 metres and the pitch of the roof is more than 1 in 1,5 (34° from the horizontal).

(c) Where the distance from the ground level to the eaves is more than 7 metres and the pitch of the roof is more than 1 in 1 (i.e. the included angle at the apex of the roof is less than 90°).

Under these circumstances eaves conductors need not be installed.

Any non-metallic objects which protrude above the general roof lines, such as Cape Dutch gable ends, must be protected as described above with a suitable air terminal system. Any metallic objects which protrude above the general roof line, such as hot water expansion pipes must be bonded as directly as possible to the nearest eaves conductor, gutter or other part of the lightning system.

N.B. : These bonding conductors must run in a horizontal or preferably a downward direction, from the vent pipe, etc., to the lightning protection system.

5.2 Air Terminals for Metallic Pitched Roofs

Buildings with roofs covered with electrically continuous metal sheets do not require separate air terminals but must be earthed via down conductors generally as described in 5.6 and 5.7. Any non-metallic objects projecting above the general roof line must be separately protected as described in 5.1 and bonded to the metal roof covering.

5.3 Air Terminals for Non-metallic flat or Mono-pitched Roofs

For flat or mono pitched roofs of non-metallic construction the air terminal system must consist of aluminium alloy conductors installed around the outer perimeter of each section of the roof structure. These conductors must be installed on top of parapet walls if these exist. Lift motor rooms, tank rooms, penthouses, etc., which protrude above the general roof line must have air terminal conductors installed around the outer perimeter of each roof slab or parapet wall. Any metallic objects which protrude above the roof line, such as expansion pipes, signs, flag poles, handrails, etc., must be bonded directly to the nearest component of the lightning protection system as described in 5.1.

N.B. : It is not permissible for the ends of conductors to be bonded directly to the perimeter air terminal system if the latter is installed upon a parapet wall having a height exceeding 500 mm above roof slab level. In these circumstances the conductors are to be bonded directly to the down conductors.

5.4 Air Terminals for Metallic flat or Mono Pitched Roofs

Metallic flat or mono pitched roofs do not require separate air terminal conductors, providing that there is electrical continuity between the metallic roofing sheets, (see 5.2). A metallic roof surrounded by a non-metallic parapet wall shall have conductors installed at the top of the parapet wall and these must be bonded to the metallic roof at intervals not exceeding 20 metres. If the parapet wall is clad with metal over its upper surface or a handrail is installed which affords good electrical continuity, separate air terminal conductors need not be installed. Under these circumstances the metal handrail or cladding must be bonded to the metal roof covering at intervals not exceeding 20 metres.

All non-metallic covering such as slates, tiles, asbestos cement sheeting, etc., supported by a steel structure being electrically continuous throughout may be treated as being of a complete metal construction. In these circumstances no separate air terminal system need be installed providing the steel roof structure is bonded to earth at intervals given in 5.5.

5.5 Down Conductors for Non-metallic Structures

Down conductors must be installed at regular intervals around structures and to run as directly as possible between the air terminal and earthing system. They must, where practicable, be positioned at the external corners of the structure. The maximum separating distance between down conductors around the perimeter of the structure must not exceed 30 metres. In the case of very tall buildings having a slender base (i.e. chimney stacks, water towers, etc.), a minimum of two down conductors must be installed.

The lower ends of down conductors are to be terminated and bonded to the earthing system approximately 200 mm above finished ground level. Under no circumstances must aluminium conductors be buried underground. Test joints must be provided between the down conductors and earthing system. Down conductors must run vertically between the air terminal and earthing systems. Where this is impracticable, their course may be deviated to run at any angle up to and including horizontal.

Where it is necessary to run conductors horizontally over the upper surface of a structural protrusion, such as an exposed concrete slab, the conductor may run down vertically over the edge of the slab and return to the main structure, so that the distance between the upper and lower conductors exceeds one third of the length of the horizontal run. Looped down conductors are not permitted. Down conductors must not run over the underside of large overhangs which are less than 6 metres above ground level, or other areas where people are likely to be present during a thunderstorm.

External or internal metallic rainwater pipes may be used as down conductors providing these are of substantial section and are jointed by screwing one length into another or welding. Thin gauge galvanized steel pipes whose sections are held together by friction, rivets or screws must not form part of a lightning protection system.

5.6 Down conductors for reinforced concrete framed structures

The steel reinforcement of this type of structure may be used in place of down conductors. Where the reinforcing system is used, the air terminal system must be bonded to it at a maximum of 30 metre intervals using steel clamps. This bond may be achieved by clamping, with a steel clamp, a steel conductor to a selected reinforcing bar, the opposite end of this conductor must terminate at a corrosion resistant metallic terminal such as Grade 316 stainless steel.

The reinforcing system of prefabricated concrete buildings must not be used unless special provision is made for bonding the various prefabricated sections together.

The terminals should be mounted flush with the face of the concrete. An aluminium alloy bond must then be taken from the air terminal system and be connected to the stainless steel terminal by means of a heavily tinned crimp lug for circular section aluminium, or a suitable bi-metallic joint in the case of flat section aluminium. A similar system must be used to bond the reinforcing system at ground level to the earthing system at points directly below the air terminal bonds. Here copper conductors must be used as the external bonding material.

Under no circumstances must copper, or other non-ferrous material be allowed to come into contact with steel reinforcing bars, as this may cause severe corrosion and subsequent structural damage. The lightning protection system must not be bonded to any part of the structure which is electrically isolated from the remainder of the building, i.e. cantilevered sections. In these circumstances, or where it is otherwise impracticable to use the reinforcing system, external down conductors must be installed as described in 5.5.

5.7 Down conductors for steel framed structures

Where the framework of a building is constructed of structural steel columns, these may be used in place of down conductors providing the separating distance between them does not exceed 30 metres. The upper ends of the columns must be bonded to the air terminal systems and the lower ends to the earthing system.

5.8 Earthing by means of vertically installed rod type electrodes

Rod-type electrodes must be driven into the ground at a position directly below each down connector. The maximum earthing resistance of each electrode or number of electrodes bonded to any one down conductor shall not exceed N X 30 ohms, where N equals the total number of down conductors which are bonded to a common air terminal system, or 200 ohms whichever is the lower value.

The minimum horizontal separating distance between rod-type electrodes bonded together must not be less than their installed depth. The upper ends of installed rod-type electrodes are to be terminated approximately 500 mm below finished surface level. A 50 mm^2 copper bonding conductor must be installed to run between each earthing electrode system and the lower ends of the adjacent down conductors. A joint is to be made between each of these bonding conductors and the down conductors at a position approximately 200 mm above finished ground level. These bonding conductors must be installed in P.V.C. conduit securely affixed to the wall (see 3.4). The length of this P.V.C. conduit must be approximately 600 mm and must be installed so that approximately 200 mm protrudes above ground level, the remainder being buried into the soil.

5.9 Earthing by means of metallic water mains

Where two or three down conductors are installed the water mains may serve as an earth terminal for one of these. Where three of more down conductors are installed the water mains may serve as an earth terminal for two of these. Regardless of whether the water mains are used as an earth terminal or not, the incoming metal water pipe must be bonded to the lightning protection earthing system underground.

5.10 Earthing by means of trench type electrodes

Where the soil conditions prevent the satisfactory installation of rod-type electrodes, a trench earth system must be installed. This method is to comprise a 50 mm^2 stranded copper conductor installed horizontally into a trench at a depth of 500 mm below finished ground level. The conductor is to follow the general outline of the structure to be protected and be installed 1 metre away from the outside walls. Where the building stands on rocky ground, the trench earth may be attached to the lower part of the wall in areas where rock protrudes through the soil. The conductor must, however, be buried wherever possible as described above.

Each down conductor must be bonded to the trench earth system as directly as possible by means of a copper conductor.

Trench earth systems must have a maximum earth resistance of 30 ohms. An isolated length of trench earth mat must be bonded to the down conductor system in such a way as to reduce the length of dead-ends to the minimum.

Should trench earths be installed beneath pathways where people are likely to be present during a thunderstorm, a plastic, bitumastic or ceramic pipe must be installed having a length similar to the width of the pathway and the trench earth conductor run inside it.

N.B. : The maximum useful length of a dead-ended trench earth is 80 metres.

ANNEXURE 3


Terry St
Netcare St An
Hospital - Paediatr
King Micha
310 Jabu Ndlovu St,
Pietermaritzburg, 3201
7 min walk
Transmed Dispensary
/ Pharmacy
Anand Pillay Attorneys
tional
vice...
Burger St
ounge
Hospersa
Royal Hospital
Umgeni Water
Burger St
Henrietta St
Layers

ANNEXURE 4

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Joint Venture Agreement
(March 2004)
(First Edition of CIDB document 1017)

1. **PREAMBLE**

This agreement is made and entered into by and between

_____

_____

_____

of the first part and

_____

_____

_____

of the second part and

_____

_____

_____

of the third part.

(allow for additional parties as necessary).

Whereas the foregoing parties have resolved to form a Joint Venture under the title of

_____

_____

_____

for the exclusive purposes of securing and/or executing the Contract to be awarded by

(name of Employer)

to the KZN Department of Health in respect of the following project:

for *(brief description of Contract)*

MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Now it is hereby agreed as follows :

2. DEFINITIONS AND INTERPRETATION

2.1 Definitions

The following words and expressions shall have the meanings indicated, except where the context otherwise requires. Defined terms and words are, in general, signified in the text of the Agreement by the use of capital initial letters, but the absence of such letters does not necessarily signify that a term, or word, is not defined.

'Agreement' means the agreement between the Members of the Joint Venture and includes this model form of agreement together with the Preamble, Specific Provisions, if any, Schedules 'A', 'B' and 'C' and any relevant Documents prepared prior to the signing of the Agreement and appended thereto.

'Contract' means the contract with the Employer for the supply of the Deliverables, for the purposes of securing and executing which, the Joint Venture has been formed.

'Deliverables' means the works and/or services, equipment, materials, goods, etc. to be furnished by the Joint Venture to the Employer in terms of the Contract.

'Document' means any written, drawn, typed, printed, or photographic material, which relates to the Agreement.

'Employer' means the person, or body, which is to award the Contract and will employ the Joint Venture if it is awarded the Contract.

'Joint Venture' means the joint venture formed by the Members in accordance with the Agreement.

'Management Committee' means the body established in terms of the Agreement to manage all aspects of the work of the Joint Venture in securing and executing the Contract and in meeting the provisions for the Agreement.

'Member' means a person, or body which, being a party to the Agreement, is a member of the Joint Venture.

'Member's Interest' means the proportion expressed as a percentage, which the total monetary value of all resources provided and contributions made by a Member towards the execution by the Joint Venture of the Contract bears to the total of such values by all Members and, unless otherwise indicated in the Agreement, represents the extent to which the Member participates in the fortunes of the Joint Venture.

'Representative' means the person representing a Member on the Management Committee.

'Schedules' means Schedules 'A', 'B' and 'C' which set out general, financial and other information relating to the Members and the obligations, duties, rights, risks and benefits arising from their participation in the Joint Venture.

'Specific Provisions' means the variations, if any, required to this standard form of agreement for the specific purposes of the Agreement.

2.2 Interpretation

Unless inconsistent with the context, an expression in the Agreement which denotes:

- any gender shall include the other genders
- a natural person shall include a juristic person and vice versa
- the singular shall include the plural and vice versa

2.3 Headings

The headings to clauses of the Agreement shall not be considered part thereof, nor shall the words they contain be taken into account in the interpretation of any clause.

2.4 Law

The Agreement shall be construed in accordance with and governed by the laws of the Republic of South Africa and the English language versions shall prevail.

2.5 Language

English shall be exclusively used by the Members in the preparation of Documents unless otherwise indicated.

2.6 Conflict between Agreement and Contract

Should any provision of the Agreement be in conflict with the terms of the Contract, the Agreement shall be amended to the approval of the Management Committee so as to eliminate the conflict.

3. JOINT VENTURE GENERAL

3.1 Establishment and Purpose

The Joint Venture established by the Members in terms of the Agreement is an unincorporated association with the exclusive purposes of securing and executing the Contract for the benefit of the Members.

3.2 Termination

The operation of the Joint Venture and the validity of the Agreement shall terminate if and when it becomes evident that the Joint Venture will not be awarded the Contract, or, if the Joint Venture secures the Contract, when all obligations and rights of the Joint Venture and the Members in connection with the Contract and the Agreement have ceased and/or been satisfactorily discharged.

Unless otherwise decided by the Management Committee, the Agreement shall not terminate if a Member changes its name, or is taken over by, or merged with, another body.

This agreement will terminate when any one of the Members resigns, are liquidated or opts out of this agreement and the Joint Venture will be in breach of contract with the Employer and their contract could be cancelled.

3.3 Exclusivity

Unless otherwise agreed by the Management Committee, or provided for in the Contract no Member shall engage in any activity related to the Contract other than as a Member of the Joint Venture and Members shall ensure that their subsidiaries and other bodies over which they have control comply with this requirement.

3.4 Participation of Members

Except as may otherwise be stipulated in the Agreement, each Member shall be responsible for all costs incurred by it prior to the date of inception of the Agreement.

Subsequent to the date of inception of the Agreement, each Member shall, participate in the operations, risks, responsibilities and fortunes of the Joint Venture including, inter alia, the provision of funding, sureties, guarantees, insurances, human and other resources and participation in profits and losses to the extents indicated in the Schedules. Participation in any aspect not covered in the Schedules shall, if an agreement cannot be reached between the Members, be to the same extents as indicated by the Members Interests.

3.5 Management

The affairs of the Joint Venture shall be directed and controlled by the Management Committee, as set out in Section 4 hereof.

3.6 Confidentiality

All matters relating to the Agreement and the Contract shall be treated by the Members as confidential and no such matter shall be disclosed to any third party without the prior written approval of the Management Committee.

No Member shall be party to the dissemination of publicity relating to the Contract, or the Agreement, without the prior written approval of the Management Committee and the Employer.

3.7 Assignment

No Member shall cede, assign, or in any other way make over any of its rights, or obligations, under the Agreement without the prior written consent of the Management Committee.

3.8 Subcontracting

No Member shall subcontract any obligation, work or duty for which it is, itself, responsible in terms of the Agreement without the prior written consent of the Management Committee.

3.9 Variations to Agreement

No variation, modification, or waiver of any part of the Agreement shall be of any force, or effect, unless unanimously agreed by the Members and reduced to writing.

3.10 Liability

Each Member warrants that it will indemnify the other Members against all legal liabilities arising out of, or in connection with the performance of its obligations under the Agreement.

It is acknowledged by the Members that they may be held jointly and severally liable in respect of claims against the Joint Venture by the Employer or third parties.

4. MANAGEMENT OF JOINT VENTURE

4.1 General

The affairs of the Joint Venture shall be directed, controlled and managed by the Management Committee, which, within the terms of the Agreement and the Contract, shall have full authority to bind the Members in all matters relating to the affairs of the Joint Venture.

Communication between the Joint Venture and the Employer, or third parties, relating to the Contract shall be conducted exclusively by the Management Committee, or by such person as it may delegate to perform this function.

The Management Committee shall have the power to appoint a project manager and/or such other persons as it may see fit to appoint for the purpose of executing the Contract and may delegate such of its powers, responsibilities and duties as it may consider necessary, or desirable, to persons or bodies appointed or seconded for this purpose.

Such administrative functions as are necessary to ensure the effective operation of the Management Committee shall be performed by its chairman.

4.2 Management Committee

4.2.1 *Composition*

The Management Committee shall, unless otherwise agreed by all the Members, consist of one Representative of each Member and each Member shall be obliged, at all times, to maintain a Representative on the Management Committee.

Each member shall, not later than three working days after the signing of the Agreement, appoint its Representative and notify the other Members of the name and contact details of the Representative. Such Representative shall have the power to bind the Member that he represents in all matters relating to the execution of the Contract and the performance of the Agreement.

A Member shall be entitled, after giving the other Members not less than three working days written notice of his intention to do so, appoint, remove and/or replace, an alternate who shall, at any meeting of the Management Committee from which the Representative whom he represents is absent, be vested with all rights and powers and subjected to all the obligations of the absent Representative.

The chairman of the Management Committee shall be the Representative of the Member which has the largest Member's Interest. If two, or more, Members have the same, largest Member's Interest, the chairmanship shall rotate between the Representatives of such Members at three monthly intervals, the order of rotation to be determined by ballot.

Notwithstanding the foregoing, the chairmanship of the Management Committee may be determined, or changed, at any time by unanimous decision of the Management Committee.

No remuneration shall be paid by the Joint Venture to Representatives or their alternates for serving on the Management Committee,

4.2.2 *Meetings*

Meetings of the Management Committee shall take place at such times and places as the Management Committee may determine, provided that the chairman shall convene a meeting of the Management Committee to be held not later than ten working days after he has been requested, in writing, by a Member to do so. Not less than five working days written notice of any meeting of the Management Committee shall be given to all Representatives and their alternates.

The Management Committee may permit, or invite, persons other than Representatives or alternates to attend any of its meetings, but such persons shall not have voting rights.

4.2.3 *Decisions*

Each Representative shall have one vote on the Management Committee and where, in terms of this clause, a casting vote is required, this shall be exercised by the chairman.

All decisions of the Management Committee shall, desirably, be unanimous. Accordingly, if unanimity cannot, initially, be achieved in regard to a decision, the meeting at which that decision is sought shall be adjourned for a period of 48 hours to enable Representatives to consult with their principals. If, on resumption of the adjourned meeting, unanimity can still not be achieved, the decision, provided it is not one requiring unanimity of the Members, shall be taken by majority vote and, in the event of a tie, the chairman shall exercise a casting vote.

A Member not satisfied with a majority decision of the Management Committee may declare a dispute, to be dealt with in terms of Clause 8 hereof, but the majority decision shall, nevertheless, be implemented with immediate effect.

Decisions of the Management Committee, whether taken at a meeting, or otherwise, shall be recorded in written minutes, which shall be distributed by the chairman to reach the Representatives not later than five working days after those decisions were taken. Such minutes shall be deemed to have been affirmed by the Representatives unless written notice of dissent is received by the chairman not later than three working days after receipt of the minutes by the Representative.

4.2.4 <u>Powers and duties</u>

The functions, responsibilities and powers of the Management Committee shall include, inter alia, those listed below:

4.2.4.1 Formulating overall policy in regard to the achievement of the objectives of the Joint Venture.

4.2.4.2 Managing the day to day affairs of the Joint Venture.

4.2.4.3 Monitoring, directing and co-ordinating the activities of the Members to ensure that the objectives of the Joint Venture are achieved and that the obligations and responsibilities of the individual Members are met.

4.2.4.4 Monitoring and controlling the financial affairs of the Joint Venture and ensuring that proper books of account and financial records relating to affairs of the Joint Venture are maintained in an approved form and submitted to the Management Committee for approval at regular intervals, which shall not be longer than one month.

4.2.4.5 Determining the necessity for and the details of any changes in the duties and responsibilities of Members provided that any resulting changes in Members' Interests shall be unanimously approved by the Members.

4.2.4.6 Determining the terms and conditions of employment of personnel and the emoluments applicable to staff seconded to the Joint Venture by the Members.

4.2.4.7 Controlling and approving the appointment of all subcontractors.

4.2.4.8 Procuring, after the completion of the Contract and the release of all bonds, guarantees and sureties given in respect of the performances of the Joint Venture and the Members, the preparation and auditing of a final set of accounts, on the basis of which the final profits, or losses, attributable to the individual Members shall be determined and any necessary adjustments effected.

5 RESOURCES OF JOINT VENTURE

The resources to be utilised by the Joint Venture in securing and executing the Contract shall, insofar as these are to be provided directly by the Members, be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Member's Interests are not, except with the unanimous approval of the Members, affected thereby.

Similarly, specific areas of responsibility of the Members for the performance of work and the provision of facilities shall be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Members' Interest are not, except with the unanimous approval of the Members, affected thereby.

