

Procurement of Small Works

Foreword

This Standard Bidding Document for Procurement of Small Works has been prepared for **SNV Netherlands Development Organisation** based on the original by the Zambia Public Procurement Authority. The Standard Bidding Document for Procurement of Small Works is based on and reflects the structure and the provisions of the Master Procurement Document for the Procurement of Small Works, which are consistent with the Public Procurement Act N^{o.} 12 of 2008 of the Laws of Zambia, the Public Procurement (Amendment) Act, 2011 and the Public Procurement Regulations, Statutory Instrument N^{o.} 63 of 2011.

This Standard Bidding Document for Procurement of Small Works has been prepared for use in contracts involving "smaller" contracts. This document is intended as a model in the award of admeasurement (unit prices or unit rates in a bill of quantities) and lump sum types of contracts, which are the most common in Works contracting.

Lump sum contracts are used for buildings and other forms of construction where the Works are well defined and are unlikely to change in quantity or specification, and where encountering difficult or unforeseen site conditions (for example, hidden foundation problems) is unlikely. Lump sum contracts should be used for Works that can be defined in their full physical and qualitative characteristics before bids are called, or where the risks of substantial design variations are minimal, such as bus shelters or school ablution units. In lump sum contracts, the concept of priced "activity schedules" is used, to enable payments to be made based on percentage completion of each activity.

Summary Description

This Standard Bidding Document for Procurement of Small Works and its User's Guide is to be used when a prequalification process has not taken place before bidding and, therefore, post-qualification applies. A brief description of these documents is given below.

SBD for Procurement of Small Works

PART 1 – BIDDING PROCEDURES

Section I. Instructions to Bidders (ITB)

This Section provides relevant information to help Bidders prepare their bids. Information is also provided on the submission, opening, and evaluation of bids and on the award of Contracts. Section I contains provisions that are to be used without modification.

Section II. Bid Data Sheet (BDS)

This Section consists of provisions that are specific to each procurement and that supplement the information or requirements included in Section I, Instructions to Bidders.

Section III. Evaluation and Qualification Criteria

This Section contains the criteria to determine the best-evaluated bid and the qualifications of the Bidder to perform the contract.

Section IV. Bidding Forms

This Section contains the forms which are to be completed by the Bidder and submitted as part of his Bid

Section V. Eligible Countries

This Section contains information regarding eligible countries.

PART 2 – EMPLOYER'S REQUIREMENTS

Section VI. Employer's Requirements

This Section contains the Specification, the Drawings, and supplementary information that describe the Plant and Installation Services to be procured.

PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section VII. General Conditions of Contract (GCC)

This Section contains the general clauses to be applied in all contracts. The text of the clauses in this Section shall not be modified.

Section VIII. Particular Conditions of Contract (PCC)

This Section consists of Contract Data and Specific Provisions which contains clauses specific to each contract. The contents of this Section modify or supplement the General Conditions and shall be prepared by the Employer.

Section IX. Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for **Performance Security** and **Advance Payment Security**, when required, shall only be completed by the successful Bidder after contract award.

User's Guide for SBD for Procurement of Small Works

This Guide to the Bidding Document, which is within the document, contains detailed explanations and recommendations on how to prepare a bidding document for a specific procurement of Small Works. The Guide is not a part of the Bidding Document.

PROCUREMENT DOCUMENTS

Bidding Document for Procurement of Small Works

Procurement of: Renovations and additions of Infrastructure at Katete Farmers Training Centre, Phase 1: Dormitory and Ablutions

Issued on 12th November 2020

Bidding No: IFB/SNV/GFA/2020 /002

Employer: SNV Netherlands Development Organisation, ZAMBIA

Standard Bidding Document

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PART 1 – Bidding Procedures

Section 1 - Instructions to Bidders

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Section I - Instructions to Bidders

A. General

- Scope of Bid
 1.1 The Employer, as indicated in the BDS, issues this Bidding Document for the procurement of the Works as specified in Section 6 (Employer's Requirements). The name, identification, and number of contracts of this bidding are provided in the BDS.
 - 1.2 Throughout this Bidding Document:
 - (a) the term "in writing" means communicated in written form and delivered against receipt;
 - (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and
 - (c) "day" means calendar day;
 - (d) the term "Project Manager" refers to the officer, body or institution appointed by the Employer as Contract Manager;
 - (e) "Government" refers to the Government of the Republic of Zambia, any Procuring Entity or the relevant approvals authority as defined in the Public Procurement Act of 2008; and
 - (f) "ZPPA" refers to the Zambia Public Procurement Authority.
- 2. Source of Funds 2.1 The Procuring Entity indicated in the BDS has applied for or received financing (hereinafter called "funds") toward the cost of the project or programme named in the BDS. The Employer intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
 - 2.2 Payments by the Employer will be made only on the basis of a payment certificate issued by the Project Manager.
- 3. Fraud and Corruption
 3.1 It is SNV policy to require that Employers (including beneficiaries of the funds), as well as bidders, suppliers, and contractors and their agents (whether declared or not), personnel, subcontractors, sub-consultants, service providers and suppliers, observe the highest standard of ethics during the

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procurement and execution of such contracts.¹ In pursuance of this policy, SNV:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party²;
 - (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation³;
 - (iii) "collusive practice" is an arrangement between two or more parties⁴ designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - (iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party⁵;
 - (v) "obstructive practice" is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Government investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from

¹ In this context, any action taken by a bidder, supplier, contractor, or any of its personnel, agents, subconsultants, sub-contractors, service providers, suppliers and/or their employees to influence the procurement process or contract execution for undue advantage is improper.

 ² "Another party" refers to an official acting in relation to the procurement process or contract execution]. In this context, "official" includes Government staff and employees of other organizations taking or reviewing procurement decisions.

³ "Party" refers to an official; the term "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

⁴ "Parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non- competitive levels.

⁵ "Party" refers to a participant in the procurement process or contract execution

disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

- (bb) acts intended to materially impede the exercise of the Government's inspection and audit rights provided for under sub-clause 3.1 (e) below.
- (b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;
- (c) will cancel the funding allocated to a contract if it determines at any time that representatives of the Employer - engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract, without the Employer having taken timely and appropriate action satisfactory to SNV to remedy the situation; and
- (d) In further pursuance of this policy, Bidders shall permit SNV to inspect any accounts and records and other documents relating to the Bid submission and contract performance, and to have them audited by auditors appointed by SNV.
- 3.2 Furthermore, bidders shall be aware of the provision stated in GCC Sub-Clauses 22.2 and 56.2 (h).
- **4. Eligible Bidders 4.1** A Bidder may be a natural person or private entity, or any combination of them in the form of a joint venture, under an existing agreement, or with the intent to constitute a legally-enforceable joint venture. Unless otherwise **stated in the BDS**, all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms.
 - 4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

- 4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:
 - (a) they have a controlling partner in common; or
 - (b) they receive or have received any direct or indirect subsidy from any of them; or
 - (c) they have the same legal representative for purposes of this bid; or
 - (d) they have a relationship with each other directly that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
 - (e) a Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the party is involved. However, this does not limit the inclusion of the same subcontractor in more than one bid; or
 - (f) a Bidder participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; or
 - (g) a Bidder has been hired (or is proposed to be hired) by the Employer as Engineer for the contract.
- 4.4 N/A
- 4.5 N/A
- 4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.7 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.
- 4.8 Firms shall be excluded if:
 - (a) N/A; or
 - (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the

5. Eligible

Materials,

Services

Charter of the United Nations, the Zambian Government prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country.

- The materials, equipment and services to be supplied under the 5.1 Contract shall have their origin in eligible source countries as defined in ITB 4.2 above and all expenditures under the Contract **Equipment and** will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.
 - 5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Document

6.1 The Bidding Document consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8.

PART 1 Bidding Procedures

Section I - Instructions to Bidders (ITB) Section II - Bid Data Sheet (BDS) Section III - Evaluation and Qualification Criteria Section IV - Bidding Forms Section V - Eligible Countries

PART 2 Requirements Section VI - Works Requirements

PART 3 Conditions of Contract and Contract Forms Section VII - General Conditions (GC) Section VIII - Particular Conditions (PC) Section IX - Contract Forms

- 6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Document.
- 6.3 The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained

6. Sections of **Bidding** Document

directly from the source stated by the Employer in the Invitation for Bids.

- The Bidder is expected to examine all instructions, forms, terms, 6.4 and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.
- 7.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Employer in writing at the Bidding Employer's address indicated in the BDS or raise his/her **Document**, Site inquiries during the pre-bid meeting if provided for in Visit, Pre-Bid Meeting accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of bids, within a period given in the BDS. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 22.2.
 - 7.2 The Bidder is encouraged to visit and examine the Site of Works and its surroundings and obtain for itself, on its own risk and responsibility, all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
 - 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
 - 7.4 The Bidder's designated representative is invited to attend a prebid meeting, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
 - 7.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer not later than one

7. **Clarification of** week before the pre-bid meeting.

- 7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
- 7.7 Non-attendance at the pre-bid meeting will be cause for disqualification of a Bidder, unless otherwise stated in the BDS.
- 8. Amendment of Bidding Document
 8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing addenda.
 - 8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
 - 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 22.2

C. Preparation of Bids

- **9.** Cost of Bidding 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
- 10. Language of Bid
 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.
- **11. Documents** 11.1 The Bid shall comprise the following: **Comprising the**

Bid	(a) Letter of Bid;
	(b) completed Schedules, in accordance with ITB 12 and 14, or as stipulated in the BDS;
	(c) Bid Security or Bid Securing Declaration, in accordance with ITB 19;
	(d) alternative bids, at Bidder's option and if permissible, in accordance with ITB 13;
	(e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
	 (f) documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract;
	(g) Technical Proposal in accordance with ITB 16;
	(h) In the case of a bid submitted by a joint venture (JV), the JV agreement, or letter of intent to enter into a JV including a draft agreement, indicating at least the parts of the Works to be executed by the respective partners; and
	(i) Any other document required in the BDS .
12. Letter of Bid and Schedules	12.1 The Letter of Bid, Schedules, and all documents listed under Clause 11, shall be prepared using the relevant forms in Section IV (Bidding Forms), if so provided. The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
13. Alternative Bids	13.1 Unless otherwise indicated in the BDS , alternative bids shall not be considered.
	13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS , as will the method of evaluating different times for completion.
	13.3 When specified in the BDS pursuant to ITB 13.1, and subject to ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the Bidding Document must first price the Employer's design as described in the Bidding Document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including

evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, **Discounts**

of the best-evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.

- 13.4 When specified in the BDS, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the BDS and described in Section VI (Employer's Requirements). The method for their evaluation will be stipulated in Section III (Evaluation and Qualification Criteria).
- 14. Bid Prices and 14.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Schedules shall conform to the requirements specified below.
 - 14.2 The Bidder shall submit a bid for the whole of the works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section IV, Bidding Forms. In case of admeasurement contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.
 - 14.3 The price to be quoted in the Letter of Bid shall be the total price of the Bid, excluding any discounts offered.
 - 14.4 Unconditional discounts, if any, and the methodology for their application shall be quoted in the Letter of Bid, in accordance with ITB 12.1.
 - 14.5 If so indicated in ITB 1.1, bids are invited for individual contracts or for any combination of contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 14.3, provided the bids for all contracts are submitted and opened at the same time.
 - 14.6 Unless otherwise provided in the BDS and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Adjustment Data in Section IV (Bidding Forms) and the Employer may require the Bidder to justify its proposed indices

and weightings.

- 14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the Bidder.
- **15.** Currencies of 15.1 The currency(ies) of the bid shall be as **specified in the BDS**. **Bid and Payment**
 - 15.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the prices shown in the appropriate form(s) of Section IV, in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.
- 16. Documents Comprising the Technical Proposal
 16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section *IV* (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
- 17. Documents
 Establishing theQualifications ofthe Bidder17.1 To establish its qualifications to perform the Contract in accordance with Section III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding information sheets included in Section *IV* (Bidding Forms).
 - 17.2 N/A.
- 18. Period of Validity of Bids18.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.

- 18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 19, it shall also be extended for a corresponding period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid.
- 18.3 In the case of fixed price contracts, if the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial bid validity, the Contract price shall be adjusted by a factor specified in the request for extension. Bid evaluation shall be based on the Bid Price without taking into consideration the above correction.
- 19. Bid Security19.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its bid, in original form, either a Bid Securing Declaration or a bid security as specified in the BDS. In the case of a bid security, the amount shall be as specified in the BDS.
 - 19.2 A Bid Securing Declaration shall use the form included in Section IV Bidding Forms.
 - 19.3 If a bid security is specified pursuant to ITB 19.1, the bid security shall be, at the Bidder's option, in any of the following forms:
 - (a) an unconditional guarantee, issued by a bank or surety;
 - (b) an irrevocable letter of credit;
 - (c) a cashier's or certified check; or
 - (d) another security indicated in the BDS.

from a reputable source within Zambia. If the unconditional guarantee is issued by an insurance company or bonding company located outside Zambia, it shall have a correspondent financial institution located in Zambia. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV (Bidding Forms) or in another substantially similar format approved by the Employer prior to bid submission. In either case, the form must include the complete name of the Bidder. The bid security shall be valid for twenty-eight days (28) beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.

- 19.4 Any bid not accompanied by an enforceable and substantially compliant bid security or Bid Securing Declaration, if required in accordance with ITB 19.1, shall be rejected by the Employer as nonresponsive.
- 19.5 If a bid security is specified pursuant to ITB 19.1, the bid security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's furnishing of the performance security pursuant to ITB 41.
- 19.6 If a bid security is specified pursuant to ITB 19.1, the bid security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required performance security.
- 19.7 The bid security may be forfeited or the Bid Securing Declaration executed:
 - (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, except as provided in ITB 18.2 or
 - (b) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB 40; or
 - (ii) furnish a performance security in accordance with ITB 41.
- 19.8 The Bid Security or the Bid Securing Declaration of a JV shall be in the name of the JV that submits the bid. If the JV has not been constituted into a legally enforceable JV, at the time of bidding, the Bid Security or the Bid Securing Declaration shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.
- 19.9 If a bid security is not required in the BDS, and
 - (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid Form, except as provided in ITB 18.2, or
 - (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 40; or furnish a performance security in accordance with ITB 41;

the Employer may, **if provided for in the BDS**, declare the Bidder disqualified to be awarded a contract by the Employer for a period of time **as stated in the BDS**.

20. Format and Signing of Bid

- 20.1 The Bidder shall prepare one original of the documents comprising the bid as described in ITB 11 and clearly mark it "ORIGINAL". Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the bid in the number **specified in the BDS**, and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.
 - 20.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as **specified in the BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature.
 - 20.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

D. Submission and Opening of Bids

- 21. Sealing and Marking of Bids21.1 Bidders may always submit their bids by email or by hand. When so specified in the BDS, bidders shall have the option of submitting their bids electronically. Procedures for submission, sealing and marking are as follows:
 - (a) Bidders submitting bids by mail or by hand shall enclose the original and each copy of the Bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL", "ALTERNATIVE" (if applicable) and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope. The rest of the procedure shall be in accordance with ITB sub-Clauses 22.2 and 22.3.
 - (b) Bidders submitting bids electronically shall follow the electronic bid submission procedures **specified in the BDS**.
 - 21.2 The inner and outer envelopes shall:
 - (a) bear the name and address of the Bidder;
 - (b) be addressed to the Employer as **provided in the BDS** pursuant to ITB 22.1;
 - (c) bear the specific identification of this bidding process

indicated in accordance with ITB 1.1; and

- (d) bear a warning not to open before the time and date for bid opening.
- 21.3 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid.
- 22.1 Bids must be received by the Employer at the address and no later than the date and time **indicated in the BDS**.
 - 22.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 23. Late Bids 23.1 The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
- 24.1 A Bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice, duly signed by an Substitution, and authorized representative, and shall include a copy of the **Modification of** Bids authorization in accordance with ITB 20.2, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be:
 - (a) prepared and submitted in accordance with ITB 20 and ITB 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," "MODIFICATION;" and
 - (b) received by the Employer prior to the deadline prescribed for submission of bids, in accordance with ITB 22.
 - 24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.
 - 24.3 No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.

22. Deadline for Submission of Bids

- 24. Withdrawal,

25. Bid Opening

- 25.1 The Employer shall open the bids in public at the address, date and time **specified in the BDS** in the presence of Bidders` designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 21.1, shall be as **specified in the BDS**.
 - 25.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding bid being substituted, and the substituted bid shall not be opened, but returned to the Bidder. No bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding bid. No bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening. Only envelopes that are opened and read out at bid opening shall be considered further.
 - 25.3 All other envelopes shall be opened one at a time, reading out: the name of the Bidder and the Bid Price(s), including any discounts and alternative bids and indicating whether there is a modification; the presence of a bid security or Bid securing Declaration, if required; and any other details as the Employer may consider appropriate. Only discounts and alternative offers read out at bid opening shall be considered for evaluation. No bid shall be rejected at bid opening except for late bids, in accordance with ITB 23.1.
 - 25.4 The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price, per contract if applicable, including any discounts and alternative offers; and the presence or absence of a bid security, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

E. Evaluation and Comparison of Bids

- 26. Confidentiality 26.1 Information relating to the examination, evaluation, comparison, and post-qualification of bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
 - 26.2 Any attempt by a Bidder to influence the Employer in the evaluation of the bids or Contract award decisions may result in the rejection of its bid.
 - 26.3 Notwithstanding ITB 25.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.
- 27. Clarification of Bids
 27.1 To assist in the examination, evaluation, and comparison of the bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the prices or substance of the bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids, in accordance with ITB 31.
 - 27.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Employer's request for clarification, its bid may be rejected.
 - 28.1 During the evaluation of bids, the following definitions apply:
 - (a) "Deviation" is a departure from the requirements specified in the Bidding Document;
 - (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and
 - (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
- **29. Determination of** 29.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11.