5.1 Schedule 'A' (General)

Schedule 'A' shall contain general information relating to the Joint Venture including, inter alia, the following :

1. The Employer's name and address.
2. A brief description of the Contract and the Deliverables.
3. The name, physical address, communications addresses and domicilium citandi et executandi of each Member and of the Joint Venture.
4. The Members' Interests.
5. A statement indicating whether, or not, Specific Provisions apply to the Agreement.
6. A schedule of insurance policies which must be taken out by the Joint Venture and by the individual Members.
7. A Schedule of sureties, indemnities and guarantees that must be furnished by the Joint Venture and by the individual Members.
8. Details of the persons, who, in the event of failure by the Members to reach agreement on the appointments of mediator and arbitrator, will nominate appointees to these positions in terms of Clauses 8.2 and 8.3.

5.2 Schedule 'B' (Financial)

Schedule 'B' shall contain information regarding the financial affairs of the Joint Venture including, inter alia, the following :

1. The working capital required by the Joint Venture and the extent to which and manner whereby this will be provided and/or guaranteed by the individual Members from time to time.
2. The banking accounts that are to be opened in the name of the Joint Venture and the manner in which these are to be operated.
3. The rates of interest that will be applicable to amounts by which Members are in debit, or credit, to the Joint Venture.
4. The names of the auditors and others, if any, who will provide auditing and accounting services to the Joint Venture.
5. The intervals at which interim financial accounts and forecasts will be prepared for approval by the Management Committee.
6. Insofar as not covered in Schedule 'C', the basis on which contributions of various types by the Members towards the work of the Joint Venture in securing, executing, managing and satisfactorily completing the Contract, will be valued.
7. The basis on which profits and/or surplus cash will, if available from time to time, be distributed to Members.
8. The basis upon which losses, if any, are to be apportioned to Members.

5.3 Schedule 'C' (Contributions by Members)

Schedule 'C' shall set out the contributions of various types, other than cash, that will be made by the individual Members towards the work and obligations of the Joint Venture and shall, as far as possible, indicate the monetary values to be placed on such contributions, which may include, inter alia, the following :

1. Staff seconded to the Joint Venture.
2. Work carried out and services provided to, or on behalf of, the Joint Venture.
3. Plant, equipment, facilities etc. made available for use by the Joint Venture.
4. Materials and goods supplied to, or on behalf of, the Joint Venture.
5. Licences, sureties, guarantees and indemnities furnished to, or on behalf of, the Joint Venture.
6. Joint Venture Disclosure form required for the Contract.

6. BREACH OF AGREEMENT

If a Member breaches any material provision of the Agreement, or delays or fails to fulfil its obligations in whole, or in part, and does not remedy the situation within fourteen calendar days of receipt of notice from the Management Committee, or another Member, to do so, the other Members shall have the right, without prejudice to any other rights arising from the default, to summarily terminate the Agreement and re-assign the defaulting Member's rights and obligations in the Joint Venture as they see fit and withhold any moneys due to the defaulting member by the Joint Venture.

Each Member shall indemnify the other Members against all losses, costs and claims which may arise against them in the event of the Agreement being terminated as a result of breach of the Agreement by the said Member.

7. INSOLVENCY OF MEMBER

Should a Member be placed in liquidation, or under judicial management, whether provisionally or finally, or propose any compromise with its creditors, the other Members shall be entitled to proceed in terms of Clause 6, as if the Member had breached the Agreement.

8. DISPUTES

8.1 Settlement

The Members shall negotiate in good faith and make every effort to settle any dispute, or claim, that may arise out of, or relate to, the Agreement.

If agreement cannot be reached, an aggrieved Member shall, if he intends to proceed further in terms of Clause 8.2 hereof, advise all other Members in writing that negotiations have failed and that he intends to refer the matter to mediation in terms of Clause 8.2.

8.2 Mediation

Not earlier than ten working days after having advised the other Members, in terms of Clause 8.1, that negotiations in regard to a dispute have failed, an aggrieved Member may require that the dispute be referred, without legal representation, to mediation by a single mediator.

The mediator shall be selected by agreement between the Members, or, failing such agreement, by the person named for this purpose in Schedule 'A'. The costs of the mediation shall be borne equally by all Members.

The mediator shall convene a hearing of the Members and may hold separate discussions with any Member and shall assist the Members in reaching a mutually acceptable settlement of their differences through means of reconciliation, interpretation, clarification, suggestion and advice. The Members shall record such agreement in writing and thereafter they shall be bound by such agreement.

The mediator is authorised to end the mediation process whenever in his opinion further efforts at mediation would not contribute to a resolution of the dispute between the Members.

8.3 Arbitration

Where a dispute or claim is not resolved by mediation, it shall be referred to arbitration by a single arbitrator to be selected by agreement between the Members or, failing agreement, to be nominated by the person named for this purpose in Schedule 'A'.

The Member requiring referral to arbitration shall notify the other Members, in writing, thereof, not later than thirty calendar days after the mediator has expressed his opinion, failing which the mediator's opinion shall be deemed to have been accepted by all Members and shall be put into effect.

Arbitration shall be conducted in accordance with the provisions of the Arbitration Act No. 42 of 1965, as amended, and in accordance with such procedure as may be agreed by the Members or, failing such agreement, in accordance with the rules for the Conduct of Arbitrations published by the Association of Arbitrators and current at the date that the arbitrator is appointed.

The decisions of the arbitrator shall be final and binding on the Members, shall be carried into immediate effect and, if necessary, be made an order of any court of competent jurisdiction.

9. DOMICILIUM

The Members choose domicilium citandi et executandi for all purposes of and in connection with the Agreement as stated in Schedule 'A'. A Member shall be entitled to change his domicilium from time to time, but such change shall be effective only on receipt of written notice of the change by all other Members.

Member No. 1

Thus done and signed at _____ this _____ day of _____20___

For and on behalf of_____*[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

Member No. 2

Thus done and signed at _____ this _____ day of _____20___

For and on behalf of_____*[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

Member No. 3

Thus done and signed at _____ this _____ day of _____20___

For and on behalf of_____*[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

[Allow for additional parties as necessary].

ANNEXURE 5

ANNEXURE 6

HEALTH AND SAFETY IMPLEMENTATION COSTING

Contractor to give a breakdown of his Health and Safety costs on this sheet.

ITEM	DESCRIPTION	UNIT	QUAN-TITY	MONTHS (Indicative)	RATE	AMOUNT
			(a)		(b)	(a) x (b)
1	**MEDICALS**					
1.1	Pre-employment medical	Nr.	-			
1.2	Re-medicals - yearly	Nr.	-			
	TOTAL					
2	**PERSONAL PROTECTIVE EQUIPMENT**					
2.1	Overalls	Nr.				
2.2	Hard Hats	Nr.				
2.3	Safety boots/shoes	Nr.				
2.4	Gloves	Nr.				
2.5	Gumboots steel toe cap	Nr.				
2.6	Safety glasses	Nr.				
2.7	Reflector Bibs	Nr.				
2.8	Barricading Material	M				
2.9	Dust masks	Box 20				
	TOTAL					
3	**FIRE FIGHTING**					
3.1	Fire extinguishers - 4.5Kg	Nr.				
3.2	Surveys - Annual Service	Nr.				
	TOTAL					
4	**HEALTH AND SAFETY PERSONNEL**					
4.1	Safety Manager	Nr.				
4.2	Safety Officer	Nr.				
4.3	Construction Phase Safety, Health, Environmental and Waste Management Plan	Nr.				
	TOTAL					
5	**FACILITIES**					
5.7	Degreasing & Toilet soap	Nr.				
	TOTAL					
6	**FALL PREVENTION / PROTECTION**					
6.1	Safety harnesses with double lanyards	Nr.				
6.2	Safety harnesses with Scaffold hooks	Nr.				
6.3	Lifelines and vertical fall arrest systems	Nr.				
6.4	Scaffolding – material, erection and inspection (Estimate for project)	Nr.				
6.5	Temporary hand railing material and kick flats	Nr.				
6.6	Chin Straps	Nr.				
	TOTAL					

7	**FIRST AID**					
7.1	Replenishment of boxes and other supplies	Nr				
	TOTAL					
8	**TRAINING**					
8.1	SHE Representative	Nr.				
8.2	First Aid Level 1	Nr.				
8.3	Fire Fighting	Nr.				
	TOTAL					
9	**SIGNAGE**					
9.1	All Signage as required by Law, regulatory, warning and information	Nr.				
9.2	Posters for awareness	Nr.				
	TOTAL					
10	**ELECTRICAL**					
10.1	Replacement of Locks required for lockouts	Nr.				
10.2	Replacement of tags	Nr.				
10.3	Replacement for Permit books	Nr.				
10.4	Replacement of Callipers	Nr.				
	TOTAL					
11	**OTHERS (Project Specific)**					
11.1		Nr.				
	TOTAL					
GRAND TOTAL TO BE CARRIED TO THE PRELIMINARIES AND GENERAL IN BILL OF QUANTITIES						

ANNEXURE 7

WAIVER OF CONTRACTOR'S LIEN

DEFINITIONS

Contractor: _____

Employer: Head of Department: Health (KZN Department of Health: Province of KwaZulu-Natal)

Agreement: GCC FOR CONSTRUCTION WORKS - SECOND EDITION 2010

Works (description): **MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**

Site: KZN DEPARTMENT OF HEALTH

AGREEMENT

The Contractor waives, in favour of the Employer, any lien or right of retention that is or may be held in respect of the Works to be executed on the Site

Thus done and signed at _____ on _____
[Date]

_____ _____
Name of signatory Capacity of signatory

ANNEXURE 8

ENGEOLAB (PTY) LTD

Reg. No. 2017/536405/07 VAT Reg. No. 4710205925

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Finances - finance@engeolabcc.co.za / 082 800 2245
Sales - paul@engeolabcc.co.za / 082 881 5370

Website:
www.engeolabcc.co.za

23 October 2023

Our Ref: LL3872

THE DIRECTOR: SUPPLY CHAIN MANAGEMENT
KWAZULU-NATAL PROVINCE DEPARTMENT OF HEALTH
310 JABU NDLOVU STREET
PIETERMARITZBURG
3201

Attention: **Mr. R. MKHIZE**

RE: REPORT ON A GEOTECHNICAL INVESTIGATION: MPOLWENI CLINIC, MSHWATI LOCAL MUNICIPALITY

Sir,

A geotechnical investigation was carried out to assess the foundation conditions for the proposed clinic located on a vacant lot next to Mpolweni Community Hall on the Remainder of the farm Groothoek No. 920, uMshwati LM.

The aim of the investigation was to provide the professional team with relevant geotechnical data for the design and construction of Mpolweni Clinic, a single storey structure with outbuildings, parking, staff quarters and reception.

Yours Faithfully,

P.G. Hansmeyer *Pr.Sci.Nat*

rdr

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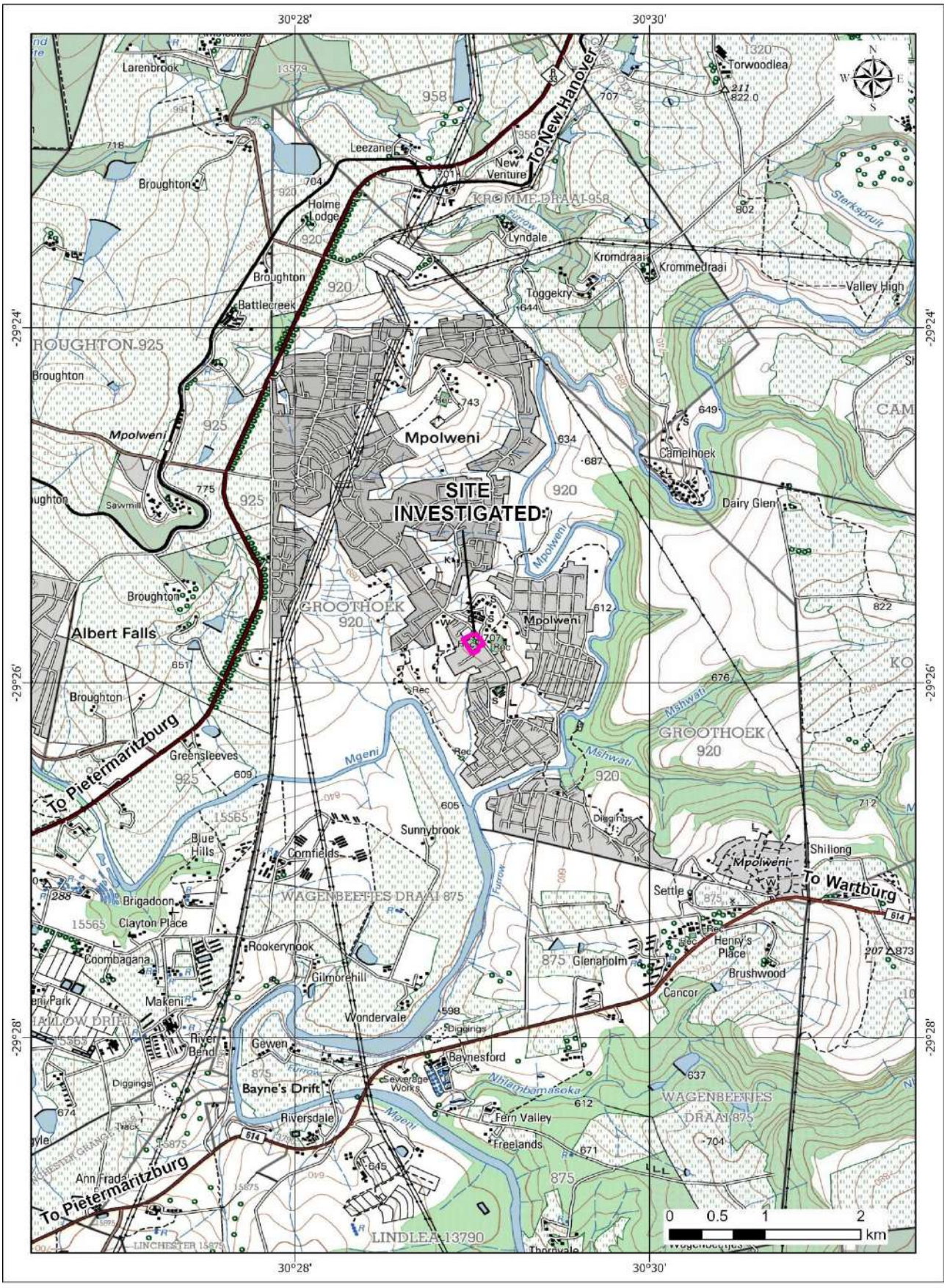
VOLUME 1
MPOLWENI CLINIC, uMSHWATI LM

health

Department:
Health
REPUBLIC OF SOUTH AFRICA

Project: LL3872
Date: OCTOBER 2023
By: P.G. Hansmeyer *Pr.Sci.Nat*

FIGURE 1: LOCALITY PLAN



Report Type: Geotechnical Investigation
Project Title: Mpolweni Clinic, uMshwati Local Municipality
Compiled for: Department of Health
Compiled by: Paul Hansmeyer *Pr.Sci.Nat*.
Engeolab Reference: LL3872
Version: Version 1
Date: October 2023
Distribution List: Mr. R. Mkhize

Disclaimer:

The results, conclusions and recommendations of this report are limited to the Scope of Work agreed between Engeolab (Consultant) and the Client who requested this investigation. All assumptions made, and all information contained within this report, and its attachments including maps depend on accessibility to and reliability of information obtained. All work conducted by Engeolab is done in accordance with the Engeolab Standard Operating Procedures.

Copyright:

Limit of Liability

The Client agrees that any claims against Consultant pertaining to this Project shall be limited to the claims related to, or attributable to, proven negligence by Consultant in the performance of its services, provided that any claims must be brought within 12 months from the earlier of the date of the last service performed by Consultant, or the date of substantial completion of the work.

The amount of claim payable by Consultant shall be limited to the amount that can be claimed under the applicable insurance policy pertaining to the Project, or 50% of the value of engineering fees paid to Consultant on the Project, whichever is less.

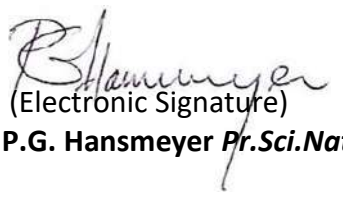
In no event shall Consultant (Engeolab) be liable, whether in contract or tort, for:

- loss or damage occasioned by any event beyond Consultant's control; or
- consequential damage including without limitation, loss of earnings, loss of production, or loss of use, howsoever caused.

Declaration:

I hereby declare:

1. I have no vested interest (now or in the future) in this project and that I have no personal interest with respect to the parties involved in this project.
2. I have not been offered, nor have I received any significant form of inappropriate reward for compiling this report.
3. I have no bias with regard to this project or towards the various stakeholders involved in this project.



(Electronic Signature) Date: 23 October 2023

P.G. Hansmeyer *Pr.Sci.Nat.*

EXECUTIVE SUMMARY

A geotechnical investigation was carried out on a vacant lot, some 1ha in size next to Mpolweni Community Hall on the Remainder of the farm Groothoek No. 920, Umshwati LM.

The objectives of the investigation were to identify the site soils and geology, assess the excavation classes and to determine the geotechnical constraints of the site.

The fieldwork comprised the excavation of nine test pits and five DPSH penetration tests. The soil samples were submitted to SNALAB in Richards Bay for analyses which included foundation indicators, compaction tests, acidity/alkalinity and conductivity measurements.

The site is underlain by dull olive-grey shale of the Pietermaritzburg Formation. No outcrops were observed on site and the bedrock is sequentially overlain by four medium active soil horizons with an average thickness of 1.5m. Although intrusive dolerite was expected, none was encountered on site.

Perched water tables were not encountered and no seepage was recorded in any of the test pits that were excavated on the site. The site is well drained and no ponding or water seeps were observed.

The foundation design, building procedures and precautionary measures for the proposed single storey masonry structure founded on H1 site class expansive soil horizon some 1.5m thick and subject to at least 10mm of differential movement will require modified normal structural solutions.

To maintain the current in situ moisture content of the site, the large Eucalyptus trees should be left intact, new trees are to be planted at distances of at least twice their estimated full-grown heights away from the building and a concrete apron, consisting of slabs 1,2m^{2}and entirely separated from one another and from the building be cast around the outside of the structures.

Table of Contents

ENGEOLAB (PTY) LTD

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VOLUME 1

GEOTECHNICAL REPORT

MPOLWENI CLINIC, UMSHWATI LM

1. Introduction

A geotechnical investigation was carried out on a vacant piece of land next to Mpolweni Community Hall on the Remainder of the farm Groothoek No. 920 – refer to the Locality Plan, Figure 1 in the beginning of the report.

Engeolab (Pty)Ltd was appointed by KZN Health's Directorate: Supply Chain Management on the 21st of July 2023 to assess the geotechnical aspects of the proposed Mpolweni Clinic site located within the jurisdiction of the Umshwati Local Municipality at S29°25'49.3" and E030°29'00".

The objectives of the investigation were to identify the site soils and geology, assess the excavation classes and to determine the geotechnical constraints of the site.

The fieldwork comprising the excavation of nine test pits and five DPSH penetration tests was carried out on the 29th August 2023. The soil samples were submitted to SNALAB in Richards Bay the following day and the results became available on Friday, 28 September 2023.

The field data was captured and the soil profiles as well as the DPSH penetration data are attached respectively as Appendices A and B with the soil laboratory data as Appendix C to Volume 1 of the report. The drawings are included in a separate booklet as Volume 2 to the report.

2. Sources of Information

The following sources of information were consulted: -

i. Geological Map, Sheet Durban printed to a scale of 1:250,000 in 1988;
ii. Detail Survey Plan of Mpolweni Clinic Site by Button & O'Connor, Professional Surveyors, to a scale of 1:250, dated June 2023;
iii. Google Maps of the area.

3. Site Details

The almost rectangular, tree lined site of some 1ha in size is located between the Mpolweni Community Hall on the western boundary and the Social Services building on the eastern boundary. The southerly boundary is formed by fenced gardens and the northern boundary by the D708 tar road – refer to Plates 1 and 2 below and the Site Map, Figure 2, Volume 2. Access to the site and beyond is via three gravel tracks of which two turn off from the D708 onto the eastern portion of the grounds.