28. Deviations,

Reservations.

and Omissions

- 29.2 A substantially responsive bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,
 - (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or
 - (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.
- 29.3 The Employer shall examine the technical aspects of the bid submitted in accordance with ITB 16, Technical Proposal to confirm that all requirements of Section 6 (Employer's Requirements) have been met without any material deviation, reservation or omission.
- 29.4 If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
- 30. Nonconformities, 30.1 Provided that a bid is substantially responsive, the Employer may waive any nonconformities in the bid.
 Omissions
 - 30.2 Provided that a bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period, to rectify nonmaterial nonconformities in the bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the bid. Failure of the Bidder to comply with the request may result in the rejection of its bid.
 - 30.3 Provided that a bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price may be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the methods indicated in Section III (Evaluation and Qualification Criteria).

- 31. Correction of Arithmetical Errors
- 31.1 Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis:
 - (a) only for unit price contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
 - (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
 - (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.
- 31.2 If the Bidder that submitted the best-evaluated bid does not accept the correction of errors, its bid shall be declared non-responsive.
- 32. Conversion to Single Currency32.1 For evaluation and comparison purposes, the currency(ies) of the bid shall be converted into a single currency as specified in the BDS.
- 33. Margin of Preference33.1 A margin of preference shall not apply, unless otherwise specified in the BDS.
 - 33.2 N/A.
 - 33.3 N/A.
- 34. Evaluation of Bids34.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.
 - 34.2 To evaluate a bid, the Employer shall consider the following:
 - (a) the bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities for admeasurement contracts or Schedule of Prices for lump sum contracts, but including Daywork items, where priced competitively;
 - (b) price adjustment for correction of arithmetic errors in

accordance with ITB 31.1;

- (c) price adjustment due to discounts offered in accordance with ITB 14.3;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;
- (e) adjustment for nonconformities in accordance with ITB 30.3;
- (f) application of all the evaluation factors indicated in Section III (Evaluation and Qualification Criteria);
- 34.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
- 34.4 If this Bidding Document allows Bidders to quote separate prices for different contracts, and to award multiple contracts to a single Bidder, the methodology to determine the best-evaluated price of the contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III (Evaluation and Qualification Criteria).
- 34.5 If the bid for an admeasurement contract, which results in the best-evaluated Bid Price, is seriously unbalanced, front loaded or substantially below updated estimates in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.
- **35. Comparison of Bids 35.1** The Employer shall compare all substantially responsive bids in accordance with ITB 34.2 to determine the best-evaluated bid.
- 36. Qualification of the Bidder36.1 The Employer shall determine to its satisfaction whether the Bidder that is selected as having submitted the best-evaluated and substantially responsive bid meets the qualifying criteria specified in Section III (Evaluation and Qualification Criteria).
 - 36.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted

by the Bidder, pursuant to ITB 17.1.

- 36.3 An affirmative determination of qualification shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the bid, in which event the Employer shall proceed to the next best-evaluated bid to make a similar determination of that Bidder's qualifications to perform satisfactorily.
- 37. Employer's Right to Accept Any Bid, and to Reject Any or All Bids
 37.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

F. Award of Contract

- **38. Award Criteria** 38.1 Subject to ITB 37.1, the Employer shall award the Contract to the Bidder whose offer has been determined to be the best-evaluated bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.
- 39. Notification of Award
 39.1 Prior to the expiration of the period of bid validity, the Employer shall notify the successful Bidder, in writing, via the Letter of Acceptance included in the Contract Forms, that its bid has been accepted. At the same time, the Employer shall also notify all other Bidders of the results of the bidding, identifying the bid and lot numbers and the following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices as read out at Bid Opening; (iii) name and evaluated prices of each Bid that was evaluated; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the Price it offered, as well as the duration and summary scope of the contract awarded.
 - 39.2 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.
 - 39.3 The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 39.1, requests in writing the grounds on which its bid was not selected.
- 40. Signing of
Contract40.1 Promptly upon notification, the Employer shall send the
successful Bidder the Contract Agreement.

- 40.2 Within 3 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.
- 41. Performance Security
 41.1 Within 5 days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, subject to ITB 34.5, using for that purpose the Performance Security Form included in Section IX (Contract Forms), or another form acceptable to the Employer. If the performance security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer.
 - 41.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security. In that event the Employer may award the Contract to the next best-evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.
 - 41.3 N/A
- 42. Adjudicator
 42.1 The Employer proposes the person named in the BDS to be appointed as Adjudicator under the Contract, at the hourly fee specified in the BDS, plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in his Bid. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the Particular Conditions of Contract (PCC) pursuant to Clause 23.1 of the General Conditions of Contract (GCC), to appoint the Adjudicator.
Section II - Bid Data Sheet (BDS)

A. Introduction

ITB 1.1	The Employer is: SNV Netherlands Development Organisation						
ITB 1.1	The name of the bidding process is: <i>Request for Bids for Small Works for</i> <i>the Renovations and Additions to Katete Farmers Training Centre Phase</i> <i>1: Dormitory and Ablutions</i>						
	The identification number of the bidding process is: <i>IFB/SNV/GFA/2020</i> /003						
	The number and identification of lots comprising this bidding process is: N/A						
ITB 2.1	The Employer is: SNV Netherlands Development Organisation						
ITB 2.1	The name of the Project is: <i>Renovations and Additions to Katete Farmers</i> <i>Training Centre Phase 1: Dormitory and Ablutions</i>						
ITB 4.1(a)	The individuals or firms in a JV, <i>shall</i> be jointly and severally liable.						

B. Bidding Documents

ITB 7.1	For clarification purposes only, the Employer's address is:						
	Attention: SNV Zambia Procurement Office]						
	SNV Netherlands Development Organisation						
	7 Nkanchibaya road,						
	Rhodespark, P.O. 31771						
	+260 211 255174/5						
	Lusaka,						
	ZAMBIA						
	Requests for clarification should be received by the Employer no later than: 5 calendar days after the issue of this bidding invitation						
ITB 7.4	An optional Pre-Bid site and clarification meeting <i>shall</i> take place at the following date, time and place: <i>on 17th November 2020 in the FTC in</i>						

	Katete
	Date: The bid opening shall take place at
	SNV Netherlands Development Organisation 7 Nkanchibaya road, Rhodespark, P.O. 31771 +260 211 255174/5 Lusaka,
	ZAMBIA
	Date: 27 th November 2020
	Time:10 am Place:

ITB 10.1	The language of the bid is: <i>English</i>					
ITB 11.1 (b)	The following schedules shall be submitted with the bid: <i>Bill of Quantities</i>					
ITB 11.1 (i)	The Bidder shall submit with its bid the following additional documents: \					
	Zambian Revenue Authority- Valid TPIN and valid tax clearance certificates					
ITB 13.1	Alternative bids shall not be permitted.					
ITB 13.2	Alternative times for completion <i>shall not be</i> permitted.					
ITB 13.4	Alternative technical solutions shall not be permitted					
ITB 14.6	The prices quoted by the Bidder <i>shall be</i> subject to adjustment during the performance of the Contract.					
ITB 15.1	The prices shall be quoted by the bidder in: Zambian Kwacha (ZK)					
ITB 18.1	The bid validity period shall be: 90 (thirty) calendar days.					

C. Preparation of Bids

ITB 19.1	- A bid security or a Bid Securing Declaration shall not be required.							
ITB 19.3 (d)	N/A							
ITB 20.1	In addition to the original of the bid, the number of copies is: 2- one soft copy and one hard copy.							
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall include:							
	(a) Documentation that demonstrate the authority of the signatory to sign the Bid such as a Power of Attorney; and							
	(b) In the case of Bids submitted by an existing or intended JV an undertaking signed by all parties							
	(i) stating that all parties shall be jointly and severally liable, if so required in accordance with ITB 4.1(a), and							
	(ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.							

ITB 21.1	Bidders <i>can submit by email or</i> email or by hand.				
ITB 22.1	For bid submission purposes only, the Employer's address is:				
	SNV Netherlands Development Organisation 7 Nkanchibaya road, Rhodespark, P.O. 31771 +260 211 255174/5 Lusaka, ZAMBIA				
	OR <u>zambiaprocurement@snv.org</u>				
ITB 25.1	The bid opening shall take place at: SNV Netherlands Development Organisation 7 Nkanchibaya road, Rhodespark, P.O. 31771 +260 211 255174/5 Lusaka, ZAMBIA Date: 27 th November 2020 Time: 10am Bid committee members shall include: WML Consultants Ministry of Agriculture -Focal point person SNV Procurement Officer (Secretary) Moffat Tembo- SNV Finance officer SNV Deputy Country Director- Operations				
ITB 25.1	If electronic bid submission is permitted in accordance with ITB 21.1, the specific bid opening procedures shall be: N/A				

D. Submission and Opening of Bids

E. Evaluation and Comparison of Bids

ITB 32.1	The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: Zambian Kwacha (ZK).
ITB 33.1	A margin of preference shall not apply.

Section III - Evaluation and Qualification Criteria

This section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders. In accordance with ITB 34 and ITB 36, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section 4 (Bidding Forms).

Table of Criteria

1.	Evaluation	
1.1	Adequacy of Technical Proposal	
1.2	Multiple Contracts	
1.3	Completion Time	
1.4	Technical Alternatives	
1.5	Margin of Preference [Applicable for ONB only]	
2.	Qualification	
2.1	Eligibility	
2.2	Historical Contract Non-Performance	
2.3	Financial Situation	
2.4	Experience	
2.5	Personnel	
2.6	Equipment	

1. Evaluation

In addition to the criteria listed in ITB 34.1 (a) - (e) the following criteria shall apply:

1.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section VI (Employer's Requirements).

1.2 Multiple Contracts

Pursuant to Sub-Clause 34.4 of the Instructions to Bidders, if Works are grouped in multiple contracts, evaluation will be as follows: N/A

1.3 Completion Time

An alternative Completion Time, if permitted under ITB 13.2, will be evaluated as follows: N/A

1.4 Technical Alternatives

Technical alternatives, if permitted under ITB 13.4, will be evaluated as follows: N/A

1.5 Margin of Preference

If a margin of preference shall apply under ITB 33.1, the procedure will be as follows as: N/A

2. Qualification

Factor	2.1 Eligibility					
		Bidder				Description
Sub-Factor	Requirement	Single Entity	Single Entity Joint Venture, Consortium or Association		Required	
			All partners combined	Each partner	At least one partner	
2.1.1 Nationality	Nationality in accordance with ITB 4.2.	Must meet requirement	Existing or intended JV must meet requirement	Must meet requirement	N / A	Form ELI –1.1 and 1.2, with attachments
2.1.2 Conflict of Interest	No- conflicts of interests as described in ITB 4.3.	Must meet requirement	Existing or intended JV must meet requirement	Must meet requirement	N / A	Letter of Bid
2.1.3 Ineligibility	Not having been declared ineligible by ZPPA as described in ITB 4.4.	N / A	N / A	N / A	N/A	Letter of Bid
2.1.4 Government Owned Entity	Compliance with conditions of ITB 4.5	N / A	N / A	N / A	N / A	Form ELI –1.1 and 1.2, with attachments
2.1.5 Ineligibility based on a United Nations resolution or Zambian law	Not having been excluded as a result of the laws of Zambia or official regulations, or by an act of compliance with UN Security Council resolution, in accordance with ITB 4.8	Must meet requirement	Existing JV must meet requirement	Must meet requirement	N / A	Letter of Bid

Factor	2.2 Historical Contract N	Ion-Performanc	e			
		Documentation				
Sub-Factor						
	Requirement		Joint Venture, Consortium or Association			Required
	-	Single Entity	All partners combined	Each partner	At least one partner	
2.2.1 History of non- performing contracts	Non-performance of a contract did not occur within the last five (5) years prior to the deadline for application submission, based on all information on fully settled disputes or litigation. A fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract, and where all appeal instances available to the bidder have been exhausted.	Must meet requirement by itself or as partner to past or existing JV	N / A	Must meet requirement by itself or as partner to past or existing JV	N / A	Form CON - 2
2.2.2 Pending Litigation	All pending litigation shall in total not represent more than ten percent (10 %) of the Bidder's net worth and shall be treated as resolved against the Bidder.	Must meet requirement by itself or as partner to past or existing JV	N / A	Must meet requirement by itself or as partner to past or existing JV	N / A	Form CON – 2

Factor	2.3 Financial Situation					
		Bidder			Documentation	
Sub-Factor	Requirement		Joint Venture, Consortium or Association			Required
		Single Entity	All partners combined	Each partner	At least one partner	
2.3.1 Historical Financial Performance	Submission of audited balance sheets or other financial statements acceptable to the Employer, for the last three [3] years to demonstrate the current soundness of the bidder's financial position and its prospective long-term profitability. (criterion 1) (criterion 2)	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN – 3.1 with attachments
2.3.2. Average Annual Turnover	Minimum average annual turnover of ZK5 000 000 (five million Zambia Kwachas), calculated as total certified payments received for contracts in progress or completed, within the last Three (3) years	Must meet requirement	Must meet requirement	Must meet fifty percent (50%) of the requirement	Must meet fifty percent (50%) of the requirement	Form FIN –3.2

Factor	2.3 Financial Situation					
		Crite	eria			
		Bidder				Documentation
Sub-Factor	Requirement		Joint Venture	e, Consortium o	Required	
	Sin	Single Entity	All partners combined	Each partner	At least one partner	
2.3.3. Financial Resources	The Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet: (i) the following cash-flow requirement: ZK1 000 000 (one million Zambia Kwachas and (ii) the overall cash flow requirements for this contract and its concurrent commitments.	Must meet requirement	Must meet requirement	Must meet fifty percent (50%) of the requirement	Must meet fifty percent (50%) of the requirement	Form FIN –3.3

Factor	2.4 Experience					
			Bidd	er		
Sub-Factor	Requirement	S. 1 E	Joint Venture, Consortium or Association			Documentation Required
		Single Entity	Single Entity All partners combined	Each partner	At least one partner	
2.4.1 General Experience	Experience under contracts in the role of contractor, subcontractor, or management contractor for at least the last five (5) years prior to the applications submission deadline, and with activity in at least nine (9) months in each year.	Must meet requirement	N / A	Must meet requirement	N / A	Form EXP-4.1
2.4.2 Specific Experience	(a)Participation as contractor, management contractor, or subcontractor, in at least five (5) contracts within the last ten (10) years, each with a value of at least ZK 1000 000 (one million Zambia Kwachas), that were successfully and substantially completed and are similar to the proposed Works. The similarity shall be based on the physical size, complexity, methods/ technology or other characteristics as described in Section VI. Employer's	Must meet requirement	Must meet requirements for all characteristics	N / A	Must meet requirement for one characteristic	Form EXP 2.4.2(a)

Factor	2.4 Experience					
			Bidde			
Sub-Factor	Requirement		Joint Venture, Consortium or Association			Documentation Required
		Single Entity All partners combined		Each partner	At least one partner	
	Requirements.					
2.4.2 Specific Experience	 b) For the above or other contracts executed during the period stipulated in 2.4.2(a) above, a minimum experience in the following key activities: Foundation works Brickwork and masonry Plumbing Tiling Electrical works Carpentry and Joinery Painting and Finishing Roofing installations Paving 	Must meet requirements	Must meet requirements	N / A	Must meet requirements	Form EXP-2.4.2(b)

2.5 Personnel

The Bidder must demonstrate that it will have the personnel for the key positions that meet the following requirements:

No.	Position	Total Work Similar Experience (years)	In Similar Works Experience (years)
1			
2			
3			
4			
5			

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Forms included in Section IV, Bidding Forms.

2.6 Equipment

The Bidder must demonstrate that it will have access to the key Contractor's equipment listed hereafter:

No.	Equipment Type and Characteristics	Minimum Number required
1		
2		
3		
4		
5		

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV.

Section IV - Bidding Forms

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Financial Resources	
General Experience	
Specific Experience	
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Letter of Bid

The Bidder must prepare the Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and address.

Note: All italicized text is for use in preparing these form and shall be deleted from the final products.

Date: _____ Bidding No.: _____ Invitation for Bid No.: _____

To:

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) Clause 8;
- (b) We offer to execute in conformity with the Bidding Documents the following Works:
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is: _____;

(d) The discounts offered and the methodology for their application are: _____;

- (e) Our bid shall be valid for a period of **ninety** (90) calendar days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document;
- (g) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries;
- (h) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3;
- (i) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.3;

- (j) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible by ZPPA or by an act of compliance with a decision of the United Nations Security Council;
- (k) We are not a government owned entity.;⁶
- (1) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:⁷

Name of Recipient	Address	Reason	Amount

- (m) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (n) We understand that you are not bound to accept the best-evaluated bid or any other bid that you may receive; and
- (o) If awarded the contract, the person named below shall act as Contractor's Representative:

Name:	
In the capacity of:	
Signed:	
Duly authorized to sign the Bid for and on behalf of:	
Date:	

⁶ Use one of the two options as appropriate.

⁷ If none has been paid or is to be paid, indicate "none".

Schedules

Bill of Quantities/ Schedules of Prices

Schedule of Payment Currencies

Forinsert name of Section of the Works

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. The Employer should insert the names of each Section of the Works.