PLATE 1: MPOLWENI COMMUNITY HALL

PLATE 2: SOCIAL SERVICES

Developments on site comprise ESKOM overhead powerlines and bulk underground water services indicated by white bollards – refer to Plate 3 below. Mature Eucalyptus trees with girths in excess of 5m line the boundaries of the site which is currently used as a soccer pitch – refer to Plate 4 below. The site dips with an even gradient of 1V:40H towards the south-east and surface water naturally drains in this direction.

PLATE 3: WHITE BOLLARDS

PLATE 4: VIEW OF THE SITE FROM THE NORTH

A vandalized concrete reservoir and asbestos-cement tank perched on top a rock pile located opposite the community hall's gate were inspected and a borehole census was also carried out, but to no avail - refer to Plate 5 on the following page.

PLATE 5: RERVOIR AND ASBESTOS-CEMENT TANK

It is understood that the Mpolweni Clinic will occupy most of the site where the soccer field is located and the buildings will be light, single storey structures with an access road, parking, staff quarters and clinic facilities.

4. Site Soils & Geology

The site is underlain by dull olive-grey shale of the Pietermaritzburg Formation – refer to Plate 6 and the Geology Map, Figure 3A, Volume 2. No outcrops were observed on site and the bedrock is sequentially overlain by residuum, a scattered pebble marker, pedogenic horizons and top soil – refer to the Cross Section A-A', Figure 3B, Volume 2.

The topography seemingly emulates the south-east dipping bedrock which is some 1.5m below surface. A generalised soil and bedrock profile of the site, depicting five horizons is presented by Table 4.1 below and the soil profiles are presented by Profiles, Figure 4, Volume 2.

TABLE 4.1: GENERALISED SITE SOILS and GEOLOGY

Depth Range (m)	Lithology
Surface to 0.7m	HORIZON A: Colluvial topsoil layer of sandy silt which blankets the whole site
0.4 – 1.2	HORIZON B: Pedogenic layer mainly present in the western half of the site, comprising abundant ferricrete nodules in a medium active sandy-silt matrix
0.3 – 1.6	HORIZON C: pebble marker present on the eastern half of the site, sandwiched between the top soil layer and the underlying residual horizon, comprising orange-brown fine tabular sandstone gravels in a medium active matrix of silty sand
0.9 – 1.4	HORIZON D: medium active residual silt-sand mixes derived from in situ decomposed shale
>1.2	HORIZON E: horizontally disposed, olive-grey with stained relict fracture surfaces, close to medium fractured shale bedrock, generally decomposed to highly weathered becoming moderately weathered at excavation refusal – refer to Plate 6 below

PLATE 6: SHALE SAMPLES

According to the Geology Map, Figure 3A - dolerite should be encountered over more than 50% of the site. Although widely scattered dolerite boulders were noticed on surface, no dolerite was observed in any of the nine test pits excavated on site and outcrops are absent.

5. Drainage, Ponding and Perched Water Table

Perched water tables were not encountered and no seepage was recorded in any of the test pits that were excavated on the site. The site is well drained and no ponding or water seeps were observed.

It must however be taken into account that the investigation was carried out during the dry winter months and a rebound of a shallow perched water table is possible during high rainfall periods. This is most likely to occur where highly permeable, thin sandy cover soils are underlain by ferruginous clays and pebble marker horizons.

6. Investigation Methodology

- ***Test Pits*:** A total of nine test pits denoted as TP1 to TP9 were excavated on the site with a depth range of 1.2 to 2.5m. The tests pits were inspected, profiled in accordance with the visual and tactile guidelines of the MCCSSO[Ref.1] methodology, photographed, sampled selectively and backfilled. The soil profiles together with their photographs are attached as Appendix A to the report and their positions are indicated on the Site Map, Figure 2, Volume 2.

- ***DPSH Penetration Tests*:** Five DPSH penetration tests (denoted as DPSH1 to DPSH5) were carried out on the site and adjacent to some of the test pits – refer to Appendix B and the Site Map, Figure 2, Volume 2. The penetration testing was carried out at depths ranging from 2.1 to 3.3m below natural ground level up to where refusal occurred - usually if more than 80

blows[Ref. 2] per 300mm of depth were recorded. The DPSH data and the summary of the soil and bedrock related consistencies are summarised as Table 6.1 below.

TABLE 6.1: SUMMARY OF DPSH PENETRATION DATA

	DEPTH (m)	GSDP1 N	GSDP2 N	GSDP3 N	GSDP 4 N	GSDP 5 N	AVG N	Interp Consistency	EABC (kPa)	Est Soil Modulus (MPa)
SANDY	0.0	0	0	0	0	0	0	VL	0	8
	0.3	21	26	29	18	16	22	MD	145	25
	0.6	39	21	74	28	36	40	D	200	39
	0.9	42	14	84	50	63	51	VD	230	48
	1.2	29	51	76	38	42	47	D	220	45
	1.5	23	64	79	32	56	51	VD	230	48
	1.8	14	52	77	39	52	47	D	220	45
	2.1	22	69	84	39	74	58	VD	245	54
	2.4	42			36		39	D	200	39
	2.7	64			40		52	VD	230	49
	3.0				38		38	D	195	38
	3.3				68		68	VD	270	62

Where: N = Number of Blows/300mm; EABC = estimated average bearing capacity; N < 4 = Very loose ; N 4 – 10 = Loose; N 10 – 30 = Medium Dense; N 30 – 50 = Dense and N >50 Very Dense for sandy soils and N <2 = V. soft; N2 – 4 = soft; N= 4 – 8 = Firm; N= 8 – 15 = Stiff and N= 15 – 30 = Very stiff for clayey soils

- ***Soil Tests*:** Eleven disturbed representative samples were taken from five of the nine test pits excavated. The samples were submitted to SNALAB in Richards Bay – an accredited civil engineering facility for soil testing. The tests were carried out to determine the engineering characteristics of the four soil horizons and included foundation indicators and compaction tests. The latter enabled the classification of the soil horizons in terms of the pavement construction material qualities[Ref.3]; pH values and electrical conductivities were included as well. The soil test data is presented by Table 6.2 on the following page.

TABLE 6.2: SUMMARY of TEST DATA

TP No	Depth (m)	Sample No	Material Type	Origin	USC	%MC	%Clay	GM	PI	MDD Kg/m³	CBR @95%	pH	C S/m	G-Class	Activity
TP2	0.6-1.2	DSTP2A	Silty sand with gravel	Pedocrete	SM	13.0	17	1.65	16	1855	8	5.68	0.023	>G10	Med
TP4	0.1-0.5	DSTP4A	Sandy silt	Colluvium	ML	13.6	25	0.67	14			5.68	0.018		Med
TP4	0.5-0.9	DSTP4B	Sandy elastic silt	Pedocrete	MH	19.3	29	0.97	19			5.96	0.0183		Med
TP4	0.9-1.4	DSTP4C	Silty sand	Res. shale	SM	17.5	19	1.34	14			5.98	0.071		Med
TP6	1.0-1.3	DSTP6A	Elastic silty with gravel	Res. shale	MH	15.6	42	0.61	21			5.63	0.0787		Low-Med
TP8	0.1-0.5	DSTP8A	Sandy lean clay	Colluvium	CL	9.5	9	0.73	12	1875	3	5.75	0.0177	>G10	Low
TP8	0.5-1.6	DSTP8B	silty sand	Pebble Marker	SM	16.0	29	1.35	18			6.22	0.0223		Med
TP8	1.6-1.9	DSTP8C	Silty sand with gravel	Res. shale	SM	14.0	10	2.25	15			6.07	0.0161		Low
TP9	0.1-0.3	DSTP9A	Sandy lean clay	Colluvium	CL	9.5	11	0.79	11			5.5	0.0201		Low
TP9	0.3-1.0	DSTP9B	Silty sand with gravel	Pebble Marker	SM	15.7	13	1.94	19			6.26	0.0142		Med
TP9	0.9-1.5	DSTP9C	Elastic silty with sand	Res. shale	MH	19.5	50	0.47	27			5.68	0.0461		Low-Med

Distilled water was leached through eleven soil samples retrieved from test pits excavated on site. The leachate was subsequently tested for conductivity and the results were inverted to determine the resistivity. A rough guide in determining the corrosiveness of a soil, based on the resistivity is shown below. The alkalinity/acidity of the site soils were determined as well.

TABLE 6.3: RESISTIVITY

Resistivity Reading (Ohm.meter)	Corrosiveness Status	Site Data (Ohm.meter)
< 30	Very corrosive	100% of samples
30 - 50	Moderately corrosive	-
50 - 100	Mildly corrosive	-

7. Geotechnical Appraisal

- ***General Site Soils & Geology*:** The site soils generally comprise an overburden of up to four horizons of medium active clays with a firm to stiff consistency and an average thickness of 1.5m. The clayey overburden is underlain by highly weathered, laminated to thinly bedded and medium jointed dull olive, soft rock shale up to 1.5m thick followed by moderately weathered, medium hard rock. Intrusive dolerite is absent and no outcrops were recorded.

  The soils are generally highly corrosive and tend to be acidic, requiring HDPE subsurface wet services.

- ***Excavation Classes*:** The clayey overburden and decomposed to moderately weathered shale are generally soft excavatable, becoming intermediate excavatable at TLB refusal level. The DPSH refusal depths corroborate the TLB's excavation refusal depths to some extent and an average soft excavation depth of 1.5m is envisaged for the terrain, followed by intermediate excavation class[Ref.4].

- ***Bearing Capacity & Differential Movement*** : The dynamic penetration test data generally displayed stiff consistencies associated with the clayey overburden up to 1.5m below surface level. These silt-sand-clay mixes are medium compressible ($Modulus_{ave}$ ~38MPa) with an estimated bearing capacity of 150KPa at foundation level – that is 0.6m below natural ground level with an expected range of differential movement of up to 10mm. At DPSH refusal depth, dense to very dense founding material is seemingly present with a modulus E~60MPa, an average bearing capacity of 250KPa and negligible settlement – refer to Table 7.1 below.

TABLE 7.1: SUMMARY of SITE SOIL CONSISTENCIES & ESTIMATED BEARING CAPACITIES

Depth Range (m)	Average Thickness	N_{ave}	Consistency	Estimated AVE. Bearing Capacity (EABC KPa)	Generalised Lithology
Surface to 1.5m	1.5		stiff	150	Overburden of medium active clays
>	N/A		Medium hard shale	250	Shale bedrock

NOTE: Settlements <5mm are expected at average refusal depth 1.5m below natural ground level on very dense shale

- ***Alkalinity/Acidity of Site Soils & Soil Resistivities*:** The pH values range from pH = 5.7 to a maximum of pH = 6.3, indicating predominantly acidic soil conditions and based on the resistivity values, the site soils are generally corrosive.

- ***Pavement Construction Material Classes***: The clayey overburden generally complies with G10 (and worse) quality pavement construction materials[Ref.3].

- ***Seepage and Perched Water Tables*:** Although no seepage was recorded in any of the test pits excavated, a temporary perched water table may be encountered during good summer rains.

8. Recommendations

* The foundation design, building procedures and precautionary measures for the proposed single storey masonry structure founded on H1 site class expansive soil horizon[Ref.5] some 1.5m thick and subject to at least 10mm of differential movement will require modified normal structural solutions. This will include the following: -

Reinforced strip footings;
Articulation joints on all external doors and weight carrying internal doors;
Light reinforcement in masonry;
Good site drainage with down pipes discharging to collective sumps draining south-eastwards away from the peripheral foundations;
Service/plumbing precautions with flexible piping;
Foundation pressures not to exceed 100KPa.

To maintain the current in situ moisture content (which varies from 9.5 to 19.3%), the large Eucalyptus trees should be left intact and new trees are to be planted at distances of at least twice their estimated full-grown heights away from the building and a concrete apron, consisting of slabs 1,2m^{2}and entirely separated from one another and from the building be cast around the outside of the structures[Ref.6].

9. References

Reference 1: Guidelines for Soil and Rock Logging in SA, 2nd Impression2001, eds. A.B.A. Brink and R.M.H Bruin, Proceedings , Geoterminology Workshop organised by AEG, SAICE and SAIEG, 1990.

Reference 2: Brink A.B.A, Partridge , T. C., Williams, A. A. B., 1982. Soil Survey for Engineering, Appendix B, Soil Sampling and in situ testing techniques, pp. 320.

Reference 3: TRH 14: 1985. Guidelines For Road Construction Materials by the Committee of State Road Authorities.

Reference 4: SANS 10400, Part G, 2011, NBR, Edition 3.

Reference 5: National Home Builders Registration Council, Circular No. 4, June 1996.

Reference 6: Brink, A.B.A., 1979. Engineering Geology of SA., Volume 1, Chapter 8, Case History 19, pp. 267.

10. Appendices

APPENDIX A – Soil Profiles

APPENDIX B – DPSH Data

APPENDIX C – Laboratory Test Data

APPENDIX A

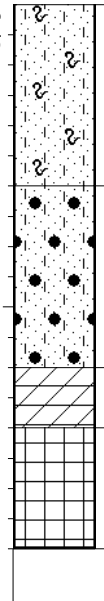
SOIL PROFILES

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP1
Sheet 1 of 1

JOB NUMBER: LL3872

Scale 1:25



0.00	Slightly moist, dark grey-brown, medium dense, intact, medium grained, silty SAND with roots to 0.5m; Colluvium.
0.60	Slightly moist, maroon-brown, medium dense to dense, intact, medium grained silty SAND with abundant FERRICRETE nodules; Pedocrete.
1.20	Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.
1.40	Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.
1.80	

NOTES

1) No seepage

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

INCLINATION : Vertical
DIAM :
DATE :
DATE : 28 Aug 2023

ELEVATION :
X-COORD : S 29˚25'49.3"
Y-COORD : E 030˚29'00.5"

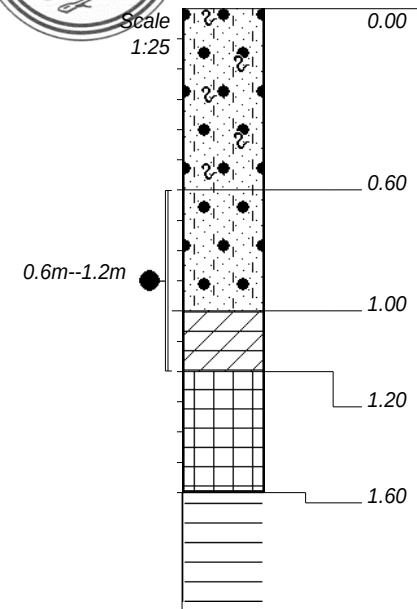
TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP2
Sheet 1 of 1

JOB NUMBER: LL3872



Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.

Slightly moist, maroon-brown, medium dense to dense, intact, medium grained silty SAND with abundant FERRICRETE nodules; Pedocrete.

Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.

Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE.

Slow penetration of backhoe in khaki-brown with black stained fracture surfaces, laminated to medium bedded and closely fractured, very soft to soft becoming medium hard, SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

2) Sampled as follows: 0.6m--1.2m (FI, %MC, pH, Conductivity, Mod+CBR)

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

ELEVATION :
X-COORD : S 29˚25'47.4"
Y-COORD : E 030˚28'58.8"

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

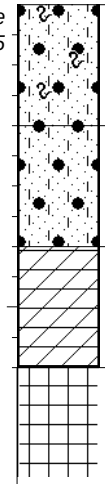
DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP3
Sheet 1 of 1

JOB NUMBER: LL3872

Scale 1:25



0.00	Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.
0.40	Slightly moist, maroon-brown, medium dense to dense, intact, medium grained silty SAND with abundant FERRICRETE nodules; Pedocrete.
0.80	Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.
1.20	Slow penetration from 1.2m followed by refusal on dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

ELEVATION :
X-COORD : S 29˚25'45.5"
Y-COORD : E 030˚28'57.7"

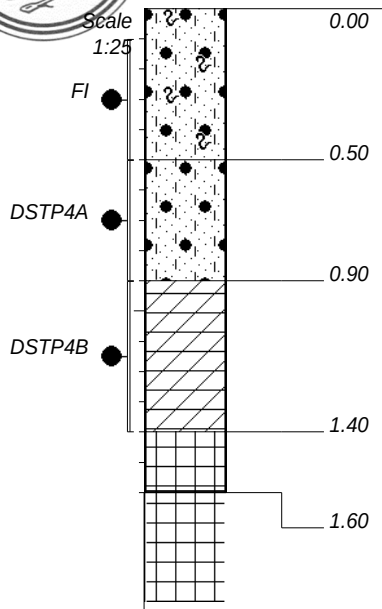
TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP4
Sheet 1 of 1

JOB NUMBER: LL3872



Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.

Slightly moist, maroon-brown, medium dense to dense, intact, medium grained silty SAND with abundant FERRICRETE nodules; Pedocrete.

Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.

Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE.

Slow penetration from 1.5m followed by refusal on dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

2) Sampled (pH, Conductivity, FI, %MC) as follows: DSTP4A from 0.1m--0.5m, DSTP4B from 0.5m--0.9m and DSTP4C from 0.9m--1.4m

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

ELEVATION :
X-COORD : S 29˚25'44.3"
Y-COORD : E 030˚28'59.4"

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

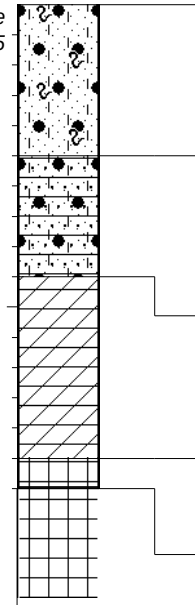
DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP5
Sheet 1 of 1

JOB NUMBER: LL3872

Scale 1:25



0.00	Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.
0.50	Abundant coarse, medium and fine FERRICRETE nodules (about 80% of matrix material) in a matrix of slightly moist to moist, maroon-brown, medium dense to dense, intact, silty SAND with widely scattered tabular maroon, fine soft Sandstone gravels; Pebble Marker.
0.90	Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.
1.50	Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE.
1.60	Slow penetration from 1.5m to 1.6m followed by refusal on dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

ELEVATION :
X-COORD : S 29˚25'44.5"
Y-COORD : E 030˚29'00.6"

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

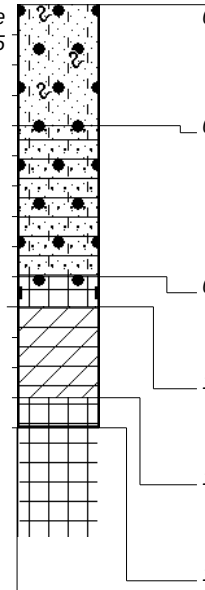
DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP6
Sheet 1 of 1

JOB NUMBER: LL3872

Scale 1:25



0.00	Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.
0.40	Abundant coarse, medium and fine FERRICRETE nodules (about 80% of matrix material) in a matrix of slightly moist to moist, maroon-brown, medium dense to dense, intact, silty SAND with widely scattered tabular maroon, fine Sandstone gravels; Pebble Marker.
0.90	Coarse FERRICRETE nodules and ivory, silt coasted SHALE fragments in a partially cemented Shale matrix; Pedocrete.
1.00	Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.
1.30	Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE.
1.40	Slow penetration from 1.3m followed by refusal on dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

ELEVATION :
X-COORD : S 29˚25'45.6"
Y-COORD : E 030˚29'01.4"

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

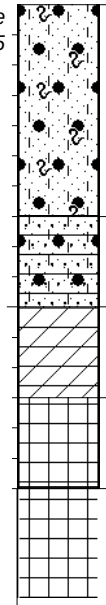
DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP7
Sheet 1 of 1

JOB NUMBER: LL3872

Scale 1:25



0.00	Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.
0.70	Abundant coarse, medium and fine FERRICRETE nodules (about 70% of matrix material) in a matrix of slightly moist to moist, maroon-brown, medium dense to dense, intact, silty SAND with widely scattered tabular maroon, fine Sandstone gravels; Pebble Marker.
1.00	Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.
1.30	Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE.
1.60	Slow penetration from 1.3m followed by refusal on dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

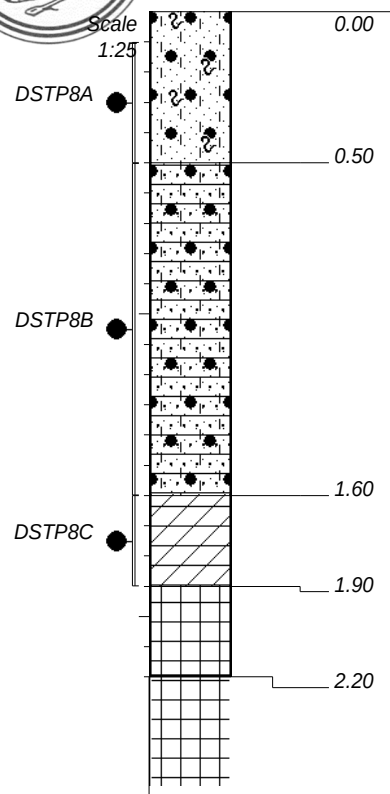
DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

ELEVATION :
X-COORD : S 29˚25'46.9"
Y-COORD : E 030˚29'02.7"

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP8
Sheet 1 of 1

JOB NUMBER: LL3872



0.00 – 0.50: Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.

0.50 – 1.60: Abundant coarse, medium and fine FERRICRETE nodules (about 60% of matrix material) in a matrix of slightly moist to moist, maroon-brown, medium dense to dense, intact, silty SAND with widely scattered tabular maroon, fine Sandstone gravels; Pebble Marker.

1.60 – 1.90: Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.

1.90 – 2.20: Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE.

2.20: Slow penetration from 1.9m followed by refusal on dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

2) Sampled (FI, pH, %MC, Conductivity) as follows: DSTP8A from 0.1m--0.5m (Mod+CBR), DSTP8B from 0.5m--1.6m and DSTP8C from 1.6m--1.9m

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

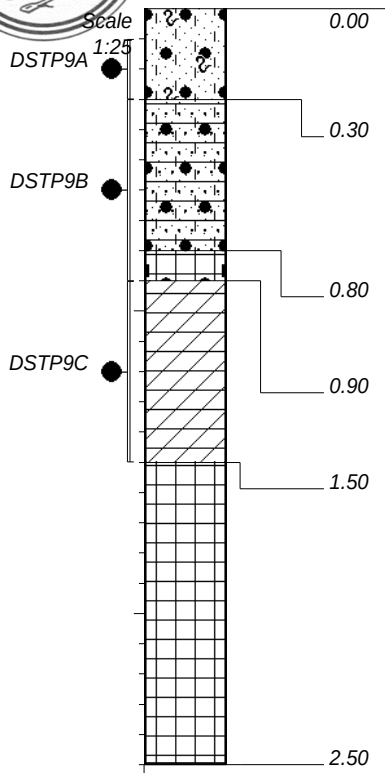
DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

ELEVATION :
X-COORD : S 29˚25'48.5"
Y-COORD : E 030˚29'02.2"

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

HOLE No: TP9
Sheet 1 of 1

JOB NUMBER: LL3872



Slightly moist, dark grey-brown, medium dense to dense, intact, medium grained, silty SAND with grass roots and abundant FERRICRETE nodules; Colluvium.

Abundant coarse, medium and fine FERRICRETE nodules (about 70% of matrix material) in a matrix of slightly moist to moist, maroon-brown, medium dense to dense, intact, silty SAND with widely scattered tabular maroon, fine Sandstone gravels; Pebble Marker.

Coarse FERRICRETE nodules and ivory, silt coasted SHALE fragments in a partially cemented matrix; Pedocrete.

Slightly moist, olive mottled brown, stiff, slickensided CLAY; Residual SHALE.

Dull khaki stained maroon and black, highly weathered with silt coated relict fractures, laminated to thinly bedded, very soft rock SHALE of the Pietermaritzburg Formation.

NOTES

1) No seepage

2) Sampled as follows: DSTP9A from 0.1m--0.3m, DSTP9B from 0.3m--0.9m and DSTP9C from 0.9m--1.5m (pH, Conductivity, FI, %MC)

CONTRACTOR : Deeplaul's Plant Hire
MACHINE : CASE 570T
DRILLED BY : Sithole
PROFILED BY : P Hansmeyer

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 28 Aug 2023

DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

ELEVATION :
X-COORD : S 29˚25'49.4"
Y-COORD : E 030˚29'00.0"

DOH KwaZulu-Natal Province
Mpolweni Clinic, Isidlavaleni Village

LEGEND
Sheet 1 of 1

JOB NUMBER: LL3872

	SAND	{SA04}
	SILT	{SA06}
	SILTY	{SA07}
	CLAY	{SA08}
	SANDSTONE	{SA11}
	SHALE	{SA12}
	FERRICRETE NODULES	{SA24}
	PARTIALLY CEMENTED	{SA30}
Name ●	DISTURBED SAMPLE	{SA38}
	ROOTS	{SA40}

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :

INCLINATION :
DIAM :
DATE :
DATE :

ELEVATION :
X-COORD :
Y-COORD :

TYPE SET BY : R du Randt
SETUP FILE : STANDARD.SET

DATE : 30/08/2023 13:08
TEXT : ..FILES\LL3872Mpolweni.txt

APPENDIX B

DPSH DATA

DPSH TEST RESULTS SUMMARY

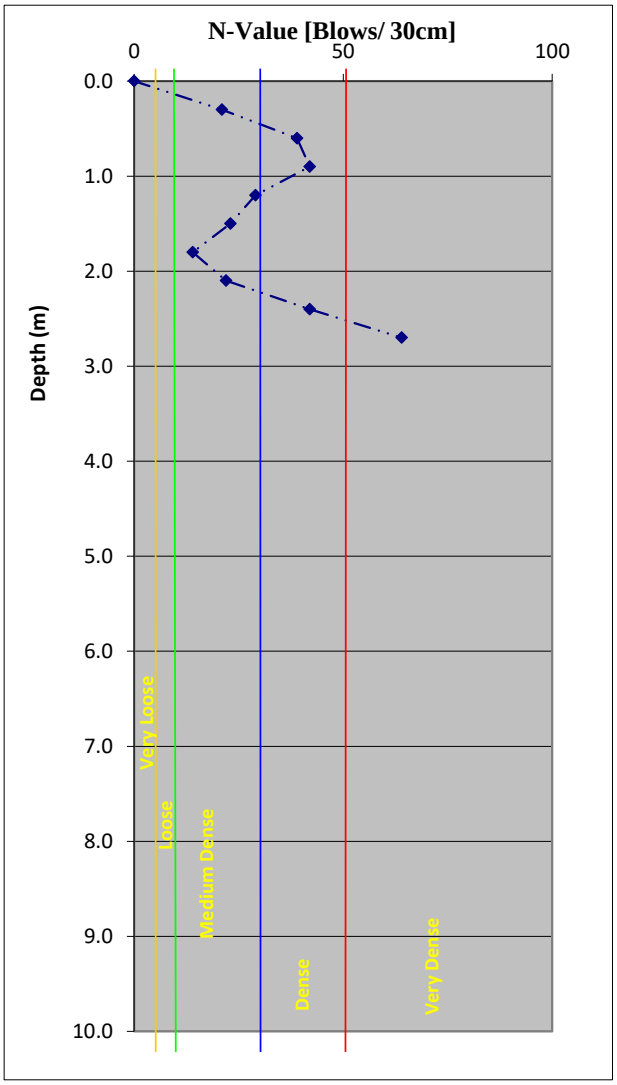
CLIENT	DOH KwaZulu-Natal Prov
PROJECT	Mpolweni Clinic
SITE	Mpolweni Clinic

FILE No.	LL3872
TEST BY	Phiwa & Themba
DATE	28/08/2023

COORDINATES	**S 29°25'47.3"**
	E 30°28'00.0"

DPSH No.	**GSDP1**

Depth (m)	N-Value [Blows/ 30cm]	Cumulative Count		EABC (kPa)	Est Soil Modulus (MPa)
0.0	0	0	VL	0	8
0.3	21	21	MD	140	24
0.6	39	60	D	200	39
0.9	42	102	D	205	41
1.2	29	131	MD	170	31
1.5	23	154	MD	150	26
1.8	14	168	MD	115	19
2.1	22	190	MD	145	25
2.4	42	232	D	205	41
2.7	64	296	VD	260	59
3.0					
3.3					
3.6					
3.9					
4.2					
4.5					
4.8					
5.1					
5.4					
5.7					
6.0					
6.3					
6.6					
6.9					
7.2					
7.5					
7.8					
8.1					
8.4					
8.7					
9.0					
9.3					
9.6					
9.9					
10.2					
	Refusal				



Sand		Clay	
N SPT value	Relative Density	N SPT value	Consistency
0 – 4	Very Loose	<2	Very Soft
4 – 10	Loose	2 – 4	Soft
10 – 30	Medium	4 – 8	Medium
30 – 50	Dense	8 – 15	Stiff
>50	Very Dense	15 – 30	Very Stiff
		>30	Hard

1. Relative density and soil characteristics based on N SPT value (Terzaghi dan Peck) [5]

DPSH TEST RESULTS SUMMARY

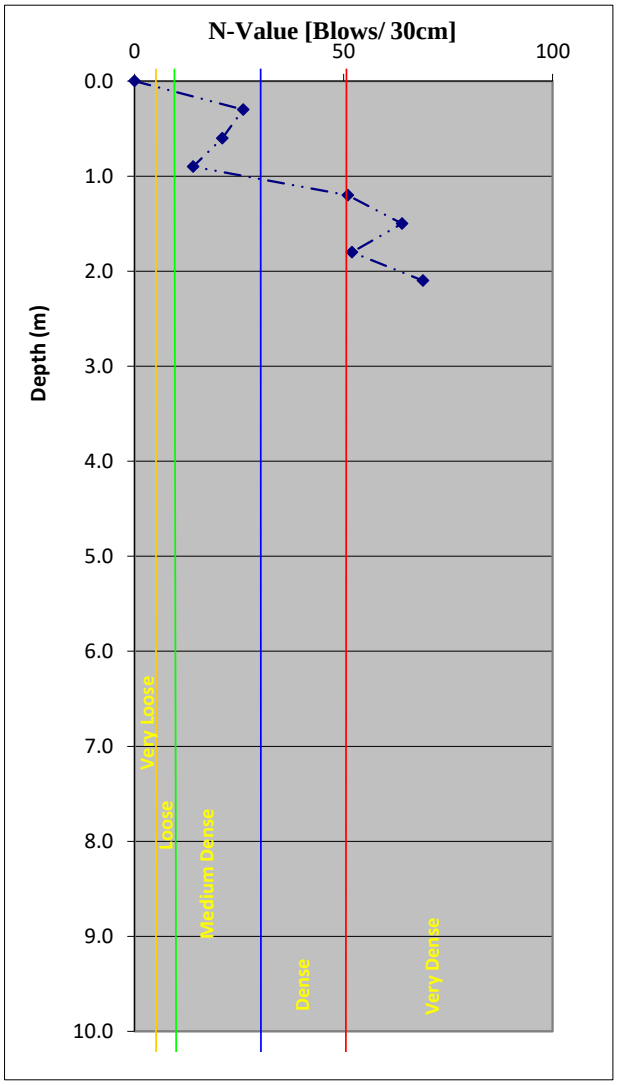
CLIENT	DOH KwaZulu-Natal Prov
PROJECT	Mpolweni Clinic
SITE	Mpolweni Clinic

FILE No.	LL3872
TEST BY	Phiwa & Themba
DATE	28/08/2023

COORDINATES	**S 29°25'45.7"**
	E 30°28'57.8"

DPSH No.	**GSDP2**

Depth (m)	N-Value [Blows/ 30cm]	Cumulative Count		EABC (kPa)	Est Soil Modulus (MPa)
0.0	0	0	VL	0	8
0.3	26	26	MD	160	28
0.6	21	47	MD	140	24
0.9	14	61	MD	115	19
1.2	51	112	VD	230	48
1.5	64	176	VD	260	59
1.8	52	228	VD	230	49
2.1	69	297	VD	270	63
2.4					
2.7					
3.0					
3.3					
3.6					
3.9					
4.2					
4.5					
4.8					
5.1					
5.4					
5.7					
6.0					
6.3					
6.6					
6.9					
7.2					
7.5					
7.8					
8.1					
8.4					
8.7					
9.0					
9.3					
9.6					
9.9					
10.2					
	Refusal				



Sand		Clay	
N SPT value	Relative Density	N SPT value	Consistency
0 – 4	Very Loose	<2	Very Soft
4 – 10	Loose	2 – 4	Soft
10 – 30	Medium	4 – 8	Medium
30 – 50	Dense	8 – 15	Stiff
>50	Very Dense	15 – 30	Very Stiff
		>30	Hard

1. Relative density and soil characteristics based on N SPT value (Terzaghi dan Peck) [5]

DPSH TEST RESULTS SUMMARY

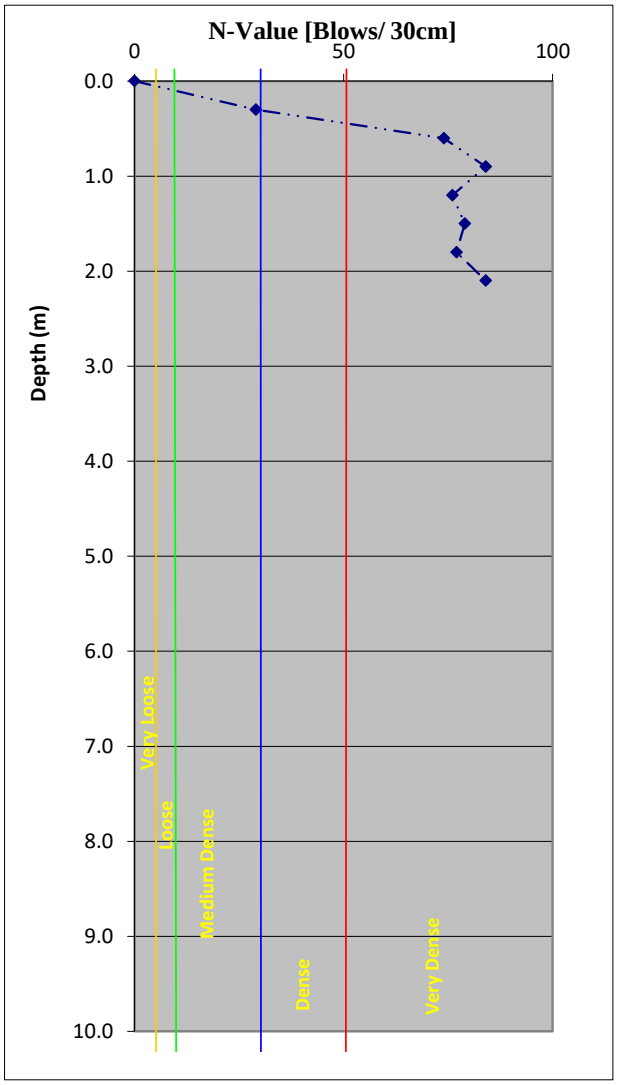
CLIENT	DOH KwaZulu-Natal Prov
PROJECT	Mpolweni Clinic
SITE	Mpolweni Clinic

FILE No.	LL3872
TEST BY	Phiwa & Themba
DATE	28/08/2023

COORDINATES	**S 29°25'44.8"**
	E 30°29'00.9"

DPSH No.	**GSDP3**

Depth (m)	N-Value [Blows/ 30cm]	Cumulative Count		EABC (kPa)	Est Soil Modulus (MPa)
0.0	0	0	VL	0	8
0.3	29	29	MD	170	31
0.6	74	103	VD	280	67
0.9	84	187	VD	300	75
1.2	76	263	VD	285	68
1.5	79	342	VD	290	71
1.8	77	419	VD	285	69
2.1	84	503	VD	300	75
2.4					
2.7					
3.0					
3.3					
3.6					
3.9					
4.2					
4.5					
4.8					
5.1					
5.4					
5.7					
6.0					
6.3					
6.6					
6.9					
7.2					
7.5					
7.8					
8.1					
8.4					
8.7					
9.0					
9.3					
9.6					
9.9					
10.2					
	Refusal				



Sand		Clay	
N SPT value	Relative Density	N SPT value	Consistency
0 – 4	Very Loose	<2	Very Soft
4 – 10	Loose	2 – 4	Soft
10 – 30	Medium	4 – 8	Medium
30 – 50	Dense	8 – 15	Stiff
>50	Very Dense	15 – 30	Very Stiff
		>30	Hard

1. Relative density and soil characteristics based on N SPT value (Terzaghi dan Peck) [5]

DPSH TEST RESULTS SUMMARY

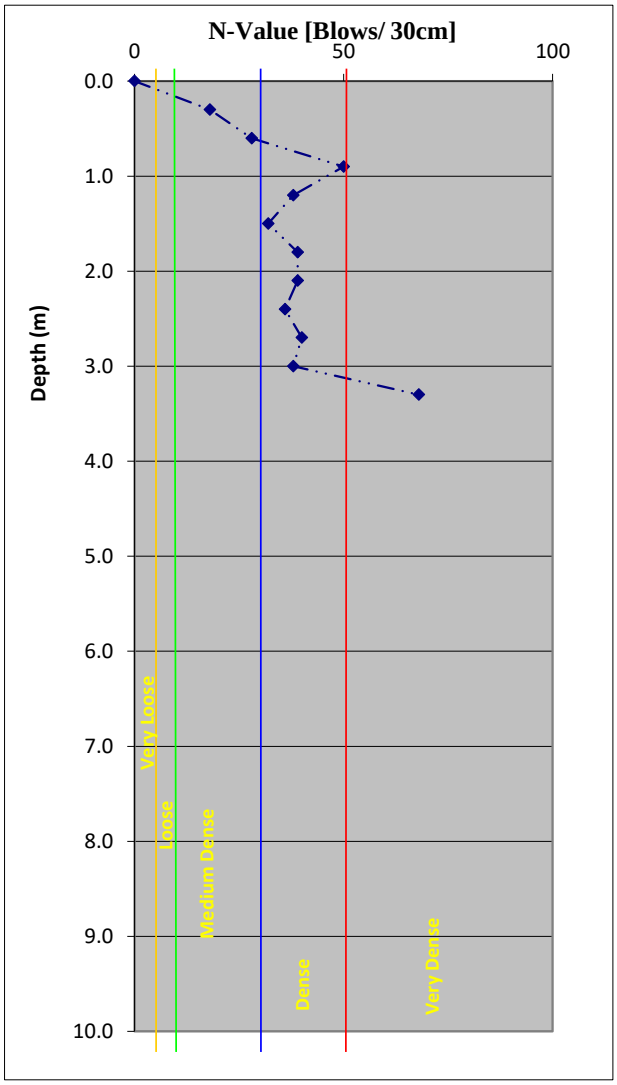
CLIENT	DOH KwaZulu-Natal Prov
PROJECT	Mpolweni Clinic
SITE	Mpolweni Clinic

FILE No.	LL3872
TEST BY	Phiwa & Themba
DATE	28/08/2023

COORDINATES	**S 29°25'47.0"**
	E 30°29'02.6"

DPSH No.	**GSDP4**

Depth (m)	N-Value [Blows/ 30cm]	Cumulative Count		EABC (kPa)	Est Soil Modulus (MPa)
0.0	0	0	VL	0	8
0.3	18	18	MD	130	22
0.6	28	46	MD	165	30
0.9	50	96	VD	225	48
1.2	38	134	D	195	38
1.5	32	166	D	180	33
1.8	39	205	D	200	39
2.1	39	244	D	200	39
2.4	36	280	D	190	36
2.7	40	320	D	200	40
3.0	38	358	D	195	38
3.3	68	426	VD	270	62
3.6					
3.9					
4.2					
4.5					
4.8					
5.1					
5.4					
5.7					
6.0					
6.3					
6.6					
6.9					
7.2					
7.5					
7.8					
8.1					
8.4					
8.7					
9.0					
9.3					
9.6					
9.9					
10.2					
	Refusal				