	Α	В	С	D
Name of Payment Currency	Amount of Currency	Rate of Exchange to Local Currency	Local Currency Equivalent C = A x B	Percentage of Net Bid Price (NBP) <u>100xC</u> NBP
Local currency		1.00		
Net Bid Price				100.00
Provisional Sums Expressed in Local Currency		1.00		
BID PRICE				

Table(s) of Adjustment Data

Table A - Local Currency

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Local Currency Amount	Bidder's Proposed Weighting
	Nonadjustable				A: B: C: D: E:
			Total		1.00

Technical Proposal

Technical Proposal Forms

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Forms for Personnel

Form PER – 1: Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements for each of the positions listed in Section III (Evaluation and Qualification Criteria). The data on their experience should be supplied using the Form below for each candidate.

1.	Title of position
	Name
2.	Title of position
	Name
3.	Title of position
	Name
4.	Title of position
	Name
5.	Title of position
	Name
6.	Title of position
	Name
etc.	Title of position
	Name

Form PER – 2: Resume of Proposed Personnel

The Bidder shall provide all the information requested below. Fields with asterix (*) shall be used for evaluation.

Position*				
Personnel information	Name *	Date of birth		
	Professional qualifications			
Present employment	Name of Employer			
	Address of Employer			
	Telephone	Contact (manager / personnel officer)		
	Fax	E-mail		
	Job title	Years with present Employer		

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From*	To*	Company, Project, Position, and Relevant Technical and Management
		Experience*

Forms for Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III (Evaluation and Qualification Criteria). A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder. The Bidder shall provide all the information requested below, to the extent possible. Fields with asterisk (*) shall be used for evaluation.

Type of Equi	pment*			
Equipment Information	Name of manufacture	er	Model and	l power rating
	Capacity*		Year of m	anufacture*
Current Status	Current location			
	Details of current con	nmitments		
Source	Indicate source of the	equipment		
	□ Owned	□ Rented	□ Leased	Specially manufactured

The following information shall be provided only for equipment not owned by the Bidder.

Owner	Name of owner						
Address of owner							
	Telephone	Contact name and title					
	Fax	Telex					
Agreements	Details of rental / lease / manufacture	agreements specific to the project					

Bidder's Qualification

To establish its qualifications to perform the contract in accordance with Section III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder

Form ELI 1.1

Bidder Information Sheet

		Date:			
		Biddir	ng No.:		
		Invita	tion for	Bid No.:	
		Page _		of	pages
1	Bidder's Legal Name				
1.	Brader 5 Begar Marine				
2.	In case of JV, legal name of each party:				
3.	Bidder's actual or intended Country of Registration:				
4.	Bidder's Year of Registration:				
5	Bidder's Legal Address in Country of Registration:				
5.	Brader 5 Degar Mariess in County of Registration.				
6.	Bidder's Authorized Representative Information				
	Name:				
	Address:				
	Telephone/Fax numbers:				
	Email Address:				
7.	Attached are copies of original documents of:				
	Articles of Incorporation or Registration of firm named ITB Sub-Clauses 4.1 and 4.2.	in 1, ab	ove, in	accordanc	e with
	In case of JV, letter of intent to form JV including a dra accordance with ITB Sub-Clauses 4.1	ft agree	ement, c	or JV agree	ement, in

Form ELI 1.2

Party to JV Information Sheet

Date:		
Bidding N	o.:	
Invitation	for Bid No.:_	
Page	of	pages

1. Bidder's Legal Name:
2. JV's Party legal name:
3. JV's Party Country of Registration:
4. JV's Party Year of Registration:
5. JV's Party Legal Address in Country of Registration:
6. JV's Party Authorized Representative Information
Name:
Address:
Telephone/Fax numbers:
Email Address:
7. Attached are copies of original documents of:
Articles of Incorporation or Registration of firm named in 1, above, in accordance with ITB Sub-Clauses 4.1 and 4.2.

Form CON – 2

Historical Contract Non-Performance

Bidder's Legal Name:		Date:	
JV Partner Legal Name:			
		Bidding No.:	
		Page 0	of pages
Non	-Performing Co	ontracts in accordance with (Evaluation and Qualificat	ion Criteria)
	ontract non-perf	ormance did not occur during the stipulated period, in Section III (Evaluation and Qualification Criteria)	accordance with
	ntract non-perf	ormance during the stipulated period in accordance w	vith Sub-Factor
2.2.1	of Section III (Evaluation and Qualification Criteria).	
Year	Outcome as Percent of Total Assets	Contract Identification	Total Contract Amount (current value, ZK equivalent)
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	
Pendi	ng Litigation, in	accordance with Section III (Evaluation and Qualific	ation Criteria)
Q	pending litigati ualification Cri	on in accordance with Sub-Factor 2.2.2 of Section III teria)	(Evaluation and
Pendi	ng litigation in	accordance with Sub-Factor 2.2.2 of Section III (Eval	uation and
Ouali	fication Criteria	a), as indicated below	und und
Year	Outcome as Percent of Total Assets	Contract Identification	Total Contract Amount (current value, ZK equivalent)
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	

Form CCC

Current Contract Commitments / Works in Progress

Bidders and each partner to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Name of contract	Employer, contact address/ tel/ fax	Value of outstanding work (current US\$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US\$/month)
1.				
2.				
3.				
4.				
5.				
etc.				

Financial Situation

Historical Financial Performance

Bidder's Legal Name:	Date:		
JV Partner Legal Name:	Bidding No.:		
-	Page	_ of	pages

To be completed by the Bidder and, if JV, by each partner

Financial	Historic information for previous () years						
information in	(ZK equivalent in 000s)						
ZK equivalent		1	T			1	
	Year 1	Year 2	Year 3	Year	Year n	Avg.	Avg. Ratio
Information fro	m Balance	e Sheet					Itutio
Total Assets (TA)							
Total Liabilities (TL)							
Net Worth (NW)							
Current Assets (CA)							
Current Liabilities (CL)							
Information fro	m Income	Statement			-	-	
Total Revenue (TR)							
Profits Before Taxes (PBT)							

- □ Attached are copies of financial statements (balance sheets, including all related notes, and income statements) for the years required above complying with the following conditions:
 - Must reflect the financial situation of the Bidder or partner to a JV, and not sister or parent companies
 - Historic financial statements must be audited by a certified accountant
 - Historic financial statements must be complete, including all notes to the financial statements
 - Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted)

Form FIN – 3.2

Average Annual Turnover

Bidder's Legal Name:	Date:
JV Partner Legal Name:	Bidding No.:
-	Page of pages

Annual turnover data (construction only)					
Year	Amount and Currency	ZK equivalent			
*Average Annual Construction Turnover					

*Average annual turnover calculated as total certified payments received for work in progress or completed over the number of years specified in Section III (Evaluation and Qualification Criteria), Sub-Factor 2.3.2, divided by that same number of years.

Form FIN3.3

Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as indicated in Section III (Evaluation and Qualification Criteria)

Source of financing	Amount (ZK equivalent)
1.	
2.	
3.	
4.	

Experience General Experience

Bidder's Legal Name:	Date:
JV Partner Legal Name:	Bidding No.:
	Page of pages

Starting Month / Year	Ending Month / Year	Years*	Contract Identification	Role of Bidder
			Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	
			Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	
			Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	
			Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	
			Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	
			Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	

*List calendar year for years with contracts with at least nine (9) months activity per year starting with the earliest year

Form EXP – 2.4.2(a) Specific Experience

Bidder's Legal Name:	Date:		
JV Partner Legal Name:	Bidding No.:		
	Page	_ of	_ pages

Similar Contract Number: total of five (5) contracts required.		Information	
Contract Identification			
Award date Completion date			
Role in Contract	Contractor	□ Management	
Total contract amount		Contractor	71
			ZK
If partner in a JV or subcontractor, specify participation of total contract amount	%		ZK
Employer's Name:			
Address:			
Telephone/fax number: E-mail:			

Form EXP – 2.4.2(a) (cont.) Specific Experience (cont.)

Bidder's Legal Name: _	Page	of	pages
JV Partner Legal Name:			

Similar Contract Number: total of five (5) contracts required.	Information
Description of the similarity in accordance with Sub-Factor 2.4.2a) of Section III (Evaluation and Qualification Criteria):	
Amount	
Physical size	
Complexity	
Methods/Technology	
Physical Production Rate	

Form EXP – 2.4.2(b)

Specific Experience in Key Activities

Bidder's Legal Name: JV Partner Legal Name: Subcontractor's Legal Name:	Date: Bidding No.: Page of pages		
	Information		
Contract Identification			
Award date Completion date			
Role in Contract	Contractor	□ Management Contractor	Subcontractor
Total contract amount			US\$
If partner in a JV or subcontractor, specify participation of total contract amount	%		US\$
Employer's Name:			
Address:			
Telephone/fax number: E-mail:			
Form EXP – 2.4.2 (b)(cont.)

Specific Experience in Key Activities (cont.)

Bidder's Legal Name:	 Page	of	pages
JV Partner Legal Name:			
Subcontractor's Legal Name: _			

	Information
Description of the key activities in accordance with Sub-Factor 2.4.2b) of Section III (Evaluation and Qualification Criteria):	

PART 2 – Employer's Requirements

Section VI - Employer's Requirements

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Specifications

Appendix 1 – Project Specifications (Civil)

1.1 WORKS SPECIFICATION

1.1.1 Applicable SABS Standards

a) For the purpose of this Contract the latest issues of the following Standard Specifications for Civil Engineering Construction, applicable at the date of tender advertisement, shall apply -

SABS 1200 A	:	1986	General
SABS 1200 A.	A :	1986	General (Small Works)
SABS 1200 AI	B :	1986	Engineer's Office
SABS 1200 AI	D :	1986	General (Small Dams)
SABS 1200 C	:	1980	Site Clearance (Amendment 1, 1982)
SABS 1200 D	:	1988	Earthworks (Amendment 1, 1990)
SABS 1200 D.	A :	1988	Earthworks (Small Works) (Amendment 1, 1990)
SABS 1200 DI	B :	1989	Earthworks (Pipe Trenches)
SABS 1200 DI	E :	1984	Small Earth Dams
SABS 1200 DI	К :	1996	Gabions And Pitching
SABS 1200 DI	M :	1981	Earthworks (Roads, Subgrade)
SABS 1200 G	:	1982	Concrete (Structural)
SABS 1200 G	A :	1982	Concrete (Small Works)
SABS 1200 H	:	1990	Structural Steelwork
SABS 1200 H	A :	1990	Structural Steelwork (Sundry Items)
SABS 1200 H	C :	1988	Corrosion Protection Of Structural Steel
SABS 1200 L	:	1983	Medium-Pressure Pipelines
SABS 1200 LH	3:	1983	Bedding (Pipes)
SABS 1200 LC	C :	1981	Cable Ducts
SABS 1200 LI) :	1982	Sewers
SABS 1200 LH	E :	1982	Stormwater Drainage
SABS 1200 LH		1983	Erf Connections (Water)
SABS 1200 LC	G :	1983	Pipe Jacking
SABS 1200 M	:	1996	Roads (General)
SABS 1200 M	E :	1981	Subbase
SABS 1200 M	F :	1981	Base
SABS 1200 M	FL :	1996	Base (Light Pavement Structures)
SABS 1200 M	G :	1996	Bituminous Surface Treatment

b) The term 'project specifications' appearing in any of the SABS 1200 standardised specifications must be replaced with the terms 'scope of work'.

1.1.2 Applicable National and International Standards

NOT APPLICABLE

1.1.3 Particular / Generic Specifications

In addition the following particular specifications that are bound into this document shall apply:

Specification PA - FENCING

Specification PB - BUILDING WORK

1.1.4 Variations and Additions to Specifications

This project specification covers variations and additions to standardised or particular specifications that are applicable to the contract.

The numbering method of this project specification deviates as follows from the method suggested in the Code of Practice SABS 0120.

Each clause with the prefix PS shall refer to the congruent clause in the appropriate section of the standardised or particular specification. Such clause shall either substitute, or supplement, or amend the clause with the same number. Where there is no such congruent clause in the standardised or particular specification, the PS clause shall be a new clause in the project specification. Any clause referred to in the standardised specification will also include the appropriate project specification.

PROJECT SPECIFICATION

SABS 1200 A : GENERAL

A 3 MATERIALS

PS A 3.1 QUALITY

Substitute the second sentence of the first paragraph of A 3.1 with the following:

Materials shall bear the official mark of the appropriate standard.

Substitute the second paragraph with the following:

Samples on which laboratory testing is required, shall be delivered free of charge to an approved accredited laboratory. The Contractor is responsible for the cost of all testing to ascertain that the materials do comply with the specified minimum requirements of the relative materials and no additional payment will be made for such testing.

The Contractor shall inform the Engineer of any control testing to be done at least 48 hours before such tests are required and must allow in his programme for the time necessary for the tests and the processing of the results thereof.

PS A 4 PLANT

PS A 4.2 CONTRACTOR'S OFFICE, STORES AND SERVICES

Add the following to A 4.2:

The Contractor's site agent or representative must be contactable at all times by phone. Should use be made of radio and/or cellular-phone, these must be operational at all times with sufficient back-up batteries or recharging facilities.

There exists no housing facilities for the Contractor's work force, and arrangements must be made by the Contractor to accomplish that as well as transport. The Contractor is solely responsible for all housing, or the arranging thereof, and no payment or extension of time will be allowed because of any delay and/or work damage that may arise.

A 5 CONSTRUCTION

A 5.1 SURVEY

PS A 5.1.1 Setting Out Of The Works

Substitute the first sentence in A 5.1.1 with the following:

Setting out of the works is the sole responsibility of the Contractor and shall be done from survey pegs along the street reserve boundaries and from bench marks as indicated on the drawings. The Contractor shall, within two (2) weeks after the site has been handed over to him, ascertain himself of the correctness of all pegs and bench marks. Any discrepancy shall immediately be reported in writing to the Engineer. Any costs or subsequent costs arising from discrepancies which had not been reported to the Engineer within the aforementioned period, shall be the sole responsibility of the Contractor.

Add the following:

Setting out of the works will not be measured and paid for directly, and compensation for the work involved in setting out shall be deemed to be covered by the tendered rates for the various items of work included under the contract. Surveys under Provisional Sum items will only be carried out and paid for under instruction of the Engineer.

PS A 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Add the following to A 5.4:

The Contractor shall as soon as possible after handing over of the site, commence with the detection of existing services, continue with it without interruption and finalise it at least seven (7) days before excavation starts at that particular section. Similarly in accordance with the Contractor's submitted programme, he is expected to proactively expose existing services in the next section along his critical path, so as to avoid unnecessary delays.

In the event of damage to existing services, the Contractor shall take such immediate action as is necessary to prevent further damage or danger to life or property and shall immediately notify the Engineer who will issue instructions as to the necessary repairs or protective measures to be taken. The cost thereof shall be borne by the Contractor irrespective of whether the repairs or protective measures were carried out by him or on behalf of the service authority or department concerned.

Where the Contractor is responsible for the cost of repairs carried out by the Employer or others, the costs will be recovered by means of a deduction from the Contractor's monthly payment certificate.

PS A 5.5 **DEALING WITH WATER ON WORKS**

Add the following to A 5.5:

Special treatment of water on site shall where necessary, be specified separately.

PS A.5.7 SAFETY

Substitute A 5.7 with the following:

"Pursuant to the provisions of the Conditions of Contract, and without in any way limiting the Contractor's obligations there under, the Contractor shall at its own expense (except only where specific provision (if any) is made in the Contract for the reimbursement to the Contractor in respect of particular items):

- (a) Provide to its Employees on the Site of Works, all safety materials, clothing and equipment necessary to ensure full compliance with the provisions of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) as amended and effective measures to ensure the proper usage of such safety materials, clothing and equipment at all times; and
- (b) Provide, install and maintain of all barricades, safety signage and other measures to ensure the safety of workmen and all persons in, on and around the Site, as well as the general public; and
- (c) Implement on the Site of Works, such procedures and systems and keep all records as may be required to ensure compliance with the requirements of the Act at all times; and

- (d) Implement all necessary measures as to ensure compliance of the Act by all subcontractors engaged by the Contractor and their employees engaged on the Works; and
- (e) Comply fully with all other requirements pertaining to safety as may be specified in the Contract.

The Employer, Employers Agent and the Engineer shall be entitled, although not obliged, to make such inspections on the Site, as they shall deem appropriate, for the purpose of verifying the Contractor's compliance with the requirement of the Act. For this purpose, the Contractor shall grant full access to the Site of all parts of the Site and shall co-operate fully in such inspection and shall make available for inspection, all such documents and records as the Employer's and/or Engineer's representative may reasonably require.

Where any such investigations reveal, or where it comes to the Engineer's attention that the Contractor is in any way in breach of the requirements of the Act or is failing to comply with the provisions of this clause, the Engineer shall, in accordance with the provision of Clause 39 of the General Conditions of Contract, be entitled to suspend progress on the Works or any part thereof until such time as the Contractor has demonstrated to the satisfaction of the Engineer, the breach has been rectified.

The Contractor shall have no grounds for a claim against the Employer for extension of time and/or additional costs if the progress on the Works or any part thereof is suspended by the Engineer in terms of this clause and the Contractor shall remain fully liable in respect of the payment of penalties for late completion in accordance with the provisions of Clause 43(1) of the General Conditions of Contract should the Contractor fail to complete the Works on or before the specified Due Completion Date in consequence of the suspension.

Persistent and repeated breach by the Contractor of the requirements of the Act and/or this clause shall constitute ground for the Engineer to act in terms of Sub-Clause 55.1.5 of the General Conditions of Contract and for the Employer to terminate the Contract in accordance with the further provisions of the said Clause 55.

PS A 5.10 COMPENSATION ACT

It is a requirement of this contract that all labour employed on the site be covered by the Employee's Compensation Act and Social Security. The Contractor is to arrange a suitable method of complying with the Act including the payment of the necessary levies.