Sand		Clay	
N SPT value	Relative Density	N SPT value	Consistency
0 – 4	Very Loose	<2	Very Soft
4 – 10	Loose	2 – 4	Soft
10 – 30	Medium	4 – 8	Medium
30 – 50	Dense	8 – 15	Stiff
>50	Very Dense	15 – 30	Very Stiff
		>30	Hard

1. Relative density and soil characteristics based on N SPT value (Terzaghi dan Peck) [5]

DPSH TEST RESULTS SUMMARY

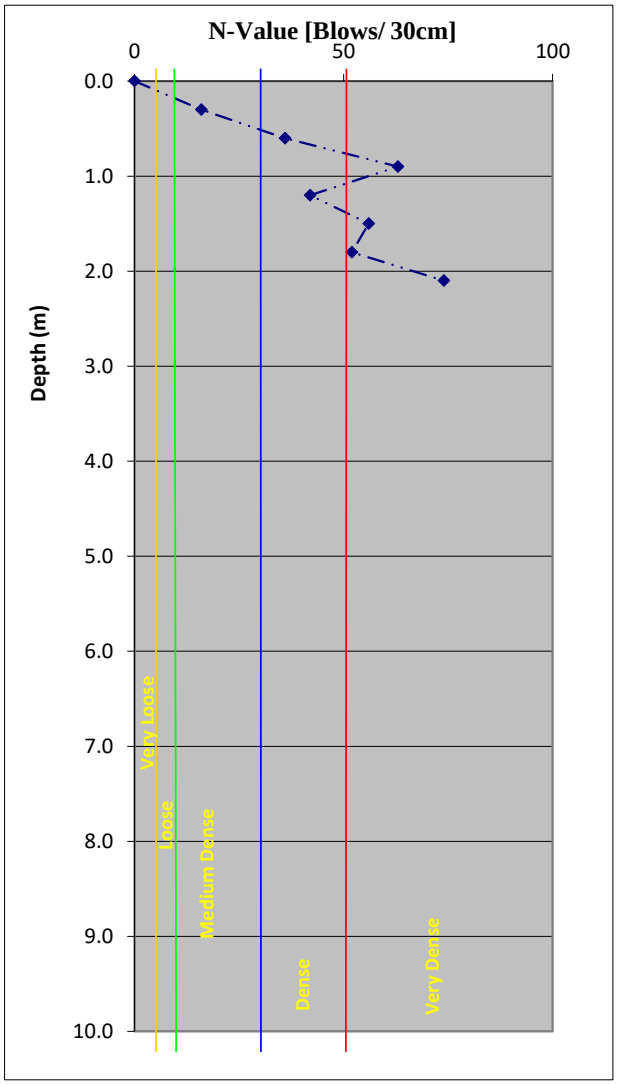
CLIENT	DOH KwaZulu-Natal Prov
PROJECT	Mpolweni Clinic
SITE	Mpolweni Clinic

FILE No.	LL3872
TEST BY	Phiwa & Themba
DATE	28/08/2023

COORDINATES	**S 29°25'49.1"**
	E 30°28'59.9"

DPSH No.	**GSDP5**

Depth (m)	N-Value [Blows/ 30cm]	Cumulative Count		EABC (kPa)	Est Soil Modulus (MPa)
0.0	0	0	VL	0	8
0.3	16	16	MD	125	20
0.6	36	52	D	190	36
0.9	63	115	VD	260	58
1.2	42	157	D	205	41
1.5	56	213	VD	240	52
1.8	52	265	VD	230	49
2.1	74	339	VD	280	67
2.4					
2.7					
3.0					
3.3					
3.6					
3.9					
4.2					
4.5					
4.8					
5.1					
5.4					
5.7					
6.0					
6.3					
6.6					
6.9					
7.2					
7.5					
7.8					
8.1					
8.4					
8.7					
9.0					
9.3					
9.6					
9.9					
10.2					
	Refusal				



Sand		Clay	
N SPT value	Relative Density	N SPT value	Consistency
0 – 4	Very Loose	<2	Very Soft
4 – 10	Loose	2 – 4	Soft
10 – 30	Medium	4 – 8	Medium
30 – 50	Dense	8 – 15	Stiff
>50	Very Dense	15 – 30	Very Stiff
		>30	Hard

1. Relative density and soil characteristics based on N SPT value (Terzaghi dan Peck) [5]

APPENDIX C

LABORATORY TEST DATA

SNALAB CIVIL ENGINEERING LABORATORY
SNA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD
13 PESETA PARADE, ARBORETUM RICHARDS BAY
PO Box 10191, Meerensee 3901
Tel :(035) 789 7105/6/7
E-MAIL : rb@sna.co.za
REG No. 2005/006128/07

TEST REPORT

REPORT NUMBER
57962/2023

Client : ENGEOLAB (PTY) LTD

Address: PO Box 521
Mtunzini
3867

Cell : 082 881 5370
Tel: 035 - 340 1108
Fax: No Information Provided

ATTENTION: Paul Hansmeyer

Project/Order: LL3872 Mpolweni Clinic / LL3872

Brief : **Design:** - Determine 2 No. MDD/OMC, 2 No. CBR. 11 No.Foundation Indicator + 11 No. Moisture Content, 11 No. pH + Conductivity for the samples provided.

Date requested	30/08/2023
Date sampled	SAMPLED BY CLIENT
Date received	30/08/2023
Date tested	Refer attached report/s
Location of sampling	SAMPLED BY CLIENT
Sampling method/methods	SAMPLED BY CLIENT
Sampling plan	SAMPLED BY CLIENT
Sampled by	SAMPLED BY CLIENT
Sample number	Refer attached report/s
Sample description	Refer attached report/s
Sample condition	Slightly moist, uncontaminated
Sample classification	Refer attached report/s
Sampling Environmental condition	SAMPLED BY CLIENT
Test Method/Methods used	Refer attached report/s
Test done at	SNALAB R/Bay
Deviation to Test Method's :	**Will be noted on test report sheets/s, as applicable.**

ZB Mthembu
Technical Assistant

26/09/2023
DATE:

SOIL TEST REPORT

Client:	ENGEOLAB (PTY) LTD	Lab No:	REFER BELOW
Project Name/No:	MPOLWENI CLINIC	Client No :	57962/2023
Section from:	TP9	Date :	20/09/2023

Criteria REFER PROJ SPEC

Laboratory & Field Data			RESULTS				
Laboratory No			91374	91375	91376		
Test Pit No			DSTP9A	DSTP9B	DSTP9C		
Sample No.			TP9	TP9	TP9		
Source			EX SITE	EX SITE	EX SITE		
Depth		m	0,1 - 0,3	0,3 - 0,9	0,1 - 0,3		
Description			Dk Br	Dk R	Dk Br		
Sampled by					CLIENT		
SIEVE + HYDRO ANALYSIS (SANS 3001-GR1) / ASTM D422		% P					
63	mm						
53	mm						
37,5	mm						
26,5	mm						
19	mm			100			
13,2	mm		100	93	100		
4,75	mm		98	83	99		
2,00	mm		86	46	93		
0,600	mm		74	34	84		
0,425	mm		73	32	84		
0,075	mm		62	28	76		
0,060	mm		44	27	77		
0,050	mm		42	26	77		
0,026	mm		31	23	73		
0,015	mm		24	21	69		
0,010	mm		23	20	67		
0,0050	mm		16	17	58		
0,0020	mm		11	13	50		
0,0015	mm		8	13	50		
Grading Modulus (SANS 3001 - PR5)			0,79	1,94	0,47		
SOIL TYPE DISTRIBUTION (M.I.T)		%					
Gravel	(> 2.0mm)		14	54	7		
Coarse Sand	(2.0 - 0.6mm)		12	12	9		
Medium Sand	(0.6 - 0.2mm)		6	3	3		
Fine Sand	(0.2 - 0.06mm)		24	4	4		
Silt	(0.06 - 0.002mm)		33	14	27		
Clay	(<0.002mm)		11	13	50		
SOIL CONSTANTS (SANS 3001 - GR10)							
Liquid Limit		%	35	53	69		
Plasticity Index		-	11	19	27		
Linear Shrinkage		%	6,5	11,5	15,0		
MDD/OMC (SANS 3001 - GR30)							
Maximum Dry Density			**	**	**		
Opt. Moisture Content			**	**	**		
FIELD MOISTURE (SANS 3001 GR20)			9,52	15,68	19,52		
CBR (SANS GR40)							
CBR at : 100% Compaction			**	**	**		
: 98% Compaction			**	**	**		
: 95% Compaction			**	**	**		
: 93% Compaction			**	**	**		
: 90% Compaction			**	**	**		
Swell @ 100% Compaction			**	**	**		
OTHER							
pH (SANS 3001 GR57)		%	5,51	6,26	5,68		
Electric Conductivity	(TMH1 A21T)	S/m	0,0201	0,0142	0,0461		
CLASSIFICATION							
AASHTO SCS & Group Index		-	A-6 (6)	A-2-7 (1)	A-7-5 (19)		
ASTM (UNIFIED)			CL	SM	MH		
		-	SANDY LEAN CLAY	SILTY SAND WITH GRAVEL	ELASTIC SILT WITH SAND		
COLTO:1998			**	**	**		

Notes :
This report relates only to the specific sample(s) tested herein.
% P denotes "percentage passing"

Remarks:
** NOT REQUESTED

Date: 26/09/2023

Signature:

Nov 05 rev 0

SOIL TEST REPORT

SNALAB

Client:	ENGEOLAB (PTY) LTD	Lab No:	REFER BELOW
Project Name/No:	MPOLWENI CLINIC	Client No :	57962/2023
Section from:	TP2	Date :	20/09/2023
Criteria	REFER PROJ SPEC		

Laboratory & Field Data			RESULTS
Laboratory No			91377
Test Pit No			DSTP2A
Sample No.			TP2
Source			EX SITE
Depth		m	0,6 - 1,2
Description			Dk R O Br
Sampled by			CLIENT
SIEVE + HYDRO.ANALYSIS (SANS 3001-GR1) / ASTM D422		% P	
63	mm		
53	mm		
37,5	mm		
26,5	mm		
19	mm		100
13,2	mm		96
4,75	mm		84
2,00	mm		59
0,600	mm		42
0,425	mm		40
0,075	mm		36
0,060	mm		34
0,050	mm		33
0,026	mm		30
0,015	mm		28
0,010	mm		26
0,0050	mm		21
0,0020	mm		17
0,0015	mm		16
Grading Modulus (SANS 3001 - PR5)			1,65
SOIL TYPE DISTRIBUTION (M.I.T)		%	
Gravel	(> 2.0mm)		41
Coarse Sand	(2.0 - 0.6mm)		17
Medium Sand	(0.6 - 0.2mm)		4
Fine Sand	(0.2 - 0.06mm)		4
Silt	(0.06 - 0.002mm)		17
Clay	(<0.002mm)		17
SOIL CONSTANTS (SANS 3001 - GR10)			
Liquid Limit		%	45
Plasticity Index		-	16
Linear Shrinkage		%	8,5
MDD/OMC (SANS 3001 - GR30)			
Maximum Dry Density		Kg/m³	1855
Opt. Moisture Content		%	17,1
FIELD MOISTURE (SANS 3001 GR20)			13,02
CBR (SANS GR40)			
CBR at : 100% Compaction			18
: 98% Compaction			13
: 95% Compaction			8
: 93% Compaction			6
: 90% Compaction			4
Swell @ 100% Compaction			0,4
OTHER			
pH (SANS 3001 GR57)		%	5,68
Electric Conductivity	(TMH1 A21T)	S/m	0,0230
CLASSIFICATION			
AASHTO SCS & Group Index		-	A-7-6 (2)
ASTM (UNIFIED)			SM
		-	SILTY SAND
			WITH GRAVEL
COLTO:1998			NC

Notes :
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% P denotes "percentage passing"

Remarks:
** NOT REQUESTED

Date: 26/09/2023

Signature:

Nov 05 rev 0

SOIL TEST REPORT

SNALAB	Client:	ENGEOLAB (PTY) LTD	Lab No:	REFER BELOW
	Project Name/No:	MPOLWENI CLINIC	Client No :	57962/2023
	Section from:	TP4	Date :	20/09/2023

Criteria REFER PROJ SPEC

Laboratory & Field Data			**RESULTS**				
Laboratory No			91378	91379	91380		
Test Pit No			DSTP4A	DSTP4B	DSTP4C		
Sample No.			TP4	TP4	TP4		
Source			EX SITE	EX SITE	EX SITE		
Depth		m	0,1 - 0,5	0,5 - 0,9	0,9 - 1,4		
Description			Dk Br	Dk R O Br	Dk Y O		
Sampled by					CLIENT		
SIEVE + HYDRO ANALYSIS (SANS 3001-GR1) / ASTM D422		% P					
63	mm						
53	mm						
37,5	mm						
26,5	mm						
19	mm			100			
13,2	mm		100	90	100		
4,75	mm		98	86	95		
2,00	mm		88	77	70		
0,600	mm		78	69	52		
0,425	mm		77	67	51		
0,075	mm		68	59	45		
0,060	mm		65	55	40		
0,050	mm		64	52	39		
0,026	mm		53	45	37		
0,015	mm		45	40	33		
0,010	mm		40	39	30		
0,0050	mm		30	33	23		
0,0020	mm		25	29	19		
0,0015	mm		21	28	15		
Grading Modulus (SANS 3001 - PR5)			0,67	0,97	1,34		
SOIL TYPE DISTRIBUTION (M.I.T)		%					
Gravel	(> 2.0mm)		12	23	30		
Coarse Sand	(2.0 - 0.6mm)		10	8	18		
Medium Sand	(0.6 - 0.2mm)		5	6	4		
Fine Sand	(0.2 - 0.06mm)		8	8	8		
Silt	(0.06 - 0.002mm)		40	26	21		
Clay	(<0.002mm)		25	29	19		
SOIL CONSTANTS (SANS 3001 - GR10)							
Liquid Limit		%	41	55	44		
Plasticity Index		-	14	19	14		
Linear Shrinkage		%	7,5	10,5	8,5		
MDD/OMC (SANS 3001 - GR30)							
Maximum Dry Density			**	**	**		
Opt. Moisture Content			**	**	**		
FIELD MOISTURE (SANS 3001 GR20)			13,58	19,27	17,50		
CBR (SANS GR40)							
CBR at : 100% Compaction			**	**	**		
: 98% Compaction			**	**	**		
: 95% Compaction			**	**	**		
: 93% Compaction			**	**	**		
: 90% Compaction			**	**	**		
Swell @ 100% Compaction			**	**	**		
OTHER							
pH (SANS 3001 GR57)		%	5,68	5,96	5,98		
Electric Conductivity	(TMH1 A21T)	S/m	0,0180	0,0183	0,0710		
CLASSIFICATION							
AASHTO SCS & Group Index		-	A-7-6 (8)	A-7-5 (10)	A-7-5 (3)		
ASTM (UNIFIED)			ML	MH	SM		
		-	SANDY SILT	SANDY ELASTIC SILT	SILTY SAND		
COLTO:1998			**	**	**		

Notes :
This report relates only to the specific sample(s) tested herein.
% P denotes "percentage passing"

Remarks:
** NOT REQUESTED

Date: 26/09/2023

Signature:

SOIL TEST REPORT

SNALAB	Client:	ENGEOLAB (PTY) LTD	Lab No:	REFER BELOW
	Project Name/No:	MPOLWENI CLINIC	Client No :	57962/2023
	Section from:	TP8	Date :	20/09/2023
Criteria	REFER PROJ SPEC			

Laboratory & Field Data			RESULTS					
Laboratory No			91381	91382	91383			
Test Pit No			DSTP8A	DSTP8B	DSTP8C			
Sample No.			TP8	TP8	TP8			
Source			EX SITE	EX SITE	EX SITE			
Depth		m	0,1 - 0,5	0,5 - 1,6	1,6 - 1,9			
Description			Dk R Br	Dk R O	Dk R O			
Sampled by					CLIENT			
SIEVE + HYDRO ANALYSIS (SANS 3001-GR1) / ASTM D422		% P						
63	mm							
53	mm							
37,5	mm							
26,5	mm							
19	mm				100			
13,2	mm		100	100	79			
4,75	mm		99	94	67			
2,00	mm		93	67	34			
0,600	mm		77	52	23			
0,425	mm		75	50	22			
0,075	mm		59	48	19			
0,060	mm		43	46	19			
0,050	mm		40	45	18			
0,026	mm		28	40	16			
0,015	mm		23	38	15			
0,010	mm		17	37	14			
0,0050	mm		14	33	11			
0,0020	mm		9	29	10			
0,0015	mm		7	28	10			
Grading Modulus (SANS 3001 - PR5)			0,73	1,35	2,25			
SOIL TYPE DISTRIBUTION (M.I.T)		%						
Gravel	(> 2.0mm)		7	33	66			
Coarse Sand	(2.0 - 0.6mm)		16	15	11			
Medium Sand	(0.6 - 0.2mm)		10	2	2			
Fine Sand	(0.2 - 0.06mm)		24	4	2			
Silt	(0.06 - 0.002mm)		34	17	9			
Clay	(<0.002mm)		9	29	10			
SOIL CONSTANTS (SANS 3001 - GR10)								
Liquid Limit		%	35	51	43			
Plasticity Index		-	12	18	15			
Linear Shrinkage		%	6,5	9,0	8,5			
MDD/OMC (SANS 3001 - GR30)								
Maximum Dry Density			1875	**	**			
Opt. Moisture Content			13,8	**	**			
FIELD MOISTURE (SANS 3001 GR20)			9,54	15,95	14,02			
CBR (SANS GR40)								
CBR at : 100% Compaction			8	**	**			
: 98% Compaction			5	**	**			
: 95% Compaction			3	**	**			
: 93% Compaction			2	**	**			
: 90% Compaction			1	**	**			
Swell @ 100% Compaction			0,8	**	**			
OTHER								
pH (SANS 3001 GR57)		%	5,75	6,22	6,07			
Electric Conductivity	(TMH1 A21T)	S/m	0,0177	0,0223	0,0161			
CLASSIFICATION								
AASHTO SCS & Group Index		-	A-6 (6)	A-7-5 (6)	A-2-7 (0)			
ASTM (UNIFIED)			CL	SM	SM			
		-	SANDY LEAN CLAY	SILTY SAND	SILTY SAND WITH GRAVEL			
COLTO:1998			NC	**	**			

Notes :
This report relates only to the specific sample(s) tested herein.
% P denotes "percentage passing"

Remarks:
** NOT REQUESTED

Date: 26/09/2023
Signature:

Nov 05 rev 0

SOIL TEST REPORT

SNALAB	Client:	ENGEOLAB (PTY) LTD	Lab No:	REFER BELOW
	Project Name/No:	MPOLWENI CLINIC	Client No :	S7962/2023
	Section from:	TP6	Date :	20/09/2023