A 7 TESTING

PS A 7.4 STATISTICAL ANALYSIS OF CONTROL TESTS

Substitute A 7.4 with the following:

Test results shall not be evaluated by statistical methods. All results shall comply with the specified minimum requirements of the materials concerned.

A 8 MEASUREMENT AND PAYMENT

A 8.2 PAYMENT

PS A 8.2.5 Adjusted Payment For Time-related Items

The payment to the Contractor for time-related items shall be adjusted in accordance with the following formula in the event of the contract being extended by means of a variation order:

		Extended contract period as authorised by
Sum of Tendered amounts for time-	Х	variation order
related items		Tendered contract period

The above-mentioned adjustment of the payment for time-related items shall be made in the Completion Payment Certificate and shall be the only payment for additional time-related costs.

PS A 8.3 Fixed Charge and Value-related items (Clause 8.2.1)

The tender amount for this item shall be limited to a maximum of 15% of the total Tender Sum excluding the contingency amounts allowed for in the Schedule of Quantities.

Amend sub clause 8.2.1 to read as follows:

"Payment of the fixed charge and value related items will be made in three instalments, as follows:

- (1) The first instalment, 50 % of all items listed under 8.3, in the schedule of quantities, will be paid in the first payment certificate after the contractor has met all his obligations under these items and has made a substantial start with construction in accordance with the approved programme.
- (2) The second instalment, 35 % of the items stated above, will be paid when the value of the work done reaches one half of the tendered amount, excluding contingencies and price adjustments in terms of Clause 68 of the General Conditions of Contract.
- (3) The third and final instalment, 15 % of the items stated above, will be paid when the works have been completed and the Contractor has fulfilled all the requirements of the contract.

PS A 8.4.6 Standing Time Costs

Standing time will be paid on the basis of proven costs. That is those costs that the Contractor suffered/incurred during the delay which was beyond his control. Therefore the onus is with the Contractor to prove to the Engineer such costs; also that he has made every effort to mitigate such costs e.g. return hired plant when a known labour strike is due.

For the purposes of calculating the total standing time cost, a working week shall be held to consist of five working days and a working day of 9 hours.

Payment for the partial standing of any of the scheduled resources for a day or part thereof, or the standing of a complete resource for a part day, will be made pro rata in proportion to an appropriate factor assessed by the Engineer.

The amount by which the standing time costs is adjusted shall be subject to the contract price adjustment formula (if applicable) as defined in the conditions of contract.

The Contractor shall take note that payment for standing time shall only apply to delays, which **in the opinion of the Engineer**, are incurred as a result of riot, commotion, politically motivated sabotage and acts of terrorism or disorder outside the Contractor's control. This item shall also apply to standing time incurred as a result of labour boycotts, except that only sub-items (a) and (c), as applicable, will be paid where the Contractor did not pay his labour for the time boycotted. Costs for delays incurred for all other circumstances shall be treated as provided for in the conditions of contract.

The provision of this clause shall in no way prejudice the right of either the Employer or the Contractor to determine the contract in terms of the provisions of Clause 57 of the General Conditions of Contract (2004).

The Contractor shall take note that no payment will be considered for additional cost or time lost for any daily removal of plant and equipment from the site, any additional costs incurred in protecting his plant and site establishment, or loss incurred in respect of damage to construction plant, equipment and materials supplied and the works.

In the event that Clause 46.1 of the General Conditions of Contract (2004) becomes applicable, the time on which such penalties are calculated shall be reduced by the total standing time approved by the Engineer.

PS A 8.5.1 Survey for the provision of as-built information Unit : Sum

The rates shall include the provision of X, Y & Z as-built co-ordinates of all sewer manholes and structures relevant to this contract. All cover and invert levels to be taken at the centre of manholes.

PS A 8.7 **DAYWORKS**

Replace A 8.7 with the following:

Dayworks will be paid according to the percentage allowance method. For calculating the total remuneration, the General Conditions of Contract for the construction works (2004) shall apply, with the amendments as in the appropriate particular conditions of contract which is bound into this document. A daywork schedule will be provided for filling in the necessary information.

Dayworks will be on instruction from the Engineer, failing which no compensation will be paid should work be done without such instruction.

A 8.8 TEMPORARY WORKS

PS A 8.8.2 Accommodation Of Traffic Unit : Sum

Add the following to A 8.8.2:

The rate shall cover all costs pertaining to the provision, erection, moving, re-erection and maintenance of all temporary barricades, road signs, lights, flagmen, etc. as required, for the guarding and protection of the works, for the construction, gravelling and maintenance of access roads and detours to the site of the works, borrow pits or spoil sites, as well as for the later removal or the cleaning and tidying up thereof, for making the necessary traffic arrangements and arrangements with regard to the moving and/or re-erection of existing traffic signs, as well as all other costs to accommodate the traffic during construction.

PS A 8.8.4 Existing Services

Add the following to A 8.8.4:

Where the Contractor is responsible for the cost of repairs carried out by the Employer or others, the costs will be recovered by means of a deduction from the Contractor's monthly payment certificate. The Employer will attend to the payment of monies due to others.

PS A 8.8.5 Cost Of Survey In Terms Of The Land Survey Act Unit : Sum

Substitute A 8.8.5 with the following:

The sum shall cover the cost of all labour, plant and material required for the searching and compilation of a list, all in accordance with the requirements as set out in clause A 5.1.2.

PS A 8.8.6	Continuous Training And Supervision	Unit : %
	The Tenderer shall provide a rate for continuous training and supervision for targeted I the construction period. This on the job training is additional to the accredited train labour.	abour during ning of local
PS A 8.8.7	Extra-over For Allowance Of Main Contractor	Unit : %
	The Tenderer shall provide a rate as an extra-over for the continuous training and su local labour during the construction operation to master basic techniques.	pervision of
PS A 8.8.6	Special Water Control In Terms Of Project Specification	. Unit : Sum
PS A 8.8.6(b)	Continuous Handling Of Flow	. Unit : Sum
	This rate covers all costs, labour, materials and equipment, etc as may be required to er	isure:
	The method will be determined by the Contractor. Temporary works must be completion of construction.	removed on
1. PS A	8.9 OCCUPATIONAL HEALTH AND SAFETY (PROVISIONAL)
PS A 8.9.1	Health And Safety Requirements	. Unit : Sum
	The rate shall cover all costs pertaining to the provision and maintenance for the du contract of the health and safety measures required in terms of Clause 5 (Principle Co Contractor) of the Construction Regulations (2003) of the Occupational Health and Sa other sum shall be paid in this respect and Tenderers must therefore ensure that adequ has been allowed for. The Health and Safety officer involved will certify part or total allowed.	aration of the ontractor and afety Act. No ate provision of provisions
PS A 8.9.2	Health And Safety Plan	. Unit : Sum
	The rate shall cover all costs pertaining to the provision and maintenance for the du contract of the health and safety plan as required in the Construction Regulations (200 shall include for all risk assessments required as well as for the development and imple safe work procedures and method statements. No other sum shall be paid in this Tenderers must therefore ensure that adequate provision has been allowed for. The Safety officer involved will certify part or total of provisions allowed.	Tration of the (3). The rate ementation of respect and e Health and
PS A 8.9.3	Health And Safety File	. Unit : Sum
	The rate shall cover all costs pertaining to the provision and/or collection of data (draw materials, operation and maintenance manuals, etc) to be contained in the file, co-op other parties, compilation and maintenance of the file during the duration of the con handing over of the file to the Client on completion of the contract. No other sum she this respect and Tenderers must therefore ensure that adequate provision has been allow Health and Safety officer involved will certify part or total of provisions allowed.	vings, design, peration with tract and the all be paid in wed for. The

PS A. 8.10 COMMUNITY LIAISON OFFICER

a) Employment of CLO Unit : Sum

Expenditure under this item shall be made shall be made in accordance with the General Conditions of Contract.

The sum allowed in sub item (a) is to cover the cost of employing the CLO as specified under Item C.3.4.14.

Sub item (b) shall be deemed to be full compensation for all costs incurred by the Contractor in connection with their employment.

PS A.8.11 Requirements in Terms of the Environmental Management Specification Unit : Sum

1.

ll work not measured elsewhere, associated with complying with any requirements of the environmental management programme shall be measured as sum.

2.

he tendered rate shall cover any cost associated with complying with the environmental management specification and shall include for all material, labour and plant required to execute and complete the works as specified.

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PROJECT SPECIFICATION

SABS 1200 AB : ENGINEER'S OFFICE

AB 3 MATERIALS

PS AB 3.1 NAME BOARDS

Substitute "South African Institution of Civil Engineers" in the first paragraph of AB 3.1 with "Association of Consulting Engineers Zambia (ACEZ)".

PS AB 3.2 OFFICE BUILDINGS

Add the following to AB 3.2:

A site office will not be required by the Engineer. However, the Contractor must provide adequate office facilities for site meetings. The site office shall be dust proof with sufficient room to accommodate 8 people, seated at a suitable table. All contract related documentation and drawings shall be kept available in this office. Provision shall be made by Contractor for covered parking space for Engineer (at least 1 space).

AB 4 PLANT

PS AB 4.1 TELEPHONE

Substitute AB 4.1 with the following:

Where cellular communication is not possible, the Contractor will provide a fixed landline.

AB 5 CONSTRUCTION

PS AB 5.1 NAME BOARDS

Add the following to AB 5.1:

The name boards shall be erected within one month after receipt of the letter of acceptance and shall be placed at the position indicated by the Engineer, and kept in good repair for the duration of the contract and the retention period. Any damage to these boards shall be repaired within fourteen days of a written instruction issued by the Engineer. No payment shall be made in terms of the contract prior to the erection of the name boards.

The Contractor will be permitted to erect a maximum of two of his own name boards, in positions approved by the Engineer. The Engineer reserves the right to order the removal of these boards if they are not kept in good repair.

PS AB 5.5 SURVEY ASSISTANTS

Substitute "two or more suitably educated survey labourers" in the first sentence of AB 5.5 with "two semi-skilled labourers."

PS AB 5.6 SURVEY EQUIPMENT

The Contractor shall provide the following tested and approved survey equipment on site for the duration of the contract and for the use of the Engineer whenever needed:

- a) one tacheometer capable of reading to minimum 20 seconds and maximum 6 seconds of arc, plus tripod;
- b) one automatic level plus tripod;
- c) two tacheometer staffs and one level staff, all graduated metrically; and
- d) one 5 m and one 100 m tape measure or wheel.

The above-mentioned equipment may by arrangement be shared between the Contractor and the Engineer's representative.

The Contractor shall keep the equipment continuously insured against any loss, damage or breakage, and he shall indemnify the Engineer and the Employer against any claims in this regard.

The Contractor shall maintain the equipment in good working order, calibrated and keep it clean throughout the contract period.

AB 8 MEASUREMENT AND PAYMENT

AB 8.2 PAYMENT

PS AB 8.2.2 Telephone, Survey Assistants And Survey Equipment

No payment shall be made for the telephone, survey assistants or survey equipment and all costs shall be deemed to be covered by the rates tendered for the Contractor's facilities.

PROJECT SPECIFICATION

SABS 1200 C : SITE CLEARANCE

C 3 MATERIAL

PS C 3.1 DISPOSAL OF MATERIAL

Substitute the first sentence of C 3.1 with the following:

Material obtained from clearing and grubbing and demolition structures shall be disposed of at the dump site.

C 5 CONSTRUCTION

PS C 5.1 AREAS TO BE CLEARED AND GRUBBED

Substitute the first sentence of C 5.1 with the following:

Unless otherwise indicated by the Engineer, clearing and grubbing are limited to the street reserves or such wider area as is necessitated by the street prism, borrow pits, a 10 m wide strip for concrete and/or earth channels, a 3 m wide strip for pipelines not in street reserves and if requested by the Engineer the spoil areas. The Contractor may proceed with clearing and grubbing after the handing over of the site. Measurement and payment for clearing and grubbing shall only occur for areas as required in writing by the Engineer.

Substitute the last paragraph with the following:

The Contractor shall programme his work in such a manner that re-clearing will not be necessary. The cost of re-clearing shall be borne by the Contractor.

C 5.2 CUTTING OF TREES

C 5.2.3 Preservation Of Trees

PS C 5.2.3.2 Individual trees

Add the following to C 5.2.3.2:

Trees outside street, channel and pipeline routes must be left standing and undamaged, except where otherwise ordered, in writing, by the Engineer.

A penalty of N\$200-00 per tree for trees damaged and/or removed will be charged.

C 8 MEASUREMENT AND PAYMENT

C 8.2 SCHEDULED ITEMS

PS C 8.2.3 Remove And Grub All Trees And Tree Stumps Regardless The Girth Unit : ha

Add the following to C 8.2.3:

The number of trees and/or stumps in the areas indicated on the drawings, is such that individual measurement is impractical. Individual trees that fall outside the indicated area, will be measured and paid for under C 8.2.2.

Add the following to C 8.2.7:

Existing pipelines, cables, etc shall only be dismantled subject to written instruction by the Engineer. Excavation and backfilling shall be measured in the appropriate items of SABS 1200 DB : Earthworks (pipe trenches).

PS C 8.2.12 Remove And Re-erect Existing Fences Unit : m

The rate shall cover the cost of removal and stacking of existing fencing material, including all gates, as well as of the re-erection thereof with the existing material. No additional payment will be made for the replacement of fencing material that has been damaged by the Contractor.

Material that is unsuitable for re-erection must be viewed by the Engineer before it is removed after which the Engineer must give written approval for the replacement thereof and for payment therefore.

PROJECT SPECIFICATION

SABS 1200 D : EARTHWORKS

D 2 INTERPRETATIONS

PS D 2.3 **DEFINITIONS**

Add the following to D 2.3:

Sand (cohesionless and non-cohesive)

For the purposes of the compaction requirements, a non-plastic material of which not less than 95 % by mass passes a sieve of nominal aperture size 4,75 mm, and not more than 10 % passes a sieve of nominal aperture size 0,075 mm.

D 3 MATERIALS

PSD 3.1.1 Method of Classifying

The Contractor may use any method he chooses to excavate any class of material but his chosen method of excavation shall not determine the classification of the excavation. The Engineer or his Representative will decide on the classification of materials. In the first instance classification will be based on inspection of the material to be excavated and on the criteria given in PSD 3.1.2(a) and (b).

PSD 3.1.2 Classes of Excavation

All materials encountered in any excavation for any purpose including restricted excavation will be classified as follows:

(a) <u>Hard rock excavation</u>

Hard rock excavation shall be excavation in material (including undecomposed boulders exceeding 0.17 cubic metres in individual volume) that cannot be efficiently removed without blasting, wedging and splitting, or hydraulic hammers.

This classification includes materials such as:

- solid un-fractured rock occurring in bulk
- solid ledges thicker than 200mm
- igneous rock intrusions
- cemented sedimentary rocks.
- (b) <u>Soft Excavation</u>

Any material which can be removed by bulldozers or backhoes, shall be classified as soft excavation.

Soft excavation shall be material not falling into the category of hard rock excavation.

D 3.3 SELECTION

PS D 3.3.1 General

Substitute the second paragraph of D 3.3.1 with the following:

The Contractor shall deal selectively with material from general excavation. Any imported material in road reserves that do not comply with the minimum requirements for the respective layers, shall be removed and replaced with suitable material, all at the Contractor's expense.

The Contractor shall deal in such a way with materials from all excavations for streets, channels or pipe trenches and excavations for structures to ensure that usable material is not contaminated with unsuitable material. If usable material is contaminated, such contaminated material shall be removed and replaced with suitable material, all at the Contractor's expense. No additional payment shall be made in respect of this and all relevant costs shall be deemed to be included in the tendered rates.

All unsuitable material shall be removed prior to importing fill material to such areas.

PS D 3.4 MATERIAL FOR SUBSOIL DRAINAGE

PS D 3.4.1 Pipes

Pipes for subsoil drainage shall be uPVC pipes complying with the requirements of SABS 791, but shall be perforated or slotted.

The size of perforations in perforated pipes shall in all cases be 8 mm in diameter \pm 1,5 mm and the number of perforations per metre shall be not less than 26 for 110 mm pipes and 52 for 160 mm pipes. Perforations shall be spaced in two rows for 110 mm pipes and in three rows for 160 mm pipes.

Slotted pipes shall have a slot width of 8 mm \pm 1,5 mm. The arrangement of slots shall be subject to the Engineer's approval, but the total slot area shall be not less than that presented for perforations.

Pipes without slots or perforations required for conveying ground water from the subsoil drainage proper to the point of discharge, shall be uPVC pipes as specified above.

PS D 3.4.2 Crushed-stone

Crushed-stone in subsoil drains shall be 19 mm single-sized stone complying with the grading requirements of stone for concrete in SABS 1083.

PS D 3.4.4 Sand

Sand in subsoil drains shall comply with the requirements of PS D 2.3.

D 4 PLANT

PS D 4.5 AVOIDING QUAGMIRE CONDITIONS

In order to prevent quagmire conditions occurring in the excavations, relatively static plant such as back-actors shall be used combined with hand trimming to complete the excavation to final level. Should the Contractor allow quagmire conditions to develop, he shall, at his own expense, take such steps to rectify the conditions as the Engineer may order.

D 5 CONSTRUCTION

D 5.1 PRECAUTIONS

PS D 5.1.1 Safety

PS D 5.1.1.3 Explosives

Add the following to D 5.1.1.3:

Explosives may only be used with the written permission of the Engineer. The Contractor shall be responsible for obtaining the necessary permits for the purchase of transportation, storage and use of explosives and for the disposal of any unused explosives.

The Contractor shall supply the Engineer with copies of the necessary permits 24 hours before any blasting takes place. Failure to do so shall result in permission for blasting being withdrawn.

A competent, registered blaster shall carry out any blasting required. The Blaster's Certificate and the Blaster's Permit from NamPol shall be provided to the Engineer. All permits required, purchasing, transport, use and dispose of unused blasting material shall be obtained and copies given to the Engineer before any blasting may take place. The Contractor's methodology shall be provided to the Engineer for approval. Proof of insurance covering damage due to blasting must be submitted. A letter of approval from the local authority must be submitted.

The commander of the local Police Services shall be informed of the time and date that blasting operations will take place at least 6 hours before blasting. No blasting operations may take place on weekends or holidays or before 07:00 and after 17:00 on weekdays.

The Contractor shall ensure that sufficient suitable cover material, to the satisfaction of the blaster, is available and in place before a blast is initiated.

PS D 5.1.2 Existing Services

PS D 5.1.2.2 **Detection, location and exposure**

Add the following to D 5.1.2.2:

The requirements of PS A 5.4 shall apply mutatis mutandis.

If existing services are not shown on the drawings but the existence thereof can be reasonably expected, the Contractor shall, in conjunction with all relevant authorities, determine the exact depth and location of such services before the commencement of construction. After locating the exact position of services, whether indicated on the drawings or not, such services shall be deemed to be known services and the Contractor shall be liable for all costs and subsequent costs arising from the damage thereof as a result of the Contractor's activities. These services must also be indicated on the "as built" drawings.

PS D 5.1.2.3 **Protection of cables**

Substitute "estimated position" in the second sentence of D 5.1.2.3 with "actual or exposed position".

- PS D 5.1.4 Nuisance
- PS D 5.1.4.1 **Dust nuisance**

Add the following to D 5.1.4.1:

The Contractor is responsible for dust control and is liable for all claims that may result from dust nuisance on all parts of the site and at all times from the date of handing over of the site to the completion date of the contract. No payment regarding the above-mentioned will be made and all costs shall be deemed to be covered by the tendered rates.

PS D 5.1.6 Road Traffic Control

Add the following to D 5.1.6:

- a) Sufficient road signs must be erected in such a way that motorists will be warned in time of works, e.g. at the closing of a street sufficient signs to direct traffic must be erected at the preceding intersection.
- b) Bypasses and/or road signs shall be provided and/or erected at all locations where the free flow of traffic is obstructed and shall be approved by the Engineer before the commencement of construction. Where main roads are crossed, detours and temporary traffic signs must be provided as shown on the attached drawings.
- c) Where a trench crosses a street or any place where a trench crosses the direction of traffic flow, drums must be placed in the street and not just along the sides of the street with danger tape in between.
- d) Danger tape must be put up between drums and tied around the drums.
- e) Drums may not be filled with stones. The spacing of drums must be in such a way (maximum 5 m) that they are visible from all directions.
- f) Sufficient safety measures must be utilised for pedestrians.

D 5.2 METHODS AND PROCEDURES

D 5.2.1 Site Preparation

PS D 5.2.1.2 Conservation of topsoil

Add the following to D 5.2.1.2:

Removal of topsoil shall only occur in areas as approved, in writing, by the Engineer. The topsoil shall be conserved for use elsewhere.

D 5.2.2 Excavation

PS D 5.2.2.1 Excavations for general earthworks and for structures

Add the following to D 5.2.2.1:

Strip foundations and encasement of pipes shall be cast directly against excavated surfaces.

Materials under foundations and floors of structures which are regarded by the Engineer as unsuitable for the bearing of such structures shall be removed to the depths and widths ordered. The excavated voids shall then be filled with sand compacted to 100 % of MAASHTO density, to the underside of such foundation or floors, unless a soil cement mixture in terms of PS D 5.2.3.2 is ordered by the Engineer.

PS D 5.2.2.3 Disposal

Substitute the second sentence of D 5.2.2.3 with the following:

All surplus and unsuitable material shall be dumped and neatly finished off at the site indicated during the site inspection.

PS D 5.2.2.4 Excavation by hand around existing services

Where hand excavation is required around existing services it shall be done within 3,0 m above and on both sides of cables and within 500 mm above and on both sides of pipes, as well as underneath the services.

PS D 5.2.3 Placing And Compaction

PS D 5.2.3.1 Embankments

Add the following to D 5.2.3.1:

Embankments of terraces shall be constructed of approved material from excavations and shall be compacted to 95 % of the standard MAASHTO density, in layers not exceeding 150 mm in depth.

PS D 5.2.3.2 Backfilling of trenches and backfilling against structures

Add the following to D 5.2.3.2:

Backfilling around structures shall be compacted to 95 % (100 % for sand) of MAASHTO density.

When specified or ordered by the Engineer the backfilling against structures shall be done using a mixture of soil cement. The mixture shall contain 5 % cement and just sufficient water for it to be placed and compacted like ordinary backfilling material.

D 5.2.4 Finishing

PS D 5.2.4.1 Final grading

Add the following to D 5.2.4.1:

Embankments of terraces shall be trimmed to an even grade as specified by the Engineer.

PS D 5.2.4.2 Top soiling

Add the following to D 5.2.4.2:

Topsoil shall be placed on the sides and on the tops of embankments and other terraces where no paving is specified, or in areas where directed by the Engineer.

PS D 5.2.4.3 Grass or other vegetation

Add the following D 5.2.4.3:

Planting shall be carried out at the earliest convenient stage of the construction and shall be arranged to suit the seasonal weather conditions. The Contractor shall arrange for the topsoil to be tested for fertiliser requirements and he shall submit the test reports to the Engineer who will, after that, issue instructions on the fertiliser to be used. The cost of any such tests together with the cost

of supplying fertiliser will be dealt with as daywork. Undue humps and hollows shall be smoothed out before planting is commenced.

The areas to be planted shall be covered with a 50 mm depth of well-rotted compost or manure from a source to be approved by the Engineer, scarified, harrowed, raked or otherwise worked until the compost or manure has been well worked into the soil.

a) Grassing

Stools or runners of "Kikuyu" or other grass approved by the Engineer shall be planted by forming trenches 75 mm deep at 300 mm intervals along lines at right angles to the direction of maximum slope, laying the stools or runners at intervals not exceeding 150 mm along the trenches and closing the trenches in such a way to cover the grass entirely. After planting the surface shall be lightly rolled with a hand roller with a maximum mass of 150 kg.

b) Sour fig (Carpobrotus edulis)

Sour fig shall be planted on sloping sides of terraces and elsewhere, as indicated by the Engineer, at a rate 10 plants per square metre.

c) Rose of Sharon (Hypericum calycinum), Alpine Phlox (Phlox Subulata) and Knotweed (Polygonum Capitatum)

Rose of Sharon shall be planted on sloping sides of terraces and elsewhere, as indicated by the Engineer, at a rate of 4 plants per square metre.

PS D 5.2.4.6 Straw stabilisation

Where directed by the Engineer, areas affected by construction activities shall be stabilised with straw which shall be evenly spread at a rate of one bale (\pm 50 kg) of approved straw per 25 m². The straw shall be thoroughly mixed into the top 150 mm of the in situ material until a homogenous mixture is obtained. Unless otherwise approved by the Engineer, straw stabilisation shall be carried out using hand labour.

PS D 5.2.5 Transport For Earthworks

PS D 5.2.5.1 Free-haul

Substitute DE 5.2.5.1 with the following:

The provisions of D 5.2.5.1 shall apply mutatis mutandis.

All rates tendered for material or excavation shall allow for all hauling to or from the site. For this Contract "freehaul" shall therefore continue indefinitely and no overhaul shall be paid, unless otherwise specified.

D 8 MEASUREMENT AND PAYMENT

PS D 8.1 BASIC PRINCIPLES

Add the following to D 8.1:

The rates for excavation shall also cover the cost of dealing with stormwater or subsurface water which may appear in the excavations.

D 8.3 SCHEDULED ITEMS

PS D 8.3.2	Bulk Excavation
	a) Excavate in all materials and use for embankment or backfill or dispose, as ordered Unit : m ³
	Add the following to D 8.3.2(a):
	There will also be distinguished between the different types of fill and backfill as well as the different densities to which each will be compacted.
PS D 8.3.2	c) Hand excavation in all materials and use for embankment or backfill or dispose, as ordered Unit : m ³
	The provisions of D 8.3.2(a) shall apply mutatis mutandis.
	This rate will only be applicable when specifically ordered by the Engineer.
PS D 8.3.2	d) Excavate and dispose of unsuitable material from excavation bottom where specifically ordered by the Engineer $\hfill mathcal{mathcal{eq:ma$
	The rate shall cover the cost of complying with all the precautions required in terms of D 5.1 in addition to the cost of excavation of the additional depth in any material and the disposal of the unsuitable material as specified in PS D 5.2.2.3.
PS D 8.3.2	e) Extra-over for hand excavation in
	1) Hard rock excavation Unit : m ³
PS D 8.3.3	Restricted Excavation
	Substitute D 8.3.3 with the following:
	Restricted excavation shall be limited to those excavations detailed on the drawings or as agreed to by the Engineer as being restricted.
PS D 8.3.5	a) Extra excavation in all materials to provide working space around structures Unit : m ³
	Alter the number of item D 8.3.5 to PS D 8.3.5(a) and add the following sub-item:
PS D 8.3.5	b) Extra over for hard rock excavation Unit : m ³
	The rate shall cover the additional cost of complying with the requirements of PS D 5.3.5 (a) for any portion of the excavated material that is classified as hard rock.
	Measurement shall be done by means of survey at regular chainages up to 5m. The Contractor must survey the NGL, level of hard rock before excavation and final excavation level in accordance with deign after hard rock has been removed. Rock volume to be calculated from chainage to chainage.
PS D 8.3.7	Additional Lateral Support Unit : Sum

Add the following to D 8.3.7:

The depth of shoring will be measured from the bottom of excavation to the top of excavation that requires support. Additional lateral support shall be measured in depth increments where necessary.

- D 8.3.8 Existing Services
- PS D 8.3.8.1 Location

Add the following to D 8.3.8.1(c):

Excavation by hand to expose existing services shall only be measured and paid for if so ordered in writing by the Engineer. After the excavation of trial holes to determine the exact position and depth of existing services, at intervals as required by the Engineer, the excavation to a level of 300 mm above such services shall be measured and paid for as normal excavation, independent of the depth of such excavation.

Only excavation within 300 mm of the existing services will be measured and paid for as excavation by hand and then only if ordered in writing by the Engineer. The rate shall also include the backfilling of the excavations and compaction thereof.

D 8.3.8.2 Dealing with services that are at risk because of the construction of earthworks

Add the following to D 8.3.8.1(b):

The rate shall cover the cost of lease of equipment, supply and deliver of all material and labour necessary for the detection of the existing services as well as for operating the equipment.

PS D 8.3.8.1 c) Excavate by hand in soft material to expose service Unit : m³ or day work

Add the following to D 8.3.8.1(c):

Measurement will be done in depth increments of 500 mm.

PS D 8.3.8.1 c) Excavate by hand in soft material to expose service Unit : m³ or day work

Where hand excavation around existing services do occur it shall be measured within 3 m above and on both sides of cables, and within 500 mm above and on both sides of pipes, as well as all excavations underneath the services.

Measurement shall occur in depth increments of 500 mm.

- PS D 8.3.8.1 d) Extra-over PS D 8.3.8.1(c) for excavation in Unit : m³ The provisions of PS D 8.3.2(d) shall apply mutatis mutandis.
- PS D 8.3.11 Grassing Or Other Vegetation Cover Unit : m²

Add the following D 8.3.11:

Payment for grassing and covering with other vegetation of designated areas will be made in stages as follows:

First payment

When the area has been prepared and planted, 60 % of the rate tendered per square metre shall be paid.

Second payment

When the area has been initially accepted by the Engineer, a further 30 % of the rate tendered per square metre shall be paid in respect of the re-measured area which is accepted.

Third payment

At the end of the maintenance period the outstanding amount will be paid in respect of the actual re-measured area of grass and other vegetation finally accepted by the Engineer for payment.

The rate tendered and paid for shall include full compensation for trimming of existing slopes, supply and spreading of compost and/or manure, preparation of the soil, watering, supply and planting of grass and other vegetation and maintenance of the covered areas, including all labour, supervision, specialist advice, materials, transport, plant, equipment and incidentals necessary to complete the work and bring the covered areas into the condition required for final acceptance, and shall include for any loss due to vegetation failing to establish a satisfactory cover of living vegetation in which gaps larger than 150 mm do not occur.

PS D 8.3.17 Construction of Earth Stormwater ChannelsUnit : m³

The rate shall be all inclusive for labour, material and equipment necessary for the excavation, construction, selection, transport, off loading and placement according to the specified slopes and dimensions as shown on the plans, as well as for compaction to 93 % of MAASTHO density.

PS D 8.3.18 Shaping of Stormwater Channels Unit : m²

The rate is an extra-over item PS DM 8.3.4 and shall be all inclusive for labour, material and equipment to shape stormwater channels according to the dimensions and grades as shown on the drawings and to compact to 93 % of MAASTHO density (100 % for sand).

PROJECT SPECIFICATION

SABS 1200 DB : EARTHWORKS (PIPE TRENCHES)

DB 1 SCOPE

Add the following to DB 1.1:

This specification additionally covers the excavation for cable trenches.

PS DB 2.2 APPLICATION

Substitute "pipe trenches" with "pipe and cable trenches" in DB 2.2.

DB 3 MATERIALS

PS DB 3.5 BACKFILL MATERIALS

a) Substitute "from trenches" in DB 3.5(a) with "from trenches, channel or street excavations".

Add the following to DB 3.5(b):

- c) All pipe trenches in street reserves shall be classified as areas subject to loads from road traffic.
- d) All pipe trenches underlying or adjacent to the carriageway shall be backfilled with sand complying with the requirements for A3 materials, as specified in PS D 3.4.

DB 3.6 MATERIALS FOR REINSTATEMENT OF ROADS AND PAVED AREAS

PS DB 3.6.1 Subbase And Base

Substitute DB 3.6.1 with the following:

Where trenches cross or run adjacent to surfaced roads and paved areas of which the surfaces are scheduled to be reinstated, the material excavated from the existing base and/or subbase pavement layer(s) shall be set aside and used in the reconstruction of the subbase layer. Where, applicable new material complying with the requirements of SABS 1200 MF shall be used in the reconstruction of the base layer. Any shortfall in material for the reconstruction of the subbase layer shall be made up by the use of material complying with the requirements of SABS 1200 ME.

PS DB 3.6.5 Concrete Pavement

The concrete pavement shall be of the same thickness as that of the existing pavement or be at least 100 mm thick grade 20 MPa/19 mm concrete, cast in panels with maximum dimensions of 2 m x 2 m.

PS DB 3.6.6 Brick Pavement

The existing brick paving shall be re-used and damaged bricks shall be replaced with bricks of the same grade, texture and colour.

DB 4 PLANT

PS DB 4.1 EXCAVATION EQUIPMENT

Add the following to DB 4.1:

All excavations exceeding the specified widths, shall be backfilled with approved selected material. No payment shall be made for this and all relevant costs shall be deemed to be included in the tendered rates.

PS DB 4.4 **DEWATERING EQUIPMENT**

One set of dewatering equipment shall consist of pumps, pipes, well points and other equipment necessary for keeping the trenches sufficiently free from water for dewatering of excavations up to 4 m depth and a trench length of 45 m for both sides or 70 m on one side.

DB 5 CONSTRUCTION

PS DB 5.2 MINIMUM BASE WIDTHS SPECIFIED

Substitute DB 5.2(a) with the following:

The base widths for combined pipe trenches are as shown on the drawings and the excavation depth is determined by the deepest pipe in the trench. The depth increment of a combined trench will be determined by the sewer or alternatively by the water pipe. The electrical ducts will determine the depth increment where they are laid together with house water connections. The total excavation, backfilling, bedding, etc form a specific trench and is measured in the bill of quantities under the service that determines the depth.

Short erf connections are measured separately in the bill, whereas long erf connections are measured separately in the bill with trench excavations and pipework.

Substitute paragraph (b) of DB 5.2 with the following:

The minimum base width for all pipes with a diameter less than 125 mm shall be 600 mm plus the outside diameter of the pipes, irrespective of the depth at which they are laid, except for subsurface drains where the width shall be 400 mm and for house water connections where the width shall be 300 mm.

The base width of box culverts shall be the net width of the in situ cast bottom slab or the net width of the precast bottom slab plus 100 mm.

A bedding is required for all pipes, except for subsurface drains.

The minimum base width for Telecom Namibia ducts shall be 300 mm.

The minimum base width for electric cable trenches shall be 300 mm. Where more than one cable is installed in the same trench, the base minimum width shall become 500 mm and the distances specified between the centre lines of the cables shall be 150 mm minimum.

PS DB 5.4 EXCAVATION

Add the following to DB 5.4:

Excavation and backfilling of pipe trenches on sidewalks in the residential area shall be done in such a way as to ensure the least possible disruption to the public and entrances to properties. No additional payment shall be made for this and all relevant costs shall be deemed to be included in the tendered rates. Electric cable trenches shall be dug in lengths as requested by the electrical contractor.

The provisions of PS D 5.2.2.4 shall apply mutatis mutandis for hand excavation.

PS DB 5.5 **TRENCH BOTTOM**

Substitute "90 %" in the second paragraph of DB 5.5 with "93 % (100 % for sand)".

DB 5.6 BACKFILLING

PS DB 5.6.2 Material For Backfilling

Substitute "from trench excavations" in the first paragraph of DB 5.6.2 with "from trench, channel or street excavations".

PS DB 5.6.3 Disposal Of Soft Excavation Material

Add the following to DB 5.6.3:

All surplus and unsuitable material as described in DB 5.6.3 shall be disposed of at the spoil site, (as described in PS D 5.2.2.3) and levelled.