Criteria REFER PROJ SPEC

Laboratory & Field Data			RESULTS			
Laboratory No			91384			
Test Pit No			DSTP6A			
Sample No.			TP6			
Source			EX SITE			
Depth		m	1,0 - 1,3			
Description			Dk Y O			
Sampled by			CLIENT			
SIEVE + HYDRO.ANALYSIS (SANS 3001-GR1) / ASTM D422		% P				
63	mm					
53	mm					
37,5	mm					
26,5	mm					
19	mm		100			
13,2	mm		98			
4,75	mm		94			
2,00	mm		87			
0,600	mm		80			
0,425	mm		79			
0,075	mm		73			
0,060	mm		66			
0,050	mm		64			
0,026	mm		63			
0,015	mm		61			
0,010	mm		58			
0,0050	mm		48			
0,0020	mm		42			
0,0015	mm		39			
Grading Modulus (SANS 3001 - PR5)			0,61			
SOIL TYPE DISTRIBUTION (M.I.T)		%				
Gravel	(> 2.0mm)		13			
Coarse Sand	(2.0 - 0.6mm)		7			
Medium Sand	(0.6 - 0.2mm)		4			
Fine Sand	(0.2 - 0.06mm)		10			
Silt	(0.06 - 0.002mm)		24			
Clay	(<0.002mm)		42			
SOIL CONSTANTS (SANS 3001 - GR10)						
Liquid Limit		%	59			
Plasticity Index		-	21			
Linear Shrinkage		%	11,0			
MDD/OMC (SANS 3001 - GR30)						
Maximum Dry Density		Kg/m³	**			
Opt. Moisture Content		%	**			
FIELD MOISTURE (SANS 3001 GR20)			15,61			
CBR (SANS GR40)			**			
CBR at : 100% Compaction			**			
: 98% Compaction			**			
: 95% Compaction			**			
: 93% Compaction			**			
: 90% Compaction			**			
Swell @ 100% Compaction			**			
OTHER						
pH (SANS 3001 GR57)		%	5,63			
Electric Conductivity	(TMH1 A21T)	S/m	0,0787			
CLASSIFICATION						
AASHTO SCS & Group Index		-	A-7-5 (16)			
ASTM (UNIFIED)			MH			
		-	ELASTIC SILT WITH SAND			
COLTO:1998			**			

Notes :
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% P denotes "percentage passing"

Remarks:
** NOT REQUESTED

Date: 26/09/2023

Signature:

Nov 05 rev 0

VOLUME 2

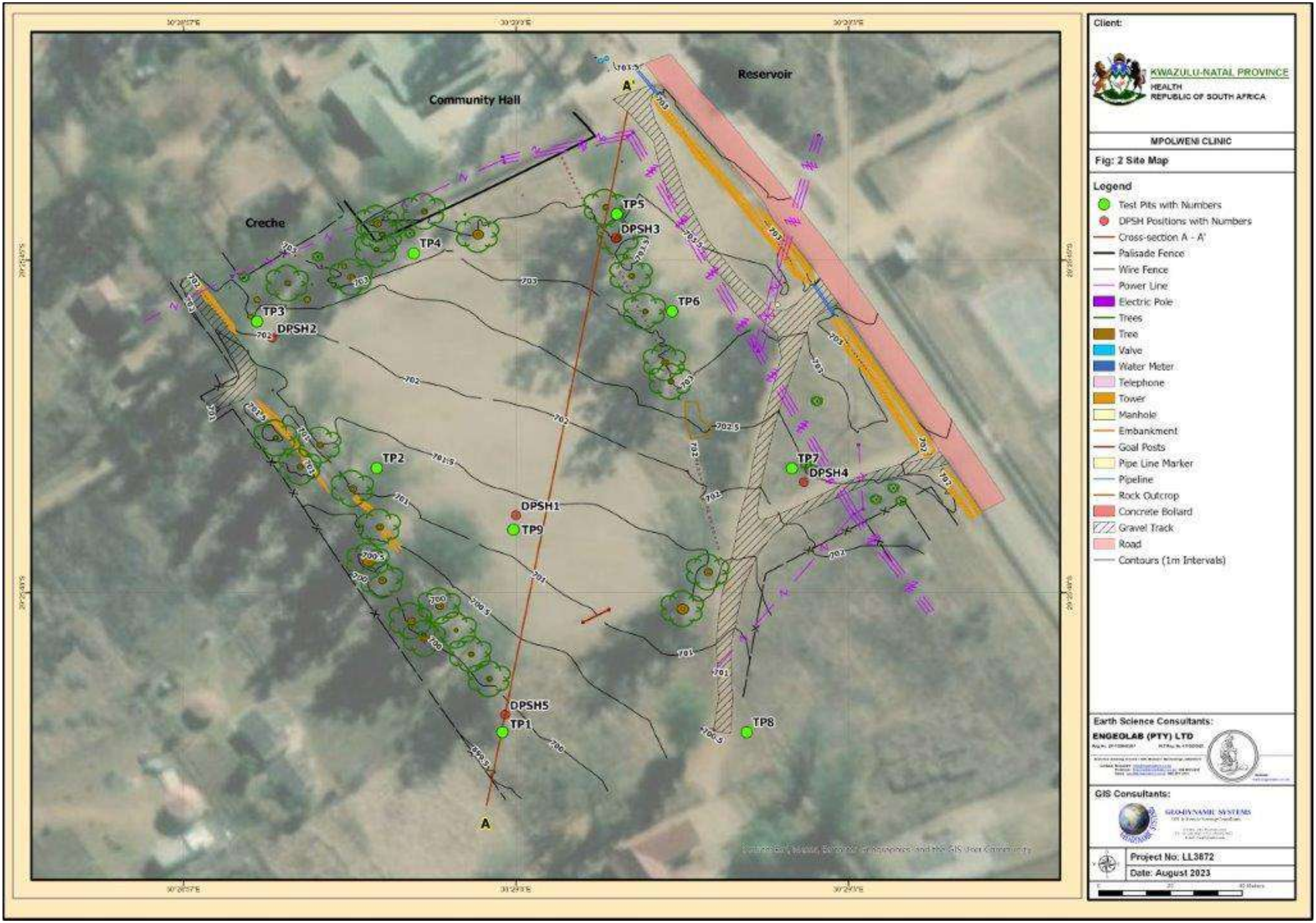
MPOLWENI CLINIC, uMSHWATI LM

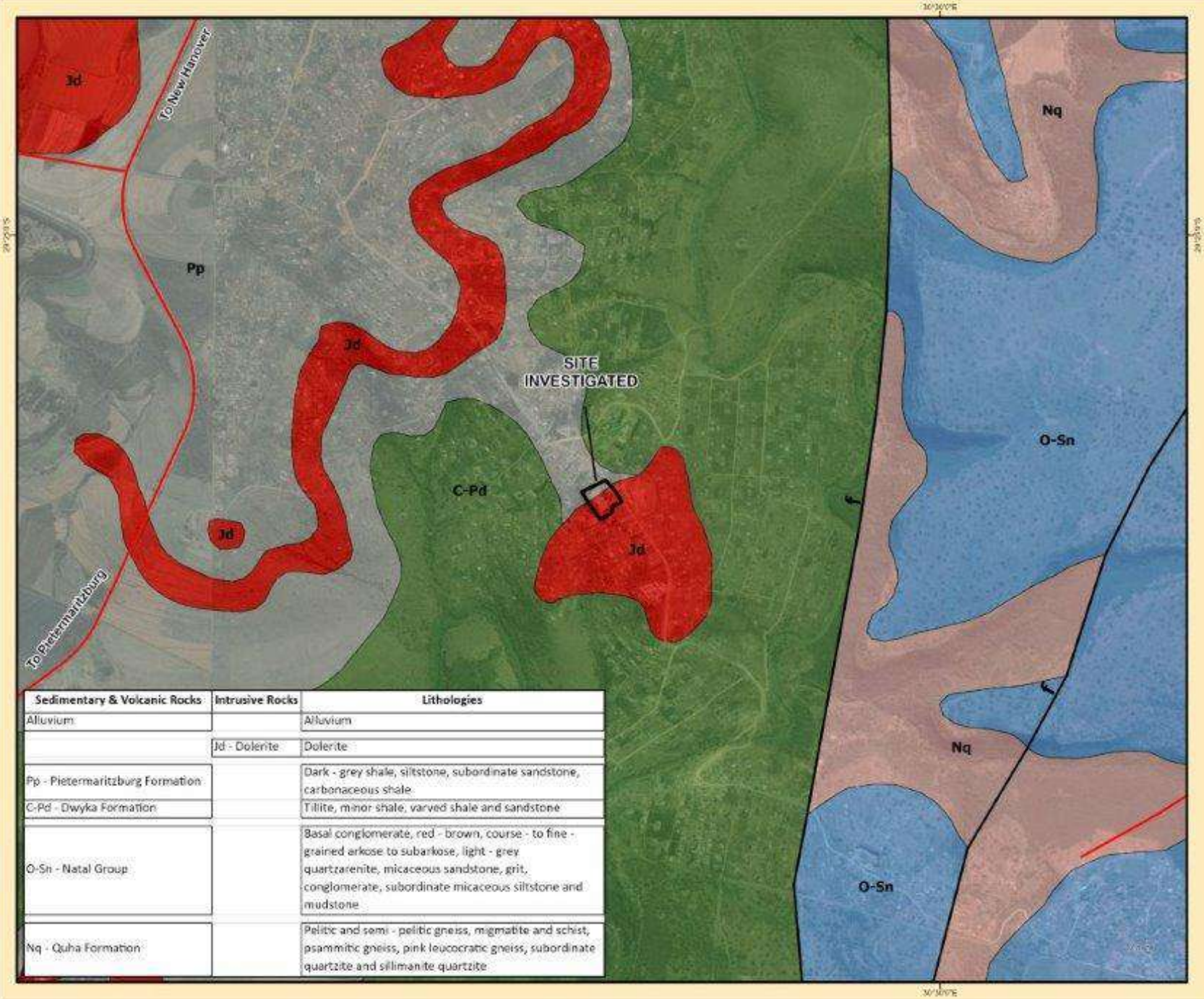
PROJECT LL3872

health

Department:
Health
REPUBLIC OF SOUTH AFRICA

ENGEOLAB (PTY) LTD
Reg. No. 2017/536405/07 VAT Reg. No. 4710205925
Branches: Gauteng_Pretoria / KZN_Mtunzini / Mpumalanga_eMalahleni
Contact: Enquiries - info@engeolabcc.co.za
Finances - finance@engeolabcc.co.za / 082 800 2245
Sales - paul@engeolabcc.co.za / 082 801 5370
Website:
www.engeolabcc.co.za


Client:
KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA
MPOLWENI CLINIC
Fig: 2 Site Map
Legend
Test Pits with Numbers
DPSH Positions with Numbers
Cross-section A - A'
Palisade Fence
Wire Fence
Power Line
Electric Pole
Trees
Tree
Valve
Water Meter
Telephone
Tower
Manhole
Embankment
Goal Posts
Pipe Line Marker
Pipeline
Rock Outcrop
Concrete Bollard
Gravel Track
Road
Contours (1m Intervals)
Earth Science Consultants:
ENGEOLAB (PTY) LTD
GIS Consultants:
GEO-DYNAMIC SYSTEMS
Project No: LL3872
Date: August 2023
Reservoir
Community Hall
Creche
A'
A
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
DPSH1
DPSH2
DPSH3
DPSH4
DPSH5



Sedimentary & Volcanic Rocks	Intrusive Rocks	Lithologies
Alluvium		Alluvium
	Jd - Dolerite	Dolerite
Pp - Pietermaritzburg Formation		Dark - grey shale, siltstone, subordinate sandstone, carbonaceous shale
C-Pd - Dwyka Formation		Tillite, minor shale, varved shale and sandstone
O-Sn - Natal Group		Basal conglomerate, red - brown, course - to fine - grained arkose to subarkose, light - grey quartzarenite, micaceous sandstone, grit, conglomerate, subordinate micaceous siltstone and mudstone
Nq - Quha Formation		Pelitic and semi - pelitic gneiss, migmatite and schist, psammitic gneiss, pink leucocratic gneiss, subordinate quartzite and sillimanite quartzite

Client:

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC

Fig: 3A Geology Map

Legend

- Site Investigated
- Provincial Roads
- Geological Faults
- Karoo Dykes

Geology

- Alluvium
- Jd - Dolerite
- Pp - Pietermaritzburg Formation
- C-Pd - Dwyka Formation
- O-Sn - Natal Group
- Nq - Quha Formation

Earth Science Consultants:

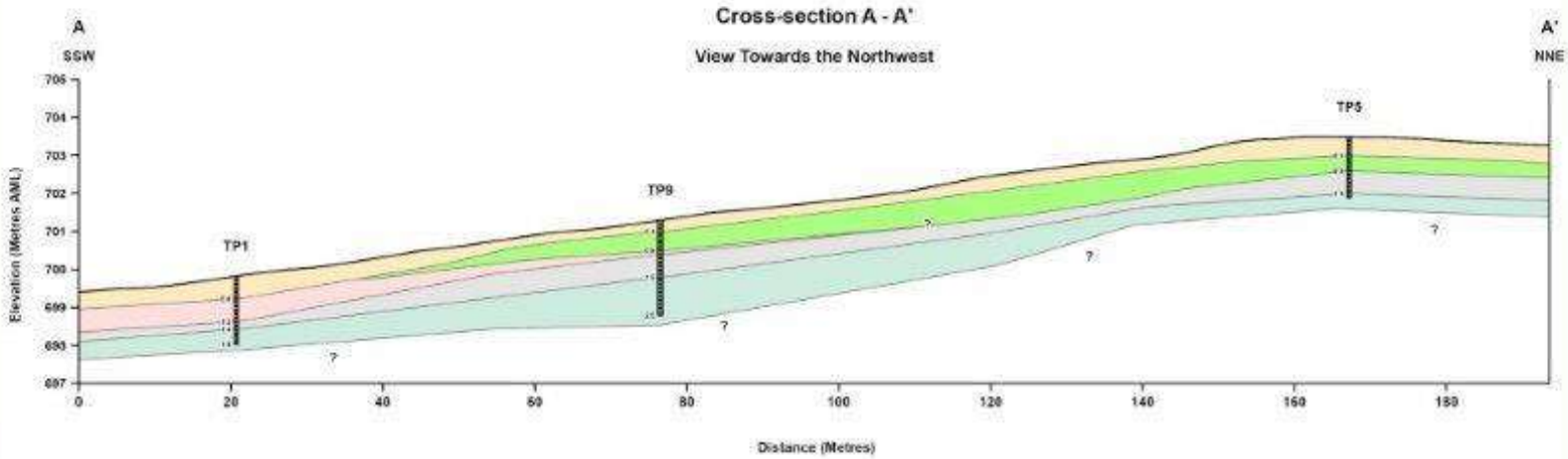
ENGEOLAB (PTY) LTD

GIS Consultants:

GEOHYNAMIC SYSTEMS

Project No: LL3872

Date: August 2023



Client:

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC

Fig: 3B Cross-section A-A'

Legend

Geology

- Colluvium
- Pebble Marker
- Pedocrete
- Clay
- Shale

Earth Science Consultants:

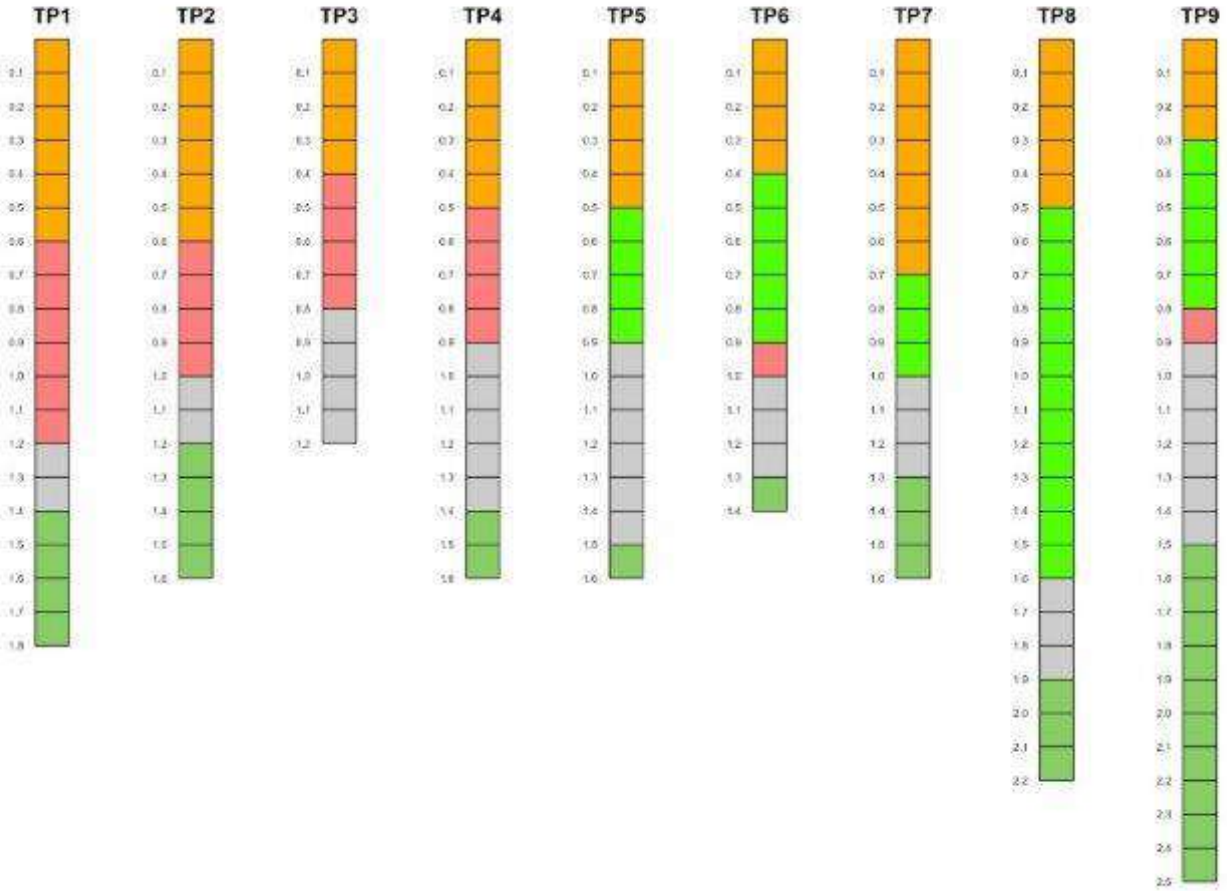
ENGEOLAB (PTY) LTD

GIS Consultants:

GEODYNAMIC SYSTEMS

Project No: LL3872

Date: August 2023



Client:

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MPOLWENI CLINIC

Fig: 4 Profiles

Legend

Geology

- Colluvium
- Pebble Marker
- Pedocrete
- Clay
- Shale

Earth Science Consultants:

ENGEOLAB (PTY) LTD

GIS Consultants:

GEOHYDAMIC SYSTEMS

Project No: LL3872

Date: August 2023

ENGEOLAB PTY LTD
Earth Science Consultants
Geotechnical & Geohydrological Specialists

ANNEXURE 9

ADDITIONAL SPECIFICATION - EPWP

SL **EMPLOYMENT AND TRAINING OF EPWP BENEFICIARY ON THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP) Infrastructure Projects:**

CONTENTS

SL 01 SCOPE

This project is part of the Expanded Public Works Programme aims to train young people and provide them with practical work experience as part of this programme. Youth aged between 18 and 35 will be recruited and trained in skills relevant to the work to be done on this project. These youth will have to be employed by the contractor as part of this project so that they can gain their work experience on these projects. The training of the youth will be coordinated and implemented by a separate service provider. This service provider will provide the contractor with a list of all the youth and the training each of these youth have received. The Contractor will be required to employ all of these youth for a minimum period of 6 months. Furthermore the Contractor will be required to supervise these youth to ensure that the work they perform is of the required standard. If necessary the contractor's staff will be required to assist and mentor the youth to ensure that they are able to perform the type of work they need to do to the satisfactory standards required. The contractor will not be required to employ all youth in the programme at the same time, but may rotate the youth on the project, as long as all youth are employed for the minimum duration stated earlier.

This specification contains the standard terms and conditions for workers employed in elementary occupations and trained on a Expanded Public Works Programme (EPWP) for the Infrastructure Programme.

SL 02 TERMINOLOGY AND DEFINITIONS

SL 02.01 TERMINOLOGY

(a) EPWP The Code of Good Practice for Expanded Public Works Programmes, which has been gazetted by the Department of Labour, and which provides for special conditions of employment for these EPWP projects. In terms of the Code of Good Practice, the workers on these projects are entitled to formal training, which will be provided by training providers appointed (and funded) by the Department of Labour. For projects of up to six months in duration, this training will cover life-skills and information about other education, training and employment opportunities.

(b) EPWP Expanded Public Works Programme, a National Programme of the government of South Africa, approved by Cabinet.

(c) UYF Umsobumvu Youth Fund.