DB 5.7 COMPACTION

PS DB 5.7.2 Areas Subject To Traffic Loads

Add the following to DB 5.7.2:

All pipe trenches that fall in the street reserves, will be regarded as areas subject to traffic loads.

Sand backfilling shall be compacted to 100 % of MAASHTO density.

DB 5.9 **REINSTATEMENT OF SURFACE**

PS DB 5.9.2 **Private Property And Commonage**

Add the following to DB 5.9.2:

Gardens and lawns shall be repaired to the original standard where they were crossed. Grass and plants shall be taken out of the ground, temporarily planted, watered during construction and replanted after backfilling.

PS DB 5.9.4 Bitumen Roads : Subbase And Base

Add the following to DB 5.9.4:

Any additional imported material required for the reinstatement of selected layers, subbase or base shall comply with the requirements of the relevant standardised and/or project specifications.

PS DB 5.9.5.1 Bitumen roads : Surfacing

Add the following to DB 5.9.5.1:

The thickness of the asphalt shall be 30 mm for all streets except if specified otherwise.

DB 8 MEASUREMENT AND PAYMENT

PS DB 8.1 BASIC PRINCIPLES

Add the following to DB 8.1.2(b):

The depth of electric cable trenches is as indicated on the relevant drawings.

DB 8.2 COMPUTATION OF QUANTITIES

PS DB 8.2.4 Shoring

Add the following to DB 8.2.4:

Shoring will only be measured and paid for if written approval is given by the Engineer before it is installed.

DB 8.3 SCHEDULED ITEMS

- PS DB 8.3.2 Excavation
- PS DB 8.3.2 a) Excavate in all materials for trenches, backfill, compact and dispose of surplus material Unit : m

Add the following to D 8.3.2(a):

The depth of excavation in street reserves shall be measured from the final finished level.

In cases where services lay parallel to steep slopes, the depth of the excavation will be measured along the centre of the trench (on the route of the service).

The rate for excavation for subsurface drains shall cover the cost of excavation and spoil of surplus material.

The rate shall also provide for the fact that the excavation width in sand will be wider than normal and that fast excavation and backfill will reduce ground water seepage.

i) Electric cable trenches

Excavation for electric cables not laid with other services will be measured and paid for separately under the relevant depth increments. The rate shall provide for excavation, preparing trench lengths as requested by the electrical subcontractor, backfilling and compaction thereof.

The rate shall also make provision for the possibility that long trenches need to be prepared for the electrical Contractor to lay full cable lengths (up to 300 m) and immediate backfilling after the installation of the cable (same day) to prevent theft.

ii) Combined trenches

The rate for excavation and backfilling of trenches with more than one service, shall allow for trench widths as set out in PS DB 5.2 and the bill of quantities. Extra bedding and fill blanket will be measured as in the case of normal pipe trenches.

The depth increment for combined trenches is determined by the deepest pipe in the trench.

PS DB 8.3.2	c) Excavate unsuitable material from trench bottom Unit : m ³
	Delete "and the disposal" in the heading of DB 8.3.2(c) and in the last paragraph.
PS DB 8.3.2	d) Hand excavation and backfill Unit : m ³
	The provisions of PS DB 8.3.2(a), DB 8.3.2(b) and PS DB 8.3.2(c) shall apply mutatis mutandis for hand excavation.
	Payment shall only be made if so ordered by the Engineer.
PS DB 8.3.2	e) Extra-over PS DB 8.3.2(a) for temporary stockpiling of material Unit : m ³
	Temporary stockpiling of material will only be measured and paid for if ordered so in writing by the Engineer and if it is not contaminated with unsuitable material.
	The rate shall provide for the handling and stockpiling of the material within the free haul distance.
DB 8.3.3	Excavation Ancillaries
PS DB 8.3.3.1	Make up deficiency in backfill material (provisional) Unit : m ³
	Add the following to DB 8.3.3.1:
	d) Stockpile Unit : m ³
	Add the following to the last paragraph of DB 8.3.3.1:
	No payment will be made for the transport of material from commercial sources or sources outside the site that the Contractor has selected.
PS DB 8.3.3.3	Compaction in road reserves Unit : m ³
	Add the following to DB 8.3.3.3:
	This item is only applicable to the backfill above the bedding and fill blanket.
PS DB 8.3.3.5	Backfilling of culverts with 1:3:6 concrete mixture Unit : m ³
	Backfilling of box culverts with 1:3:6 concrete mixture shall be measured to the neat dimensions as shown on the drawings. Backfilling as above shall only be done with the written permission of the Engineer.
	The rate shall provide for the supply, delivery, mixing and placing of all the necessary materials as well as for labour and supervision.
PS DB 8.3.4	a) Shore a trench opposite structure or service Unit : m

Add the following to DB 8.3.4(a):

Separate items shall be provided for shoring on both sides and on one side of trenches.

The tendered rate shall allow for additional excavation for shoring as well as for the design of effective shoring.

DB 8.3.5 Existing Services That Intersect Or Adjoin A Pipe Trench

PS DB 8.3.5 a) Services that intersect a trench Unit : No or m

Add the following to DB 8.3.5(a):

The unit "number" will only be used for services such as poles and trees.

No payment will be made for overhead services that do not rest directly on the ground except where allowance is made for this in the schedule of quantities.

Existing services that rest directly on the ground e.g. poles, trees, walls and structures are handled in the same way as underground services, but the axis of the service will be determined as follows:

The vertical axis is defined as the nearest side or corner of the existing structure to the excavation, measured at the point where the structure and natural ground level intersect.

The horizontal axis will be at the point where the structure and the natural ground level intersects. In this instance, where the excavation falls above the 45° line but within 1,0 meter horizontally from the structure, the service will also be measured as adjoining.

If the structure, according to the above-mentioned, does not qualify as an adjoining service but the foundation of the structure is such that if a 45° line drawn from the nearest bottom corner thereof cuts through the excavation, the structure will be measured as an adjoining service **if approved by the Engineer**.

There will be distinguished between existing trunk services and existing erf connection.

Further, existing services with a depth of cover exceeding 300 mm, measured from the bottom of excavation to the top of the existing service shall not be measured and paid for. There will be distinguished between existing trunk services and existing erf connection.

The rate shall also allow for the following costs:

- i) Sufficient photos have to be taken of existing services and handed over to the Engineer before they are being crossed, if there is a possibility of a difference in opinion over the condition of those services, especially on private property.
- ii) If such a service is damaged, it has to be repaired to its original condition or if possible, to a standard agreed to in writing with the relevant owner. This agreement has to be approved by the Engineer.
- iii) If such a service is removed, it has to be replaced as per original.

Add the following to DB 8.3.5 (b):

The unit "number" will only be used for services such as poles and trees.

No payment will be made for overhead services that do not rest directly on the ground except where allowance is made for this in the schedule of quantities.

Existing services that rest directly on the ground e.g. poles, trees, walls and structures are handled in the same way as underground services, but the axis of the service will be determined as follows:

The vertical axis is defined as the nearest side or corner of the existing structure to the excavation, measured at the point where the structure and natural ground level intersect.

The horizontal axis will be at the point where the structure and the natural ground level intersects. In this instance, where the excavation falls above the 45° line but within 1,0 meter horizontally from the structure, the service will also be measured as adjoining.

If the structure, according to the above-mentioned, does not qualify as an adjoining service but the foundation of the structure is such that if a 45° line drawn from the nearest bottom corner thereof cuts through the excavation, the structure will be measured as an adjoining service **if approved by the Engineer**.

There will be distinguished between existing trunk services and existing erf connection.

PS DB 8.3.5.4 Removal and replacement of bollards Unit : No

The rate shall include the cost of removal, loading, transport to the municipal dumping site, the supply and installation of the same type of bollards with a finish similar to that of the existing.

PS DB 8.3.5.5 Removal and relaying of existing brick paving Unit : m²

The rate shall include the cost of the removal of the existing brick paving, stacking on site and the relaying thereof, after completion of the services, on a 25 mm layer of sand from commercial sources placed on a 300 μ m (0,3 mm) polyethylene sheet. No payment will be made for the buying of additional brick paving due to damage, and it will be deemed as covered in the relevant items. Payment for excavation and backfilling up to the level of the polyethylene sheet will be made in the relevant items in the schedule of quantities.

PS DB 8.3.5.6 Removal and replacement of concrete paving Unit : m²

The rate shall include the cost of cutting the concrete, breaking, loading, transport and spoiling thereof on the municipal dumping site, preparation of the backfill directly beneath the concrete, placement of a 100 mm thick class 20/19 concrete in panels of maximum 2 m x 2 m including the necessary shuttering, expansion joints and wood-floated finish to match the level of the existing surfaces.

A maximum of 10 % of the tendered amount will be payable after completion of the breaking up and removal of the concrete.

The rate for the reinstatement of lawns, where it was crossed by pipe trenches, will include the following:

- i) the removal of grass sods in the strip needed for excavating the trench;
- ii) maintenance of the grass sods during the construction period;

iii) reinstating the grass to its original level and watering it after backfilling the trench.

Payment will only be made for the specified trench width and on approval of the Engineer.

PS DB 8.3.5.8 Reinstatement of gardens Unit : m²

Shrubs, bushes, plants and small trees will all be regarded as shrubs for the purpose of measuring. Annuals will not be regarded as shrubs.

The rate for the reinstating of gardens, where pipe trenches have crossed the gardens, will include the following:

- i) the removal of shrubs with minimum damage thereto;
- ii) maintenance of these shrubs during the construction period;
- iii) replanting and watering of shrubs in their original positions.

Payment will only be made for the specified trench width and if approved by the Engineer.

DB 8.3.6 Finishing

PS DB 8.3.6.1 Re-instatement of road layers

Add the following to DB 8.3.6.1:

The rate shall include for the selective excavation of existing subbase and base material where this material is going to be re-used.

PS DB 8.3.6.2 Extra-over DB 8.3.6.1 for imported material Unit : m³

The quantity will be calculated according to the actual volume of material placed in the final position according to the specified dimensions.

The rate is an "extra-over" Item DB 8.3.6.1 and includes all costs of supplying and placing of imported material in the final position with material from commercial sources.

SABS 1200 DM : EARTHWORKS (ROADS, SUBGRADE)

DM 3 MATERIALS

PS DM 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

Add the following to DM 3.1:

All in situ pavement material shall be classified as soft material for excavation purposes.

DM 3.2 CLASSIFICATION FOR PLACING PURPOSES

PS DM 3.2.3 Selected Layers

Substitute DM 3.2.3 with the following:
Materials used for selected layers shall comply with the requirements of standard specification 1200 M.

All imported material underlying the subbase or base of the final road prism, whichever may be applicable, that does not comply with the requirements for lower selected layer or upper selected layer in the respective depth categories, shall be removed and replaced with material complying with the requirements of selected layers, all at the Contractor's expense.

DM 5 CONSTRUCTION

DM 5.1 PRECAUTIONS

PS DM 5.1.2 Accommodation Of Traffic

Add the following to DM 5.1.2:

Bypasses shall be constructed and road signs erected where the free flow of public traffic is restricted. Such bypasses and road signs shall be in accordance with the "Namibia Road Traffic Signs Manual" and shall be approved by the Engineer before the commencement of construction.

DM 5.2 METHODS AND PROCEDURES

DM 5.2.2 Cut And Borrow

PS DM 5.2.2.2 Dimensions of cuts

Substitute "subbase" in the second paragraph of DM 5.2.2.2 with "subbase or selected layer, whichever may be applicable", and

Substitute "CBR of at least 7" with "CBR as applicable according to the provisions of PS DM 3.2.3".

PS DM 5.2.2.3 b) Cut to spoil

Substitute DM 5.2.2.3(b) with the following:

All surplus and/or unsuitable material shall be removed from the site and disposed of at the spoil site (as described in PS D 5.2.2.3) and shall be shaped to establish a free draining surface.

PS DM 5.2.2.4 Temporary stockpiling of materials

Add the following to DM 5.2.2.4:

The Contractor shall programme the works in such a manner that suitable excavated material shall, if practically possible, be placed directly in the appropriate position to ensure that temporary stockpiling is limited to an absolute minimum. No payment shall be made for the temporary stockpiling of material where such material is to be used for backfilling of pipe trenches, except when so ordered in writing by the Engineer.

DM 5.2.3 Treatment Of Road bed

PS DM 5.2.3.3 Treatment of road bed

a) Preparation and compaction of road bed

Substitute the first paragraph of DM 5.2.3.3(a) with the following:

The road bed shall be scarified to a depth of 150 mm, watered, shaped and compacted to 90 % of MAASHTO density (100 % for sand), except where otherwise ordered by the Engineer.

In clay areas only excavation and shaping to the correct level will be necessary.

The road bed shall be prepared with a ionic stabiliser at a rate of 0,03 ℓ/m^2 in layers of 150 mm and 0,02 ℓ/m^2 in layers of 100 mm before compaction if ordered by the Engineer.

The stabiliser must be thoroughly mixed with water.

Measurement and payment shall be made under item PS ME 8.3.8(g).

Add the following subclause:

c) In situ preparation of road bed with eight roller passes

Any part of the road bed that lies within the selected layer and which, regardless of its density, is suitable according to the Engineers opinion, can be used in situ if so instructed by the Engineer.

If due to the nature of material, the degree of compaction cannot be controlled by means of in situ density tests, the Engineer may instruct compaction to be done by eight roller passes as specified in PS DM 4.2. The Engineer may further request that the compaction effort be altered by increasing or reducing the number of passes and that payment be amended accordingly.

The surface of the road bed shall be shaped true in respect of line and level within the tolerances as specified in clause 6. During the shaping of the road bed, all material that has to be removed and cannot be re-used, shall be disposed of and will be paid for under item PS DM 8.3.7. If necessary, additional material that has been approved by the Engineer shall be imported to meet the required levels.

No strict measurements in connection with soil moisture content will be applied by the Engineer during compaction. The Contractor must however convince the Engineer that all possible efforts have been made to utilise favourable soil moisture conditions. Compaction must be done during periods when the road bed is not to wet or to dry. The Engineer has full authority to decide whenever conditions are favourable for compaction, and may at any stage instruct the Contractor to water the road bed at the Contractors expense if he, in the Engineer's opinion, neglected to satisfy the above-mentioned requirements.

PS DM 5.2.5 Selected Layer

Add the following to DM 5.2.5:

The Engineer may, depending on the quality of the in situ material, order the omission of one or both of the selected layers. To determine the amount of selected layers, if any, the Engineer may order the Contractor to dig test holes with maximum dimensions of 1,5 m x 1,5 m and 1,0 m deep at positions indicated by the Engineer, before construction commences.

The Contractor shall backfill all test holes with selected material and compact it to 95 % of MAASHTO density, after the Engineer has taken samples and profiled the holes.

PS DM 5.2.9 Shaping And Compacting Below Selected Layer

Each portion of the road bed below the selected layer which, by virtue of its inadequate natural density, is directed by the Engineer to be compacted by means of a pneumatic-tyred roller, shall be prepared by shaping where necessary, and each such portion shall be compacted by means of at least eight complete passes by a pneumatic-tyred roller. One pass shall consist of the complete area being systematically passed in the longitudinal direction so that each pass overlaps the previous by half.

PSDM 5.2.10 Trimming and Grading of Verges

During the initial earthworks the verge width shall be cut or filled to approximately the final leveland shall be kept trimmed and tidy during construction of the works. After completion of the road layers, including the premix surface, and after construction of the necessary kerbs, including the satisfactory backfilling behind the kerb, the verge shall be finished off to the lines and levels shown on the drawings or as specified.

The verge material shall consist of that material which would normally be occurring at that position or depth when in cut and shall not be contaminated by foreign materials such as bricks, base course material, horticultural inferior materials from trench excavations, etc. Verges in fill conditions are to consist of the material as specified for the fills and similarly not be contaminated with foreign materials.

Over those sections of verge where grass is to be planted or where the Engineer deems it necessary to spread topsoil, he may instruct the Contractor at the stage of the major earthworks operation to work to levels altered from those shown on the drawings.

Topsoil may be provided from stockpiles on site in which case the Contractor shall load, transport and spread as ordered by the Engineer. In the case of topsoil provided and imported by the Contractor the quality of the topsoil shall be approved of by the Engineer beforehand.

The Contractor shall be responsible for taking the necessary precautions and measures to control the dust nuisance which may arise due to his operations on the verge, whether from the natural ground surface or topsoil layer, until the verge is accepted by the Engineer.

PSDM 5.2.11 Dimension and Level Control and Process Control

The Contractor shall submit to the Engineer records of dimension and level control and/or process control prior to requesting the Engineer to carry out any routine tests and/or inspections.

A sample form can be obtained from the Engineer.

PSDM 5.2.12 Requesting of Tests

Tests and Inspections of the works will only be carried out by the Engineer once the appropriate test/inspection request forms have been fully completed. Test/inspection request forms can be obtained from the Engineer.

DM 6 TOLERANCES

PS DM 6.5 DIMENSIONS AND LEVEL CONTROL

The Contractor shall submit to the Engineer, in a form acceptable to the Engineer, records of dimension and level control, prior to requesting the Engineer to carry out any routine inspections.

DM 7 TESTING

PS DM 7.2 **PROCESS CONTROL**

Amend table 1 of DM 7.2 as follows:

Substitute "2 000 m²" with "1 500 m²", "1 500 m²" with "1 200 m² and "5 000 m²" with "3 000 m²".

DM 7.3 ROUTINE INSPECTION AND TESTING

Substitute DM 7.3.2 with the following:

No density shall be less than the specified minimum density for the relevant layer.

The cost of all routine testing done by the Engineer, and of which the results do not comply with the specified minimum requirement for the material, shall be borne by the Contractor and will be subtracted from the monthly payment certificates.