(d) DOL Department of Labour.

SL 02.02 DEFINITIONS

(a) "employer" means the contractor or any party employing the worker / beneficiary under the EPWP Programme.

(b) "client" means the Department of Public Works.

(c) " worker / trainee" means any person working or training in an elementary occupation on a EPWP.

SL 03 APPLICABLE LABOUR LAWS

In line with the Expanded Public Works Programme (EPWP) policies, the Ministerial Determination, Special Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of labour in government Notice No. R63 of 25 January 2002, of which extracts have been reproduced below in clauses SL 04 shall apply to works described in the scope of work and which are undertaken by unskilled or semi-skilled workers. The Code of Good Practise for Employment and Conditions of Work for Expanded Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice No. R64 of 25 January 2002 shall apply to works described in the scope of work and which unskilled or semi-skilled workers undertake.

SI 04 EXTRACTS FROM MINISTERIAL DETERMINATION REGARDING EPWP

(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

(j) "Service Provider" means the consultant appointed by Department to coordinate and arrange the employment and training of labour on EPWP infrastructure projects.

SL 04.02 TERMS OF WORK

(a) Workers on a EPWP are employed on a temporary basis.

(b) A worker may NOT be employed for longer than 24 months in any five-year cycle on a EPWP.

(c) Employment on a EPWP does not qualify as employment and a worker so employed does not have to register as a contributor for the purposes of the Unemployment Insurance Act 30 of 1966.

SL 04.03 NORMAL HOURS OF WORK

(a) An employer may not set tasks or hours of work that require a worker to work–

(i) more than forty hours in any week
(ii) on more than five days in any week; and
(iii) for more than eight hours on any day.

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

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

Every work 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.

SL 04.04 MEAL BREAKS

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

(b) An employer and worker may agree on longer meal breaks.

(c) 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.

SL 04.05 SPECIAL CONDITIONS FOR SECURITY GUARDS

(a) A security guard may work up to 55 hours per week and up to eleven hours per day.

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

SL 04.06 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.

SL 04.07 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").

SL 04.08 WORK ON SUNDAYS AND PUBLIC HOLIDAYS

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

(b) Work on Sundays is paid at the ordinary rate of pay.

(c) A task-rated worker who works on a public holiday must be paid –

(i) the worker's daily task rate, if the worker works for less than four hours;

(ii) double the worker's daily task rate, if the worker works for more than four hours.

(d) A time-rated worker who works on a public holiday must be paid –

(i) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday;

(ii) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.

SL 04.09 SICK LEAVE

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

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

(c) A worker may accumulate a maximum of twelve days' sick leave in a year.

(d) Accumulated sick-leave may not be transferred from one contract to another contract.

(e) An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave.

(f) An employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave.

(g) An employer must pay a worker sick pay on the worker's usual payday.

(h) 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 –

(i) absent from work for more than two consecutive days; or

(ii) absent from work on more than two occasions in any eight-week period.

(i) 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.

(j) 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.

SL 04.10 MATERNITY LEAVE

(a) A worker may take up to four consecutive months' unpaid maternity leave.

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

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

(d) 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.

(e) A worker may begin maternity leave –

(i) four weeks before the expected date of birth; or

(ii) on an earlier date –

(1) 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

(2) if agreed to between employer and worker; or

(iii) 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.

(f) 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.

(g) A worker who returns to work after maternity leave, has the right to start a new cycle of twenty-four months employment, unless the EPWP on which she was employed has ended.

SL 04.11 FAMILY RESPONSIBILITY LEAVE

(a) 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 -

(i) when the employee's child is born;

(ii) when the employee's child is sick;

(iii) in the event of the death of –

(1) the employee's spouse or life partner

(2) the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling

SL 04.12 STATEMENT OF CONDITIONS

(a) An employer must give a worker a statement containing the following details at the start of employment –

(i) the employer's name and address and the name of the EPWP;

(ii) the tasks or job that the worker is to perform;

(iii) the period for which the worker is hired or, if this is not certain, the expected duration of the contract;

(iv) the worker's rate of pay and how this is to be calculated;

(v) the training that the worker may be entitled to receive during the EPWP.

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

(c) An employer must supply each worker with a copy of the relevant conditions of employment contained in this specification.

(d) An employer must enter into a formal contract of employment with each employee. A copy of a pro-forma is attached at the end of this specification.

SL 04.13 KEEPING RECORDS

(a) Every employer must keep a written record of at least the following –

(i) the worker's name and position;

(ii) in the case of a task-rated worker, the number of tasks completed by the worker;

(iii) in the case of a time-rated worker, the time worked by the worker;

(iv) payments made to each worker.

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

SL 04.14 PAYMENT

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

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

(c) A time-rated worker will be paid at the end of each month and payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker.

(d) Payment in cash or by cheque must take place –

(i) at the workplace or at a place agreed to by at least 75% of the workers; and

(ii) during the worker's working hours or within fifteen minutes of the start or finish of work;

(e) All payments must be enclosed in a sealed envelope which becomes the property of the worker.

(f) An employer must give a worker the following information in writing –

(i) the period for which payment is made;

(ii) the number of tasks completed or hours worked;

(iii) the worker's earnings;

(iv) any money deducted from the payment;

(v) the actual amount paid to the worker.

(g) 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.

(h) If a worker's employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment.

SL 04.15 DEDUCTIONS

(a) An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law.

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

(c) An employer who deducts money from a worker's 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.

(d) An employer may not require or allow a worker to –

(i) repay any payment except an overpayment previously made by the employer by mistake;

(ii) state that the worker received a greater amount of money than the employer actually paid to the worker; or

(iii) pay the employer or any other person for having been employed.

SL 04.16 HEALTH AND SAFETY

(a) Employers must take all reasonable steps to ensure that the working environment is healthy and safe and that all legal requirements regarding health and safety are strictly adhered to.

(b) A worker must:

(i) work in a way that does not endanger his/her health and safety or that of any other person;

(ii) obey any health and safety instruction;

(iii) obey all health and safety rules;

(iv) use any personal protective equipment or clothing issued by the employer;

(v) report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager.

SL 04.17 COMPENSATION FOR INJURIES AND DISEASES

(a) It is the responsibility of employers 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 1993.

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

(c) The employer must report the accident or disease to the Compensation Commissioner.

(d) 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.

SL 04.18 TERMINATION

(a) The employer may terminate the employment of a worker provided he has a valid reason and after following existing termination procedures.

(b) A worker will not receive severance pay on termination.

(c) 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.

(d) 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 re-engaged if a position becomes available for the balance of the 24-month period.

(e) 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.

SL 04.19 CERTIFICATE OF SERVICE

(a) On termination of employment, a worker is entitled to a certificate stating –

(i) the worker's full name;
(ii) the name and address of the employer;
(iii) the SPWP on which the worker worked;
(iv) the work performed by the worker;
(v) any training received by the worker as part of the EPWP;
(vi) the period for which the worker worked on the EPWP;
(vii) any other information agreed on by the employer and worker.

SL 05 EMPLOYER'S RESPONSIBILITIES

The employer shall adhere to the conditions of employment as stipulated in the *Code of Good Practice for Employment and Conditions of Work for Expanded Public Works Programmes*. Over and above the conditions stipulated above, he shall be responsible to:

(a) formulate and design a contract between himself/ herself and each of the recruited EPWP beneficiary, ensuring that the contract does not contravene any of the Acts stipulated in South African Law, e.g. Basic Conditions of Employment Act, etc. (A copy of a pro-forma contract is attached at the end of this specification);

(b) screen and select suitable candidates for employment from the priority list of EPWP beneficiary provided by the Umsobumvu Youth Fund (UYF);

(c) ensure that the recruited EPWP beneficiary are made available to receive basic life skills training which will be conducted and paid for by the Umsobumvu Youth Fund;

(d) ensure that all EPWP beneficiary receive instruction on safety on site prior to them commencing with work on site;

(e) ensure that all EPWP beneficiary are covered under workmen's compensation for as long as they are contracted to the contractor. Payment to the Compensation Commissioner shall be the responsibility of the contractor;

(f) assist in the identification and assessment of potential EPWP beneficiary to undergo advanced technical training in respective trades;

(g) test and implement strict quality control and to ensure that the health and safety regulations are adhered to;

(h) provide all EPWP beneficiary with the necessary protective clothing as required by law for the specific trades that they are involved in.

(i) provide overall supervision and day-to-day management of EPWP beneficiary and/or sub-contractors; and

(j) ensure that all EPWP beneficiary are paid their wages on time through a pre-agreed payment method as stipulated in the contract with the EPWP beneficiary.

SL 06 PLACEMENT OF RECRUITED EPWP BENEFICIARY

Employers will be contractually obliged to:

(a) employ EPWP beneficiary from targeted social groups from the priority list provided by the Service Provider/ Umsobumvu Youth Fund.

(b) facilitate on-the-job training and skills development programmes for the EPWP beneficiary;

(c) achieve the following minimum employment targets:

(i) 55% people between the ages of 18 and 35

(ii) 55% women;

(iii) 2% people with disabilities.

(d) brief EPWP beneficiary on the conditions of employment as specified in sub clause SL 04.09 above;

(e) enter into a contract with each EPWP beneficiary, which contract will form part of the Employment Agreement;

(f) allow EPWP beneficiary the opportunity to attend life skills training through DOL. This shall be arranged at the beginning of the contract;

(g) ensure that payments to EPWP beneficiary are made as set out in sub clauses SL 04.14 and SL 04.15 above.

(h) set up of personal profile files as prescribed by EPWP beneficiary and as set out in sub clause SL 04.13 above.

(i) in addition to (h)
- a copy of the I.D;
- qualifications;
- career progress;
- EPWP Employment Agreement, and
- list of small trade tools;

must be included in the EPWP beneficiary's personal profile file.

SL 07 TRAINING OF EPWP BENEFICIARY

Three types of training are applicable, namely

· Life skills;

· On the job training and

· Technical Skills training.

Training will be implemented by training instructors accredited by DOL and/or CETA :

· EPWP beneficiary shall be employed on the projects for an average of 6 months.

· EPWP beneficiary shall be deployed on projects in the vicinity of their homes. The same arrangements as for other workers regarding accommodation, subsistence and travel shall be applicable to EPWP beneficiary.

(a) Life skills training

All EPWP beneficiary are entitled to undergo life skills training. Training of this module will be flexible enough to meet the needs of the employer. Training should take place immediately after site hand-over and during the period of site establishment and pre-planning before actual construction starts, alternatively this will be spread over the duration of the contract period. The contractor will be required to work closely with the person to schedule the training sessions so that the timing of the training is aligned with the contractors work schedule and his demand for workers.

(b) On-the job training

The Employer shall provide EPWP beneficiary with on-the-job training to enable them to fulfil their employment requirements. The employer shall also be expected to closely monitor the job performance of EPWP beneficiary and shall identify potential EPWP beneficiary for skills development programmes.

(c) Technical skills training
The Employer shall assist in identifying EPWP beneficiary for further training. These EPWP beneficiary will undergo further technical training to prepare them for opportunities as semi-skilled labourers.

Such training will comprise of an off-site theoretical component and practical training on-site. The contractor will be responsible for on-site practical work under his supervision. EPWP beneficiary who graduate from the first phase of the training programme will be identified and given opportunities to register for skills development programmes. These can ultimately result in a accredited qualification. The programme will consist of theoretical instruction away from the construction site as well as on-site practical work under the supervision of the employer. Candidates will be entitled to employment to complete all training modules.

SL 08 BENEFICIARY (EPWP BENEFICIARY) SELECTION CRITERIA

SL 08.01 PREAMBLE

The *Code of Good Practise for Employment and Conditions of Work for Expanded Public Works Programmes* encourages:

- optimal use of locally-based labour in a Expanded Public Works Programme (EPWP);
- a focus on targeted groups which consist of namely youth, consisting of women, female-headed households, disabled and households coping with HIV/AIDS; and
- the empowerment of individuals and communities engaged in a SPWP through the provision of training.

SL 08.02 BENEFICIARY (EPWP BENEFICIARY) SELECTION CRITERIA

(a) The EPWP beneficiary of the programmes should preferably be non-working individuals from the most vulnerable sections of disadvantaged communities who do not receive any social security pension income. The local community must, through all structures available, be informed of and consulted about the establishment of any EPWP

(b) In order to spread the benefit as broadly as possible in the community, a maximum of one person per household should be employed, taking local circumstances into account.

(c) Skilled artisans from other areas may be employed if they have skills that are required for a project and there are not enough persons in the local communities who have those skills or who could undergo appropriate skills training. However, this should not result in more than 20% of persons working on a programme not being from local communities.

(d) Programmes should set participation targets for employment with respect to youth, single male- and female-headed households, women, people with disabilities, households coping with HIV/AIDS, people who have never worked, and those in long-term unemployment.

(e) The proposed targets as set out in sub clause SL 06 (c)

- 55% youth from 18 to 35 years of age;
- 55% women;
- 2% disabled.

SL 09 CONTRACTUAL OBLIGATIONS IN RELATION TO YOUTH LABOUR

The EPWP beneficiary to be employed in the programme (EPWP) shall be directly contracted to the employer. Over and above the construction and project management responsibilities, the employer will be expected to perform the tasks and responsibilities as set out in clause SL 05 above.

SL 10 PROVINCIAL RATES OF PAY

It is stipulated that youth workers on the EPWP receive a minimum of R 1 000 per month whilst working and R 600 per month whilst on training in ALL provinces. Should EPWP beneficiary be attending training whilst employed by the contractor, the contractor will still be responsible for payment to the EPWP beneficiary whilst at training.

SL 11 MEASUREMENTS AND PAYMENT

The number of EPWP beneficiary specified for this contract that will receive life skills training is 50 and technical training is 50

SL 11.01 PAYMENT FOR TRAINING OF EPWP BENEFICIARY (TARGET:- 50 EPWP BENEFICIARY)

SL 11.01.01 Skills development and Technical training for EPWP beneficiary for an average of 10 days ……(Prov.Sum)……..…..Unit: R/EPWP beneficiary

The above item is only applicable if DoL does not fund the Technical Training PRIOR to site handover.

SL 11.01.02 Penalty due to not meeting the target as in SL 11.01.01…..……..Unit: EPWP beneficiary

LESS R 2000 per EPWP beneficiary

SL 11.02 PAYMENT FOR TRAVELLING AND ACCOMMODATION DURING OFF-SITE TRAINING

SL 11.02.01 Life skills training for 26 days:

01 Travelling (based on 50 km/EPWP beneficiary) ……Unit: km

02 Accommodation……..(Prov.Sum)…..Unit: R/EPWP beneficiary

03 Profit and attendance……. Unit: %

SL 11.02.02 Skilled development and Technical training:

01 Travelling (based on 50 km/EPWP beneficiary)……...Unit: km

02 Accommodation……(Prov.Sum)….Unit: R/EPWP beneficiary

03 Profit and attendance …….. Unit: %

The units of measurement for sub items SL 11.02.01 (01) and SL 11.02.02 (01) above shall be the distance travelled in km by the EPWP beneficiary trained off site. The tendered rate shall include full compensation to safely transport the youth workers to and from the training venue/s.

The unit of measurement for sub items SL 11.02.01 (02) and SL 11.02.02 (02) above shall be the amounts in Rand expended for accommodation and daily meal allowances for the EPWP beneficiary trained off site that must be arranged by the contractor. Amounts quoted shall be corrected according to re-measurement based on actual invoices.

The tendered percentages under sub items SL 11.02.01 (03) and SL 11.02.02 (03) will be paid to the contractor on the value of each payment pertaining to the accommodation and advance meal allowances to cover his expenses in this regard.

SL 11.03 ALTERNATIVE WORKERS FOR THE PERIOD OF OFF-SITE TRAINING

SL 11.03.01 Life skills training for 26 days ……. Unit: worker-days

SL 11.03.02 Skilled development and Technical training for EPWP beneficiary for (…….) days…….. Unit: worker-days

The unit of measurement shall be the number of EPWP beneficiary replaced while in training multiplied by the number of days absent from the site.

The rates tendered shall include full compensation for additional replacement labour during periods of off-site training.

SL 11.04 EMPLOYMENT OF EPWP BENEFICIARY

SL 11.04.01 Employment of EPWP beneficiary……...(Prov.Sum)¼.Unit: R/ worker-month

SL 11.04.02 Employment of EPWP beneficiary……...(Prov.Sum)¼.Unit: R/ worker-month

The unit of measurement shall be the number of EPWP beneficiary at the statutory labour rates of R ……. multiplied by the period employed in months and the rate tendered shall include full compensation for all costs associated with the employment of EPWP beneficiary and for complying with the conditions of contract. The cost for the training shall be excluded from this item. This item is based on 6 months appointment for EPWP beneficiary.

SL 11.05 PROVISION OF EPWP DESIGNED OVERALLS TO EPWP BENEFICIARY

SL 11.05.01 Supply EPWP designed overalls to EPWP beneficiary ……..…….. (Prov.Sum)…….Unit: R

EPWP beneficiary overalls should be orange (top and bottom) as per EPWP specification with the exception of Correctional Services contracts where the EPWP beneficiary top would be blue and the bottom orange.

SL 11.05.02 Profit and attendance…….... Unit: %

An amount has been provided in the Schedule of Quantities under sub item SL 10.05.01 for the supply of EPWP designed overalls, as per the specification provided by the EPWP unit, arranged by the Service Provider. The Engineer will have sole authority to spend the amounts or part thereof. The tendered percentage under sub items SL 10.05.02 will be paid to the contractor on the value of each payment pertaining to the supply of overalls to cover his expenses in this regard.

SL 11.06 PROVISION OF SMALL TOOLS FOR EPWP BENEFICIARY

SL 11.06.01 Provide all EPWP beneficiary with prescribed tools for their respective trades. Specification for the mentioned tools to be provided by the EPWP Service Provider. These tools will become the property of the EPWP beneficiary after the completion of the programme.....(Prov.Sum)….Unit: **R 500-00** /youth worker

SL 11.06.02 Profit and attendance…….... Unit: %

SL 11.07 APPOINTMENT OF EPWP BENEFICIARY TEAM LEADER/S

SL 11.07.01 Appointment of (_____) EPWP beneficiary team leader/s for the duration of the contract…….(Prov.Sum)……..... Unit: R / EPWP beneficiary team leader

The EPWP beneficiary Team Leader will act as CLO/PLO to facilitate the project work between the EPWP beneficiary and the contractor. Umsobumvu Youth Fund can assist with the sourcing of EPWP beneficiary Team Leader for employment by the contractor.

SL 11.08 LIAISON WITH SERVICE PROVIDER……Unit: hours

The tendered rate shall include full compensation for the cost of liaising with the Service Provider and Social Facilitators on all issues regarding the works.

SCOPE OF WORKS IN RESPECT OF WORK RELATING TO THE EXTENDEND PUBLIC WORKS PROGRAMME (EPWP)			
Project title:	**MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**		
Project Code:	**N/A**	EPWP NO:	**N/A**

Introductory notes:

1. The works, or parts of the works will be constructed using labour-intensive methods only in terms of this specification. The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The items marked with the letters **LI** are not necessarily an exhaustive list of all the activities which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour intensive specification in the Scope of Works.
2. Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the Scope of Works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work which was to be done labour-intensively will not be condoned and any works so constructed will not be certified for payment.

DESCRIPTION OF THE WORKS

Employer's objectives

The employer's objectives are to deliver public infrastructure using labour-intensive methods in accordance with EPWP Guidelines.

Labour-intensive works

Labour-intensive works comprise the activities described in the Labour-Intensive Specification. Labour-intensive works shall be constructed/maintained using local workers who are temporarily employed in terms of the scope of work.

LABOUR-INTENSIVE COMPETENCIES OF SUPERVISORY AND MANAGEMENT STAFF

Contractors shall only engage supervisory and management staff in labour-intensive works that have completed the skills programme including Foremen/ Supervisors at NQF level 4 "National Certificate: Supervision of Civil Engineering Construction Processes" and Site Agent/ Manager at NQF level 5 "Manage Labour-Intensive Construction Processes" or equivalent QCTO qualifications (See Appendix C). at NQF outlined in Table 1. (See GUIDELINES FOR THE IMPLEMENTATION OF LABOUR-INTENSIVE INFRASTRUCTURE PROJECTS UNDER THE EXPANDED Health PROGRAMME (EPWP) -THIRD EDITION 2015)

Emerging contractors shall have personally completed, or be registered on a skills programme for the NQF level 2 unit standard. All other site supervisory staff in the employ of emerging contractors must have completed, or be registered on a skills programme for the NQF level 2 unit standards or NQF level 4 unit standards. Table 1: Skills programme for supervisory and management staff.

Table 1: Skills programme for supervisory and management staff

Personnel	NQF level	Unit standard titles	Skills programme description
Team leader / supervisor	2	Apply Labour-Intensive Construction Systems and Techniques to Work Activities	This unit standard must be completed, and
		Use Labour-Intensive Construction Methods to Construct and Maintain Roads and Storm water Drainage	any one of these 3 unit standards
		Use Labour-Intensive Construction Methods to Construct and Maintain Water and Sanitation Services	

		Use Labour-Intensive Construction Methods to Construct, Repair and Maintain structures	
Personnel	**NQF level**	**Unit standard titles**	**Skills programme description**
Foreman/supervisor	4	Implement Labour-Intensive Construction Systems and Techniques	This unit standard must be completed, and
		Use Labour-Intensive Construction Methods to Construct and Maintain Roads and Storm water Drainage	any one of these 3 unit standards
Details of these skills programmes may be obtained from the CETA ETQA manager (e-mail :gerard@ceta.co.za , tel: 011-265 5900)			

EMPLOYMENT OF UNSKILLED AND SEMI-SKILLED WORKERS IN LABOUR-INTENSIVE WORKS

1.1 Requirements for the sourcing and engagement of labour.

1.1.1 Unskilled and semi-skilled labour required for the execution of all labour-intensive works shall be engaged strictly in accordance with prevailing legislation and SANS 1914-5, Participation of Targeted Labour.

1.1.2 The rate of pay set for the SPWP per task or per day will be an acceptable rate determined by the Department of Labour.

1.1.3 Tasks established by the contractor must be such that:

a) the average worker completes 5 tasks per week in 40 hours or less; and
b) the weakest worker completes 5 tasks per week in 55 hours or less.

1.1.4 The contractor must revise the time taken to complete a task whenever it is established that the time taken to complete a weekly task is not within the requirements of 1.1.3.

1.1.5 The Contractor shall, through all available community structures, inform the local community of the labour-intensive

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) that who are not in receipt of any social security pension income

1.1.6 The Contractor shall endeavour to ensure that the expenditure on the employment of unskilled and semi-skilled workers is in the following proportions:

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

1.2 Specific provisions pertaining to SANS 1914-5

1.2.1 Definitions

Targeted labour: Unemployed persons who are employed as local labour on the project.

1.2.2 Contract participation goals

1.2.2.1 There is no specified contract participation goal for the contract. The contract participation goal shall be measured in the performance of the contract to enable the employment provided to targeted labour to be quantified.

1.2.2.2 The wages and allowances used to calculate the contract participation goal shall, with respect to both time-rated and task rated workers, comprise all wages paid and any training allowance paid in respect of agreed training programmes.

1.2.3 Terms and conditions for the engagement of targeted labour
Further to the provisions of clause 3.3.2 of SANS 1914-5, written contracts shall be entered into with targeted labour.

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1.2.5 Variations to SANS 1914-5

1.2.5.1 The definition for net amount shall be amended as follows:
Financial value of the contract upon completion, exclusive of any value added tax or sales tax which the law requires the employer to pay the contractor.

1.2.5.2 The schedule referred to in 5.2 shall in addition reflect the status of targeted labour as women, youth and persons with disabilities and the number of days of formal training provided to targeted labour.

1.3 Training of targeted labour

1.3.1 The contractor shall provide all the necessary on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract in a manner that does not compromise worker health and safety.

1.3.2 The cost of the formal training of targeted labour, will be funded by the local office of the Department of Labour. This training will take place as close to the project site as practically possible. The contractor must access this training by informing the relevant regional office of the Department of Labour in writing, within 14 days of being awarded the contract, of the likely number of persons that will undergo training and when such training is required. The Employer and the Department of Health (Fax: 012 3258625/ EPWP Unit, Private Bag X65, Pretoria 0001) must be furnished with a copy of this request.

1.3.3 The contractor shall do nothing to dissuade targeted labour from participating in training programmes and shall take all reasonable steps to ensure that each beneficiary is provided with two days of formal training for every 22 days worked.

1.3.4 An allowance equal to 100% of the task rate or daily rate shall be paid by the contractor to workers who attend formal training, in terms of the above.

1.3.5 Proof of compliance with the above requirements must be provided by the Contractor to the Employer prior to submission of the final payment certificate.

GENERIC LABOUR-INTENSIVE SPECIFICATION

1 Scope

This specification establishes general requirements for activities which are to be executed by hand involving the following:

a) trenches having a depth of less than 1.5 metres
b) storm water drainage
c) low-volume roads and sidewalks

2 Precedence

Where this specification is in conflict with any other standard or specification referred to in the Scope of Works to this Contract, the requirements of this specification shall prevail.

3 Hand excavateable material

Hand excavateable material is material:

a) Granular materials:

i) whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b) Cohesive materials:

i) whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note: 1) A boulder, a cobble and gravel is material with a particle size greater than 200mm, between 60 and 200mm.

2) A dynamic cone penetrometer is an instrument used to measure the in-situ shear resistance of a soil comprising a drop weight of approximately 10 kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of. 60 degrees with respect to the horizontal) into the material being used.

Table 2: Consistency of materials when profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	**DESCRIPTION**	**CONSISTENCY**	**DESCRIPTION**
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.

Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.
Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in upto 10 mm; very difficult to mould with fingers; can just be penetrated with an ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of a geological pick; requires many blows for excavation.	stiff	Can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail' with difficulty; slight indentation produced by blow of a geological pick point.

4 Trench excavation

All hand excavateable material in trenches having a depth of less than 1,5 metres shall be excavated by hand.

5 Compaction of backfilling to trenches (areas not subject to traffic)

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers

a) to 90% Proctor density;

b) such that in excess of 5 blows of a dynamic cone penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than 10% gravel of size less than 10mm and contains no isolated boulders, or

c) such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

6 Excavation

All hand excavateable material including topsoil classified as hand excavateable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand.

The excavation of any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

7 Clearing and grubbing

Grass and small bushes shall be cleared by hand.

8 Shaping

All shaping shall be undertaken by hand.

9 Loading

All loading shall be done by hand, regardless of the method of haulage.

10 Haul

Excavation material shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150 m.

11 Offloading

All material, however transported, is to be off-loaded by hand, unless tipper-trucks are utilised for haulage.

12 Spreading

All material shall be spread by hand.

13 Compaction

Small areas may be compacted by hand provided that the specified compaction is achieved.

14 Grassing

All grassing shall be undertaking by sprigging, sodding, or seeding by hand.

15 Stone pitching and rubble concrete masonry

All stone required for stone pitching and rubble concrete masonry, whether grouted or dry, must be collected, loaded, off loaded and placed by hand.

Sand and stone shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.

Grout shall be mixed and placed by hand.

16 Manufactured Elements

Elements manufactured or designed by the Contractor, such as manhole rings and cover slabs, precast concrete planks and pipes, masonry units and edge beams shall not individually, have a mass of more than 320kg. In addition, the items shall be large enough so that four workers can conveniently and simultaneously acquire a proper handhold on them.

(Insert Your Company Logo)

(This shall serve as the cover page on employment contracts for local labour)

EMPLOYMENT AGREEMENT

BETWEEN

[CONTRACTOR NAME].....

AND

[WORKER NAME].....

1. PARTIES

And

1.2. Mr / Me: _____

[worker's name]

2. DEFINITIONS AND INTERPRETATION

2.1. In this Agreement and any Annexure thereto, unless inconsistent with or otherwise indicated by the context-

"Agreement"	means the contents of this Agreement.
"Company"	means the company that employs the worker
"Department"	means the Department of Public Works
"Worker"	is a person that performs a specific or necessary task or who completes tasks in a certain way
"EPWP"	The Expanded Public Works Programme is a government programme aimed at the alleviation of poverty and unemployment. The programme ensures the full engagement on Labour Intensive Methods of Construction (LIC) to contractors for skills development. The EPWP focuses at reducing unemployment by increasing economic growth by means of improving skills levels through education and training and improving the enabling environment for the industry to flourish.

3. PURPOSE

The purpose of this agreement is to:-

Ensure that the agreement is binding to both the Worker and the Employer.

4. TERMS AND CONDITIONS

- The worker will have no entitlement to the benefits of a full time employee, namely;

  _____

  _____

- The worker should not have the expectation that this contract will be renewed or extended.
- The worker will be subject to all laws, rules, policies, codes and procedures applicable to the;

  _____

- The worker must meet the standards and requirements of the contractor
- The worker must render his/her services during normal working hours of minimum of forty to fifty five hours in any week; which comprise of an eight-hour working day in a five-day week.

5. REMUNERATION

The worker will receive compensation to the amount of R_____00 which must be paid by the 25th or on the last day of each month.

6. ROLES AND RESPONSIBILITIES

6.1 Employer / Worker

- Work for _____ in terms of the period as specified in the employment agreement contract.
- Be available for and participate in all learning and work experience required by the company.
- Comply with workplace policies and procedures.
- Complete any attendance or any written assessment tools supplied by the contractor to record relevant workplace experience.
- Demonstrate willingness to grow and learn through work experience.

  Provide the following documentation to the employer,

  - Certified identity document not longer than 3 months
  - ID size photos
  - Sign employment contract

6.2 Employer

- Employ the worker for a period specified in the agreement.
- Provide the worker with appropriate work based experience in the work environment.
- Facilitate payments of wages / stipends.
- Keep accurate records of workers.
- Where a worker/ learner is disabled, the employer will have to provide in the additional needs e.g. special materials, learning aids and in some cases physical or professional support (such aids remain the property of the employer).
- Keep up to date records of learning and discuss progress with the intern on a regular basis.
- Apply fair disciplinary, grievance and dispute resolution procedures to the worker.
- Prepare an orientation/ induction course to introduce worker/ learner to the workplace and specific workplace requirements.
- Ensure the daily attendance register is signed by the worker.

7. DURATION.

This agreement commences on: _____

and

expires on: _____

8. BREACH.

If either party commits any breach of the terms of this contract (and fails to rectify it within 30 days of receipt of a written notice calling it to do so, then) the other party shall be entitled to terminate the contract or to claim specific performance without prejudice to any of its other legal rights, including its rights to claim damages.

9. CONDITIONS OF EMPLOYMENT

9.1. Meal Breaks

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

9.1.2 An employer and worker may agree on longer meal breaks.

9.1.3 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.

9.1.4 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.

9.2. Special Conditions for Security Guards (Only applicable to security Guards)

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

9.2.2 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.

9.3. 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").

9.4. Work on Sundays and Public Holidays

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

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

9.4.3 A task-rated worker who works on a public holiday must be paid;

(a) the worker's daily task rate, if the worker works for less than four hours;

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

9.4.4 A time-rated worker who works on a public holiday must be paid

(a) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday;

(b) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.

9.5 Sick leave

9.5.1 Only workers who work more than 24 hours per month have the right to claim sick-pay in terms of this clause.

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

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

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

9.5.5 An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave.

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

9.5.7 An employer must pay a worker sick pay on the worker's usual payday.

9.5.8 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.

9.5.9 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.

9.5.10 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.

9.6. Maternity Leave

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

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

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

9.6.4 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.

9.6.5 A worker may begin maternity leave as follows;

(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.

9.7. Family responsibility leave

9.7.1 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 employee's child is born;

(b) when the employee's child is sick;

(c) in the event of a death of

(i) the employee's spouse or life partner;

(ii) the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling.

9.8. Keeping Records

9.8.1 Every employer must keep a written record on site for the duration of the project and three (3) year after completion records should consists of at least the following;

(a) the worker's name and position;

(b) copy of an acceptable worker identification

(c) in the case of a task-rated worker the number of tasks completed by the worker;

(d) in the case of a time-rated worker, the time worked by the worker;

(e) payments made to each worker in a form of Proof of Payment, Payroll registers and the acknowledgement of payment receipt signed by the worker.

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

9.9. Payment

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

9.9.2 A worker may not be paid less than the Ministerial Determination wage rate.

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

9.9.4 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.

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

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

9.9.7 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 worker's 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.

9.9.8 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 worker's earnings;

(d) any money deducted from the payment;

(e) the actual amount paid to the worker.

9.9.9 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.

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

9.10. Inclement weather

If no work has begun on site, and if an employee has reported for work, the employee will be paid for four hours. Should work be stopped after the first four hours, the employee will be paid for the hours worked. Where the employer has given employees notice on the previous working day that no work will be available due to inclement weather, then no payment will be made.

9.11. Deductions

9.11.1 An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law.

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

9.11.3 An employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement of Law; court order or arbitration

9.11.4 It is the responsibility of the employers to arrange for all persons employed on a Project to be covered in terms of the Unemployment Insurance Fund Contributions Act, 2002 (Act No. 4 of 2002)

9.11.5 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.

9.12. Health and Safety

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

9.12.2 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) use any personal protective equipment or clothing issued by the employer;

(d) report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager.

9.13. Compensation for Injuries and Diseases

9.13.1 It is the responsibility of the employers to arrange for all persons employed on a Project to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993 as amended by COIDA Act 61, 1997.

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

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

9.13.4 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.

9.14. Termination

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

9.14.2 A worker will not receive severance pay on termination.

9.14.3 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.

9.14.4 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 re-engaged if a position becomes available.

9.14.5 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.

Notice procedure is as follows;

- One week if employed for four weeks or less
- Two weeks if employed for more than four weeks but not more than a year
- Four weeks of employed for one (1) year or more

9.15. Certificate of Service

9.15.1 On termination of employment, a worker is entitled to a certificate stating;

(a) the worker's full name;
(b) the name and address of the employer;
(c) the Project on which the worker worked; the work performed by the worker;
(d) any training received by the worker;
(e) the period for which the worker worked on the Project; and
(f) any other information agreed on by the employer and worker.

9.16. DOMICILE

The address to which notices and all legal documents may be delivered or served are as follows:

Employee Details

Name & Surname: _____

ID No: _____

Residential Address: _____

_____

Contact No: _____

Date of Employment: _____

To be supervised by: **Main Contractor:** ☐
or Sub Contractor: ☐

Category of employment: **Skilled:** ☐
Semi-skilled: ☐
Unskilled: ☐

For Skilled & Semi-skilled state the trade: _____

Period of employment: Fixed for until when your services are still required on site

I confirm that I have been inducted and fully understand the condition of my appointment.

Employee Signature: _____ **Witness by SGB/CLO:** _____

Signature by Witness: _____

Employer Details

Name & Surname: _____
Designation: _____
Contact No: _____ **Signature:** _____

ANNEXURE 10

KWAZULU-NATAL DEPARTMENT OF PUBLIC WORKS

EXPANDED PUBLIC WORKS PROGRAMME

The Attendance Register for on-site Workers

Reporting month: _____ Cell No: _____

Surname: _____ First Name: _____

Project Name: **MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**

Project Code: **N/A** Tender No **ZNB5526/2023-H**

IDENTITY NUMBER:

Day	Date	Time In	Signature	Time Out	Signature	Report On Any Formal Training Provided In The Reporting Month
WEEK 1						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 2						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 3						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 4						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
Total Days worked						

ANNEXURE 11

BUSINESS PLAN

Reference No	
Profile ID	
Project Name	
Project Details	
Project Name	
Project Reference Number	
Project description	
Project Start Date	
Project End Date	
Estimated Budget	
Project Location	
Province	
District/Metro Municipality	
Local Municipality/Metro Region	
Latitude (in decimal format)	
Longitude (in decimal format)	
Public Body Details	
Public body sphere	
Reporting public body that is the project owner (and will report on the project)	
Implementing public body type	
Public body that will implement the project	
IDP reference number allocated to the project	
EPWP Details	
EPWP Sector	
EPWP Program	
EPWP Sub programme	
Budget Amount	
April 2014/March 2015	
April 2015/March 2016	
Total Budget Amount	
Wages	
UIF	
COIDA	
Training	
Administration	
Equipment and materials	
Other	
Describe other	
Outputs and Training	
First Name	
Surname	
Email	
Tel (Office)	
Fax Number	
Cell Number	
Physical Address 1	
Physical Address 2	
Physical Address 3	
Physical Address 4	
Postal Address 1	
Postal Address 2	
Postal Address 3	
Postal Address 4	

KZN DEPARTMENT OF HEALTH

Monthly Data collection for LOCAL Labour

EXPANDED PUBLIC WORKS PROGRAMME

Name of Contractor: _____ Project Code: _____ - _____ Project location name (area):_____

Name of Project: **MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**

Reporting month:_____ Project location (Ward No.):_____

Beneficiary Details																					Experience/Literacy				Location Details				Household Details		
No	First Name	Initial	Surname	ID number													D.O.B	Gender F/M	Disability Y/N	Start Date on the current month	End Date on the current month	Total days worked	Job description	Registered on UIF (Y/N)	Registered with COIDA (Y/N)	Are you receiving any Gov grant? (Y/N)	1st Language	Other Language 1	Other Language 2	Education Level (See Codes below)	Highest Level of Education	Address	Ward No.	Cell No.	Nationality	No. of people in Household	No. of Dependants in Household	No. of Children attending school
1																																	
2																																	
3																																	
4																																	
5																																	
6																																	
7																																	
8																																	
9																																	
10																																	

- Education Levels – use the codes (1,2,3) on the excel spreadsheet

(3) Grade 1-3 (Sub A – Std 1) **(5)** Grade 5-6 (Std 3-4) ABET 2 **(7)** Grade 9 (Std 7) ABET 4 **(9)** Grade 12 (Std 10)
(4) Grade 4 (Std 2) ABET 1 **(6)** Grade 7-8 (Std 5-6) ABET 3 **(8)** Grade 10-11 (Std 8-9) **(10)** Post Matric

Contractor sign:_____ **DPW Official/Consultant sign:**_____ **EPWP Official sign:**_____

Designation:_____ Designation:_____ Designation:_____

Date:_____ Date:_____ Date:_____

Contact no:_____ Contact no:_____ Contact no:_____

KZN DEPARTMENT OF HEALTH

EXPANDED PUBLIC WORKS PROGRAMME

Worker payment capture form for LOCAL Labour

Name of Contractor: _____ Project Code: -

Name of Project: MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION

Reporting month: _____

Payment Upload

No.	First Name	Initials	Surname	Identity No.	D.O.B	Job Description	Daily Wage Rate	Total Paid Days	Total Amount Paid	Total days Worked Days
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Contractor sign:_____
Designation:_____
Date:_____
Contact no:_____

DPW Official/Consultant sign:_____
Designation:_____
Date:_____
Contact no:_____

EPWP Official sign:_____
Designation:_____
Date:_____
Contact no:_____

KZN DEPARTMENT OF HEALTH

Worker Training capture form for LOCAL Labour

Name of Contractor: _____ Project Code: _____ -

Name of Project: **MPOLWENI CLINIC: CONSTRUCTION OF SMALL CLINIC WITH STAFF ACCOMMODATION**

_____ Reporting month: _____

Training														
No	Name	Surname	ID No.	Job description	Course Name	Was training Accredited or Non - accredited by a relevant SETA	Start date on current month	End date on current month	Training Days Paid	Training Days Not Paid	Total Number of Training Days	Cost per trainee	Is training complete or on - going	Name of Training Provider
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

Contractor sign: _____

Designation: _____

Date: _____

Contact no: _____

DPW Official/Consultant sign: _____

Designation: _____

Date: _____

Contact no: _____

EPWP Official sign: _____

Designation: _____

Date: _____

Contact no: _____