DM 8 MEASUREMENT AND PAYMENT

DM 8.3 SCHEDULED ITEMS

PS DM 8.3.3 Preparation Of Road Bed

Substitute DM 8.3.3(b)(1) and (2) with the following:

- b) Preparation of in situ road bed in:
 - 2) Hard rock material Unit : m³

Rock to be cut/removed to maximum top of selected subgrade level, unless otherwise ordered by the Engineer.

Add the following sub clauses:

The unit of measurement is in square metres of road bed which has been treated with eight roller passes.

The rate shall cover the costs of shaping, watering and compacting all as specified in PS DM 5.2.3.3(c). The removal, disposal, transport and replacing of materials will be paid under the appropriate items.

(d) Variations in compaction effort (pneumatic roller) Unit : m².pass

The unit of measurement is the surface on which the variation is applicable multiplied by the amount with which the compaction effort was reduced or increased as instructed by the Engineer.

If there is a change in compaction effort, as instructed by the Engineer, the Contractor will be paid as for the standard effort, except that the amount as calculated above will be subtracted or added in the appropriate item.

This rate shall include full compensation for supervision, labour, machines, construction equipment, fuel, material and additional costs necessary for the completion of the process.

PS DM 8.3.4	Cut To Fill, Borrow To Fill		Unit : m ²	3
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Substitute "90 %" in DB 8.3.4 with "90 % (100 % for sand)" and "road prism" with "road prism and borrow pits".

Add the following:

Separate items will be scheduled for fill in the road prism, fill on spoil areas and fill on erven (where a minimum density for such spoil material is required by the Engineer) and fill from the road prism, fill from the site and fill from commercial sources.

The rate for fill from commercial sources shall, in addition to the requirements of DM 8.3.4, cover the cost of the location of the source, complying with all the applicable precaution as set out in DM 5.1, obtaining the material, selection and transport from the source to the point on the road where it is to be used.

(for hand excavation see SABS 1200 D.)

PS DM 8.3.5 Selected Layer Compacted To 93 % Of MAASHTO Density Unit : m³

Substitute "93 % of MAASHTO density" in the heading of DM 8.3.5 with "93 % (100 % for sand) of MAASHTO density".

Add the following to DM 8.3.5:

Separate items will be scheduled for lower and upper selected layers as well as for material from the site of works and from commercial sources. The rate for selected layers from commercial sources shall, in addition to the provisions of DM 8.3.5, allow for locating the source, complying with all the applicable precautions as set out in DM 5.1, obtaining the material, selection and transport from the source to the point on the road where it is going to be used. No payment shall be made for the removal and replacement of unsuitable imported material.

PS DM 8.3.7	Cut To Spoil Or Stockpile From Unit : m ³
	Add the following to DM 8.3.7:
	Payment for temporary stockpiling shall be made under DM 8.3.11, only if so instructed in writing by the Engineer.
PS DM 8.3.12	Overhaul Unit : m ³ or m ³ .km
	Substitute DM 8.3.12 with the following:
	The provisions of clause D 8.3.6 shall apply mutatis mutandis.
PS DM 8.3.17	Trim, Shape And Compact Sidewalks Unit : m ²
	The area to be trimmed is the unsurfaced area from the back side of the kerbs to the boundary of the road reserve, or such wider area necessitated by the road prism.
	Measurement and payment for the above shall be restricted to areas ordered in writing by the Engineer.
	The rate shall cover the cost of trimming and shaping the sidewalks to the lines, levels and dimensions as shown on the drawings, of acquiring additional material to compensate for any material lost due to weather or other reasons, and of the compaction of any loose or disturbed material to 90 % of MAASHTO density (100 % for sand).
PS DM 8.3.18	Trial Holes Unit : No
	The unit of measurement is the number of trial holes made at positions indicated by the Engineer.
	The rate shall cover the cost of excavating to a depth of 1 m, as well as for backfilling with the excavated material, compacted to 93 % of MAASHTO density (100 % for sand). The rate shall also include the survey and booking to determine the position of existing services.
PS DM 8.3.19	Removal Of Unsuitable Material Unit : m ³
	The volume measured for payment is the volume of unsuitable material, removed on written instruction of the Engineer in accordance with clause DM 5.2.3.2, below the level of the initial road bed.
	The rate is extra-over Item PS DM 8.3.7 and covers all additional costs in respect of the removal and spoil of unsuitable material, as well as all additional costs in respect of the backfilling thereof. Payment for backfilling shall be made either under PS DM 8.3.4 or PS DM 8.3.5, whichever may be applicable.
	Payment shall differentiate between the areas of the unsuitable material, as measured on the initial road bed, in increments as scheduled.
PS DM 8.3.20	Installation Of Reference Marks Unit : No
	The quantity is the number of reference marks installed in streets on positions indicated by the Engineer.
	The rate shall cover the cost of supplying, excavation, removal of surplus material, installation to the standards as shown on the drawings, backfilling with material that comply with the

requirements of the relevant pavement layers, compacting to the specified minimum density for the relevant pavement layers and for the reinstatement of the bituminous surface with 30 mm asphalt.

PS DM 8.3.21 Existing Services That Adjoin Excavation For Streets Unit : m

The provision of items DB 8.3.5(a) and DB 8.3.5(b) shall apply mutatis mutandis.

PS DM 8.3.22 Existing Services Intersecting Excavation For Streets Unit : No

The quantity is the number of each service, as indicated in the schedule of quantities that intersect the excavation for streets.

Separate items will be provided for the depth increments as scheduled.

The rate for the crossing of services below the level of the road bed, measured to the top of the service, covers all additional costs in respect of excavation, irrespective of the method, the protection and ensuring of the continuous functioning thereof and the cost of all repair work and/or subsequent costs arising from damage to the service.

The rate for services that are not fully covered by the road bed shall, in addition to the abovementioned requirements, cover all additional costs in respect of excavation and backfilling with material as required for the relevant pavement layer as well as for compacting to the specified minimum density of the relevant pavement layer.

Services with a depth of cover of more than 500 mm shall not be measured and paid for.

PS DM 8.3.23 Shaping Of Stormwater Channels Adjoining Streets Unit : m

The rate is an extra-over item PS DM 8.3.4 and shall be all inclusive for labour, material and equipment to shape stormwater channels according to the dimensions and grades as shown on the drawings and to compact to 90 % of MAASHTO density (100 % for sand). The placing of the gravel layer shall be measured in item PS DM 8.3.24.

PS DM 8.3.24 Construction Of Gravel Layer In Stormwater Channels Unit : m³

There will be differentiated between material from the stockpile and that from the borrow pits. The rate shall be all inclusive for labour, material and equipment necessary for construction, selection, transport, off-loading and placement according to the specified slopes and dimensions as shown on the plans, as well as for compaction to 93 % of MAASHTO density.

PROJECT SPECIFICATION

SABS 1200 G : CONCRETE (STRUCTURAL)

G 3 MATERIAL

PS G 3.2.1 Applicable Specifications

Substitute G 3.2.1 with the following:

For this contract CEM I portland cement shall be used.

PS G 3.2.3 Storage Of Cement

Add the following to G 3.2.3:

Consignments of cement shall be used in the same sequence as that in which they are delivered to site. No cement shall be used which has been stored on site for a longer period than six (6) weeks. All cement so stored for a longer period than six (6) weeks, all cement damaged in any way, and all cement which does not comply with the specification, shall be removed immediately and permanently from the site.

PS G 3.5.2 Air-entraining Agents

Substitute G 3.5.2 with the following:

Air-entraining agents shall not be used in concrete.

G 4 PLANT

PS G 4.5.3 Ties

Add the following to G 4.5.3:

Permanent metal ties shall have a minimum concrete cover of 40 mm after formwork has been removed.

Tie holes shall be filled with an approved expansive cementitious grout similar to "Durabed" of ABE. The product shall be prepared to a non-slump consistency, but where no cracking occurs when pressed into a firm ball. Trial mixes shall be made to arrive at the required working consistency.

G 5 CONSTRUCTION

G 5.1 **REINFORCEMENT**

PS G 5.1.3 Cover

Substitute G 5.1.3 with the following:

The cover of concrete over reinforcement, unless otherwise indicated on the drawings, shall in no case be less than 40 mm.

PS G 5.2.1 Classification Of Finishes

Add the following to G 5.2.1:

The following surface conditions are required on the various portions of the finished concrete:

(a) **Rough**

Concealed surfaces and surfaces more than 100 mm below final ground level.

(b) Smooth

All surface finishes not classified as "rough" in paragraph (a) shall be classified as "smooth". All exposed arrises (i.e. where the angle between adjacent sides is 110° or less) unless otherwise indicated on the drawings, shall be chamfered 20 mm x 20 mm by means of triangular fillets fixed to the formwork.

PS G 5.2.5 **Removal of formwork**

In Table 2 of G 5.2.5.2, substitute "portland cement and portland cement 15" in columns 2, 3 and 4 with "CEM 1 portland cement, delete columns 5, 6 and 7 and substitute "portland blast-furnace cement" in columns 8, 9 and 10 with "CEM III blast-furnace cement or blends of CEM I portland cement with milled granulated blast-furnace slag".

PS G 5.4 **PIPES AND CONDUITS**

Add the following to G 5.4:

All pipes and specials which must be installed in the floors and walls of structures shall be embedded in the concrete during the casting of such concrete. No holes shall be left for the later installation of pipes and specials, without the written approval of the Engineer.

Where such holes have been approved by the Engineer, the Contractor shall be responsible for the grouting-in of such pipes or specials with an approved expansive cementitious grout as specified in PS G 4.5.3, regardless of whether or not these have been supplied by himself. The Contractor shall provide a smooth, dense and waterproof finish around the pipes or specials.

The clear space between pipes of any kind embedded in reinforced concrete and the clear space between such pipes and reinforcement shall at any point be not less than -

- (a) 40 mm, or
- (b) 5 mm plus the maximum size of coarse aggregate,

whichever is the greater.

G 5.5 CONCRETE

PS G 5.5.1.5 **Durability**

Substitute G 5.5.1.5 with the following:

Concrete shall be so proportioned to ensure that the water/cement ratio does not exceed 0,5 and, to ensure workability, water-reducing admixtures of approved manufacture shall be used in preference to increasing the cement content.

PS G 5.5.1.7 Strength concrete

Add the following to G 5.5.1.7:

The grade of strength concrete and the maximum nominal size of coarse aggregate for each portion of the works, unless otherwise indicated on the drawings, shall be as follows:

(a)	Mass concrete under floors and foundations	20 MPa/19 mm
(b)	Blinding layers	20 MPa/19 mm
(c)	Encasing of pipes	20 MPa/19 mm
(d)	Strip foundations	25 MPa/19 mm
(e)	Benching and screeds	15 MPa/10 mm
(f)	All reinforced concrete	30 MPa/19 mm

PS G 5.5.7 Construction Joints

Add the following to G 5.5.7.1:

Construction joints shall be limited to the minimum and shall only be made in positions as shown on the drawings or in positions as specifically approved by the Engineer. Construction joints between tank bottoms, floors, or wall bases, and the walls standing on them shall not be made flush with the supporting surface, but shall be made in the wall 150 mm above the base. The 150 mm high riser wall shall be cast as an integral part of the bottom, floor or base, i.e. the concrete in the riser shall be deposited simultaneously with the concrete in the bottom, floor or base adjacent to it. Where there is a fillet at the bottom of a wall, the construction joint shall be made 150 mm above the fillet.

A PVC waterstop without centre bulb shall be installed at all construction joints in walls of waterretaining structures. The size of the waterstops shall be 150 mm in walls thinner than 200 mm and 200 mm in walls of 200 mm thickness and more.

PS G 5.5.7.4 **Expansion joints**

Expansion joints shall be formed in positions and in accordance with details as shown on the drawings. All expansion joints shall be formed with an approved closed cell polyethylene fill material similar to "SPV 120" as supplied by Sondor, with a single part polyurethane sealant similar to Silkaflex – PRO 2HP as supplied by Sika. Rearguard S-type PVC waterstops with centre bulbs shall be installed under floors and Hydrofoil PVC waterstops with centre bulbs in walls, as shown on the drawings.

All sealants, fill material and waterstops shall be installed strictly in accordance with the specification of the manufacturers and to the satisfaction of the Engineer. The sealant shall be installed in one operation and jointing to already hardened sealant will not be permitted.

PS G 5.5.9 Adverse Weather Conditions

Add the following to G 5.5.9.1:

No material having a temperature of below 5 °C shall be used for concrete, and no concrete shall be deposited when the ground or air temperature is below 2 °C. Furthermore, if the air or ground temperature is likely to fall below 2 °C within twelve (12) hours after depositing of concrete, no concreting shall be done without the written consent of the Engineer. If such consent is given the Contractor shall heat the aggregate stockpiles and mixing water, and defrost the formwork and reinforcement.

PS G 5.5.10 Concrete Surfaces

Add the following to G 5.5.10.1:

Concrete surfaces under screeds, granolithic floor finishes or benching, and surfaces of strip foundations and footings shall be brought up to a plane, uniform surface with a suitable screed board.

PS G 5.5.10.4 Wood-floated finish

Where wood floating is specified or scheduled, the surface shall first be given a finish as specified in G 5.5.10.1 and after the concrete has hardened sufficiently, it shall be floated to a uniform surface free from trowel marks. The screeded surface shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screed marks.

PS G 5.5.10.5 Steel-floated finish

Where steel floating is specified or scheduled, the surface shall be treated as specified in PS G 5.5.10.4 except that, when the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the screeded surface shall be steel-trowelled under firm pressure to produce a dense, smooth, uniform surface free from trowel marks.

PS G 5.5.11 Watertight Concrete

Substitute G 5.5.11 with the following:

PS G 5.5.11.1 General

All structures that are designed to retain water or to keep water out, shall be regarded as watertight structures.

PS G 5.5.11.2 Requirements and tests for watertightness of structures

The completed structure shall be watertight, and the quality and finish of the work shall be such that no after-treatment of the work such as plastering or cement wash is necessary to ensure compliance with this requirement.

The works will not be certified complete until the structures enumerated in PS G 5.5.11 has been proved by testing to be watertight.

Upon completion of construction and when so agreed by the Engineer, the structure shall be filled by the gradual admission of water until, the water level reaches the designed maximum level. The water level shall then be carefully noted and recorded by the Engineer in relation to a fixed bench mark, and the structure shall be allowed to remain filled for a period of two (2) weeks or such longer time as may be required to permit complete saturation of the concrete. During this period, readings will be taken by the Engineer and the results so obtained will be available for the information of the Contractor.

At the end of this period more water shall be added, if necessary, to bring the water level back to the designed maximum level and the water shall be left undisturbed for a period of at least four (4) days during which time the level shall again be recorded by the Engineer at regular intervals. The structure shall be considered to be watertight if the drop in water level does not exceed 6 mm in 96 (ninety six) hours in the case of a roofed structure and if no leakage is apparent.

The acceptable drop in level in the case of an unroofed structure shall be such that it allows for normal evaporation during the time of the test.

If appreciable leakage is evident at any stage of the filling or testing or if, in the opinion of the Engineer, the degree of water-tightness is unsatisfactory, the Contractor shall, when so ordered by the Engineer, discontinue the test immediately and at his own expense take approved steps to rectify the work. The work of rectification shall be continued assiduously until, on repetition of the test procedure, a satisfactory test result is obtained and the degree of water-tightness is acceptable.

The Engineer shall have the right to retest the structure before the expiry of the period of maintenance and the results of these tests will be made available to the Contractor. If these tests indicate to the Engineer that the degree of water-tightness is unsatisfactory, the Engineer (before issuing the final certificate) will be entitled to order the Contractor to rectify the work at his own expense in such a manner as will cause least interruption to the running of the works and will ensure that the degree of water-tightness of the structure is satisfactory.

Backfilling around structures shall not commence until a satisfactory test result has been obtained.

The water-tightness of the dry well of the pump station shall be monitored visually until the end of the defects liability period. If any damp penetration from the outside is noticed, the Contractor shall take immediate remedial steps.

The Engineer shall have the right to retest the structure before the expiry of the period of maintenance, and the results of these tests will be made available to the Contractor. If these tests indicate to the Engineer that the degree of water-tightness is unsatisfactory, the Engineer (before issuing the final certificate) will be entitled to order the Contractor to rectify the work at his own expense in such a manner as will cause least interruption of the water supply to consumers and will ensure that the degree of water-tightness of the structure is satisfactory. Concrete mix design requirements for water retaining structures:

- 8 1 8
- Minimum Cementious Content

 $= 325 \text{ kg/m}^3$

- Maximum water / cement ratio = 0.55 (for Portland Pumvized fuel ash cement or CEM 1 cement with p.f.a. = 0.5)
- Maximum Cementious Content

 $CEM 1 + slag + 400 \text{ kg/m}^3$

CEM 1 + p.f.a. + 450 kg/m^3

• Concrete mix to contain minimum of 4 kg/m³ XYPEX Admix or similar approved to suppliers specification.

PS G 5.9 JOINING NEW CONCRETE TO EXISTING

Where partial demolition is required for extension work to existing structures, the contact face shall be cut to predetermined line and level, and any loose and fragmented material shall be removed, and projecting steel cleaned and bent as directed by the Engineer. Where partial demolition is not required but extension work only, the contact surface shall be scabbled and cleaned of all dirt and loose particles.

If dowels are required, they shall be installed in holes drilled into the existing structure, in accordance with the details shown on the drawings, and secured by means of an approved type of epoxy bonding compound such as Epidermix 372 or similar.

Fresh concrete shall be bonded to the old concrete with an approved type of epoxy bonding compound, such as Epidermix 344 or similar.

G 8 MEASUREMENT AND PAYMENT

G 8.1 MEASUREMENT AND RATES

PS G 8.1.1 Formwork

Delete the following in G 8.1.1.3(c):

"and for different prop heights for beams and slabs".

PS G 8.1.3 Concrete

Add the following to PS G 8.1.3.1(d):

Strip foundations and encasement of pipes shall be cast directly against the sides and bottoms of excavations. No payment shall be made for additional concrete in over-break.

Delete the full stop at the end of G 8.1.3.3(a) and add the following:

"and special steps necessary before depositing concrete during cold weather, as prescribed in PS G 5.5.9".

PS G 8.3.2 High-Tensile Welded Mesh Unit : m²

Add the following to G 8.3.2:

The rate shall include for overlaps and wastage.

G 8.4 SCHEDULED CONCRETE ITEMS

PS G 8.4.4 Unformed Surface Finishes Unit : m²

Add the following to G 8.4.4:

The concrete surface finishes under screeds, granolithic finishes or benching as prescribed in PS G 5.5.10 shall not be measured separately. The rates for the related concrete items shall also cover the cost of these surface finishes.

The rate shall cover the cost of the provision of concrete (made from ordinary Portland cement, unless otherwise scheduled), mixing, testing, placing, compacting, the forming of stop-ends and unforeseen construction joints, striking-off or levelling as applicable, trowelling and curing and repairing where necessary, together with the cost of all parts of formwork in contact with the concrete and the necessary bearers, struts, and other supports, plus the layout and plant necessary to erect and strike such formwork.

PS G 8.5 **JOINTS****Unit : m**

Add the following to G 8.5:

Only construction joints with PVC water stops shall be measured separately. The cost of all other construction joints shall be deemed to be included in the rates for the relevant concrete items.

PS G 8.9 TESTING STRUCTURES FOR WATER-TIGHTNESS Unit : Sum

The rate shall cover the cost of all equipment and labour necessary to test the structure for watertightness as described in PS G 5.5.11.1, including the supply of water and filling such structure.

No additional payment will be made for re-testing the structure for water-tightness after the repair of leaks.

PS G 8.13 GROUT PIPES INSTALLED BY THE MECHANICAL CONTRACTOR Unit : No

The rate shall cover the cost of scabbling, cleaning and preparing the concrete surface, providing an approved non-shrink epoxy grout, placing and ramming of it solidly into all voids, formwork and finishing to a smooth watertight surface.

PS G 8.14 JOIN NEW CONCRETE TO EXISTING

a)	Partial demolition (describe)	 Unit : Sum

- c) Steel dowels Unit : No

The rate for (a) shall cover the cost of partial demolition as described, and of exposing, cleaning, cutting and bending the existing reinforcement, as well as repairing the concrete surface that is to be retained and disposing of waste material.

The rate for (c) shall cover the cost of drilling for and supplying and installing the steel dowels, as well as the cost of supplying and applying the epoxy bonding compound.

PROJECT SPECIFICATION

SABS 1200 GA : CONCRETE (SMALL WORKS)

- GA 3 MATERIAL
- GA 3.2 CEMENT
- PS GA Applicable Specifications

Substitute G 3.2.1 with the following:

All cement types shall comply with the requirements of SABS EN 197-1.

For this contract only CEM 1 portland cement shall be used in structural concrete.

PS GA 3.2.2 Storage Of Cement

Add the following to GA 3.2.2:

Separate storage facilities shall be provided for the various type of cement specified.

Consignments of cement shall be used in the same sequence as that in which they are delivered to site. No cement shall be used which has been stored on site or a longer period than six (6) weeks. All cement so stored for a longer period than six (6) weeks, all cement damaged in any way, and all cement which does not comply with the specification, shall be removed immediately and permanently from site.

GA 5 CONSTRUCTION

GA 5.2 FORMWORK

PS GA 5.2.1 Classification Of Finishes

Add the following to GA 5.2.1:

The following surface conditions are required on the finished concrete:

a) Rough

Concealed surfaces and surfaces lower than 100 mm below finished ground level.

b) Smooth

All surface finishes not classified as rough in paragraph a) shall be classified as smooth. All exposed arrises unless otherwise indicated on the drawings, shall be chamfered 20 mm x 20 mm by means of triangular fillets fixed to the formwork.

GA 8 MEASUREMENT AND PAYMENT

GA 8.1 MEASUREMENT AND RATES

PS GA 8.1.2 Reinforcement

Substitute GA 8.1.2 with the following:

Reinforcement shall be measured and paid for by mass. Valuation of variations shall not be applicable.

No allowance shall be made for individual reinforcement bar sizes.

GA 8.2 SCHEDULED FORMWORK ITEMS

PS GA 8.2.3 Narrow Widths Unit : m

Substitute GA 8.2.3 with the following:

No payment shall be made for narrow widths.

GA 8.3 SCHEDULED REINFORCEMENT ITEMS

PS GA 8.3.2 High-tensile Welded Mesh Unit : kg

Substitute GA 8.3.2 with the following:

Welded mesh shall be measured and paid for by mass.

GA 8.4 SCHEDULED CONCRETE ITEMS

PS GA 8.4.1 Prescribed Mix Concrete Unit : m³

Add the following to GA 8.4.1:

The rate for installation of concrete slabs shall include for the compaction of the in situ material to 90 % of MAASHTO density.

PROJECT SPECIFICATION

SABS 1200 HA : STRUCTURAL STEELWORK (SUNDRY ITEMS)

HA 1 GENERAL

HA 1.1 Paint Spec

1.All steel to be cleaned and prepared for paintwork as defined in the International Standards ISO 8501-1: 1988 & Sa 2,5 ISO 880 1-1: 1988. 30-50 micrometers blast profile.

2. Paint System for Structural Mild Steel/New Steel:

- a. PRIMER: Interzinc 52-Organic Zink Rich Epoxy Primer (Code IZP 52). One 100 micron coat applied by airless/conventional spray/brush/roller.
- b. INTERMEDIATE COAT: Interseal 010 H/B Recoatable Micaceous Iron Oxide (Code IEP 10). One 100 micron coat applied by airless/conventional spray/brush/roller.
- c. FINISHING: Interthane 99 (Code IUP). One 50-75 micron coat applied by airless/conventional spray/brush/roller.
- d. Similar guaranteed and approved products may be used.

3. Steel Grade 300W.

HA 5 CONSTRUCTION

PS HA 5.2.6 Handrails

Substitute the first sentence of HA 5.2.6 with the following:

Handrails shall be of the tube and sphere type and shall be manufactured by an approved firm specialising in such works.

Handrails shall be 900 mm high and shall consist of a handrail and a knee-rail, both manufactured of steel tubing of nominal thickness 2,6 mm and of nominal outside diameter of at least 34 mm.

Stanchions shall be manufactured preformed in one piece and shall be of steel tubing of nominal thickness of 2,6 mm and of nominal outside diameter of at least 42 mm. The bases of the stanchions shall be manufactured of 150 mm x 75 mm x 12,5 mm flat bars and shall be preformed to suit the situation in which they are to be installed (i.e. for platform- or side-mounting, and for horizontal- or sloped-mounting on concrete or steel), and the stanchion spheres shall be preformed to suit right angled or other angled intersections), all as shown on the drawings.

Stanchions shall be spaced at intervals not exceeding 1,5 m and shall be fixed with two M16 galvanised bolts, washers and nuts each. All joints shall be welded.

Handrails shall be GRP after manufacture.

See paint specification above (HA 1.1).

PS HA 5.2.11 Ladders

Add the following to HA 5.2.11:

Ladders shall be GRP or equivalent after manufacturing.

See paint specification above (HA 1.1).

PS HA 5.2.12 Prefabricated Open Grid Floors

Substitute the second sentence of HA 5.2.8.1 with the following:

This shall be similar to the "U"-grid type grid floors manufactured by Armco Superlite and hotdipped galvanised.

PS HA 5.2.13 Floor plate Floors

Substitute HA 5.2.13 with the following:

Floor plate floors shall consist of 8 mm thick checker plate..

See paint specification above (HA 1.1).

HA 8 MEASUREMENT AND PAYMENT

PS HA 8.3.6 Corrosion Protection

Substitute HA 8.3.6 with the following:

Corrosion protection shall not be measured separately. The cost thereof shall be included in the rate for the related item.

PS HA 8.3.7 Stantions Unit : No

The rates shall cover the cost for the supply of all material, manufacturing, galvanising, handle, deliver to site, off loading, erection and grouting. The rate shall also cover the cost for all bolts and nuts, washers, cutting to size, etc.

PS HA 8.3.8 Steel Basket Unit : No

The rate shall cover the cost of manufacturing, supply of all materials (stainless steel) delivery on site and installation. The rate shall cover the cost of all bolts and nuts, washers, cutting to size, etc.

PROJECT SPECIFICATION

SABS 1200 L : MEDIUM PRESSURE PIPELINES

L 3 MATERIAL

PS L 3.1 GENERAL

Substitute the first sentence of L 3.1 with the following:

Types and classes of pipes shall be as scheduled.

PS L 3.2 FC PIPES AND SPECIALS

Substitute the last sentence in the first paragraph of L 3.2 with the following:

All FC pipes shall be double bitumen-dipped and all fittings except couplings shall be plain ended cast iron fittings suitable for FC COD joints.

PSL 3.3 Ci Pipes Fittings and Specials

Add: "All cast iron fittings to be lined with cement mortar or coated with Rilsan or fusion-bonded epoxy".

PS L 3.8 JOINTING MATERIALS

PS L 3.8.1 FC Pipes

Add the following to L 3.8.1:

Cast iron fittings, except valves, may be jointed to FC pipes with FC 3-ring sleeve-type couplings. If the pipe differs from the class of the Cast iron fittings, class to class adaptors shall be used and the cost shall be included in the cost of the fitting.

PS L 3.8.4 Loose Flanges

Substitute the first sentence of the last paragraph of L 3.8.4 with the following:

Bolts and nuts shall comply with the requirements of SABS 135.

L 3.9 CORROSION PROTECTION

PS L 3.9.1 Cast Iron Pipes and Fittings

Substitute L 3.9.1 with the following:

All internal surfaces shall be grit blasted to SABS 2¹/₂ standard and then coated with Copon EP 2300 epoxy paint to a minimum thickness of 350 micron.

PS L 3.9.2.1 Steel pipes of nominal bore up to 150 mm

Add the following to L 3.9.2.1:

The requirements of PS L 3.9.2.2 shall apply mutatis mutandis.

Add the following to L 3.9.2.2:

All mild steel pipes under this contract shall be treated in accordance with L 3.9.2.2(b)(2) on the inside and the outside, with a polyamide-cured epoxy system similar and equal to Copon EP 2300 or Amercoat 385. The Contractor shall furnish the Engineer with certificates of tests in accordance with L 7.4.

Substitute "250 µm" in L 3.9.2.2(b)(2) with "350 µm".

PS L 3.9.5 Joints, Bolts, Nuts And Washers

Substitute L 3.9.5 with the following:

All joints, bolts, nuts and washers shall be stainless steel.

PS L 3.10 VALVES

Delete the contents of this Clause and replace by :

"Two types of valves are acceptable:

- a) Wedge gate type valve,
- b) Resilient seal gate type valve.

Valves shall comply with the requirements of SABS 664-1989 as amended, and shall bear the SABS quality mark. A test certificate as per Clause 3.5.20 of compliance with SABS 664 will be acceptable.

Valves shall display the following features;

- A minimum of 250 microns coating of fusion bonded epoxy or Rilsan Nylon 11.
- Class 16
- Anti-clockwise closing
- Non- rising spindle type with cap.
- May have spigotted, socketted or flanged end connections. When flanged valves are specified, the drilling shall be to Table 16/11 of BS 4504".
- In the case of resilient seal valves, valve gates shall be fully EPDM rubber lined, internally and externally and the spindle shall be Grade 316 Stainless Steel or equivalent with a double o-ring seal."

PS L 3.10.1 Gate Valves

All gate valves shall comply with the requirements of SABS 664 and shall be suitable for a working pressure of 1,6 MPa. All gate valves must be supplied with a square spindle nut, suitable to be used with a valve key.

Gate valves shall have spigot ends unless shown differently on the drawings and shall open clockwise. The direction for opening and closing shall be permanently displayed on the valves. Valves shall have non-rising spindles.

Compression shut-off valves with rubber protected gate and smooth finish without recess inside, may be used.

All flanged gate valves shall be drilled according to SABS 1123 Table 1600/3. Pipes shall not be tested against a closed valve. Thrust blocks for test sections shall be approved by the Engineer prior to testing of pipes.

All internal surfaces shall be grit blasted to SA 2¹/₂ standard and then coated with COPON EP 2300 epoxy paint to a minimum thickness of 350 micron.

Valves shall be AVK type or similar approved.

PS L 3.10.2 Butterfly Valves

Butterfly valves shall be of the wafer pattern to be installed between two flanges in the water main with either short collar repair couplings or Viking Johnson couplings.

The valves shall be fitted with a gearbox with a stainless steel shaft. The body shall be clad with rubber.

Valves shall be similar to the "Compact", AVK type or similar approved with a working pressure of 1,6 MPa. Pipes shall not be tested against closed butterfly valves.

PS L 3.10.3 Fire Hydrants

Fire hydrants shall be of the screw-down underground type and shall be suitable for a working pressure of 1,6 MPa with a 65 mm inlet. The outlet shall be 63 mm dia gun-metal with London Vee screw thread with cap top and chain. It shall open clockwise with a square spindle nut of the same size that is specified for the gate valves.

The fire hydrant shall be bolted to the flanged branch of a cast iron hydrant tee.

PS L 3.10.4 Air Valves

Air valves for potable water shall be suitable for a working pressure of 1,6 MPa. All air valves shall be double action air valves of Vent-o-mat series RBX (for water pipelines) and RGX (for sewer pipelines).

On a 250 mm dia or smaller main a 50 mm air valve shall be fitted and a 80 mm air valve on diameters larger than 250mm.

Valves shall be AVK type or similar approved.

All air valve installations shall be supplied with an isolating valve and distance piece between the air valve and the branch of the tee, and other fittings shown on the drawings.

Double-acting air valves shall have large as well as small orifices. The large orifice shall have a rubber bed, and the small orifice a brass bed on which the balls can shut. Double-acting air valves shall be flanged and supplied with flanged isolating valves. Air valves shall be designed to remain open until all the air has escaped and shall not close due to the speed of the escaping air.

T-pieces for air valves shall be as follows:

Main pipe mm dia Branch mm dia

63	63
75	75
90	90
110	110
160	160
200	200
250	200
300	200
350	250
400	300
450	300
500	350
600	400
700	500
800	600
900	600
1 000	700

PS L 3.10.5 Scour valves

Scour valves shall be suitable for a working pressure of 1,6MPa.

Scour valves shall consist of a flanged gate valve of 100 mm dia coupled horizontally to a flanged cast iron scour valve tee. The outlet pipe shall be a 100 mm nominal diameter galvanised steel pipe with 4 mm wall thickness. The outlet shall discharge above ground level in the direction of the fall of the natural ground surface, perpendicular to the main pipe. The outlet end of the pipe shall be cut diagonally and supplied with a cover that is hinged and that will remain closed unless it is forced open by the water. The hinge shall be non-removable.

Scour valves on 75 mm dia pipes shall be the same as above except that a 75 x 75 mm dia fire hydrant tee shall be used and that the gate valve and outlet pipe shall both be 75 mm diameter.

PS L 3.10.6 Water Meter

Technical requirements for the meters

The bulk water meter shall be of the free-flow type manufactured from corrosion resistant material in a cast iron casing. A distance of 10 times the diameter of the pipe before and 5 times the diameter after the water meter must be kept free of any obstructions such as bends, valves, reducers, etc.

The flow reading shall be given on a dial face and totalising shall occur by means of a roller counter and shall be accurate within ± 2 %.

The meter shall be manufactured in such a way that all moving parts can be removed and replaced from the top without removing the whole meter. Replacement parts should be freely available. Each water meter installation shall be supplied with a gate valve on the upstream side of the water meter at a distance of 10 times the diameter of the pipe. This gate valve shall be provided for under the relevant item in the schedule of quantities.

The meter shall have a connection point to send flow data by signal to a computer, similar to that of a Meinecke meter.

Installation of meter

The meter shall be installed by a person approved by the supplier in order to validate the guarantee.

All accessories for the complete installation shall be supplied by the Contractor.

All metal work shall be painted according to specifications after the testing and completion of the installation.

PS L 3.10.7 Reflux Valves

Reflux valves shall be suitable for a working pressure of 1,6MPa and, unless otherwise indicated, shall be flanged.

The casing and flap shall be manufactured from close-grained cast iron with a brass face on the flap that close onto a corresponding brass plane in the casing.

The hinge pin shall swivel freely in bearings on both sides of the casing.

Cone-shaped rubber-seal reflux valves with stainless steel cones may be used if approved by the Engineer.

Single door reflux valves complying with the requirements of SABS 1551 - Part 2 shall be used for sewer pump lines.

PS L 3.10.8 Control Valves

The casing of the control valves shall be manufactured from close-grained cast iron and the flanges shall be drilled according to SABS 1123 Table 1600/3.

The valves shall be of the diaphragm single bed ball-type controlled hydraulically by a pilot valve. The main valves shall be fixed on three sides with single removable bronze beds and synthetic rubber disks with a rectangular cross-section, with disk clamps. No packing material will be allowed and repairs must be done without removing the valve from the pipeline.

L 3.11 MANHOLES AND SURFACE BOXES

PS L 3.11.4 Step Irons

Substitute L 3.11.4 with the following:

Step irons shall consist of polypropylene coated 12 mm high tensile steel such as Calcamite or similar. The installation of the step irons shall be in accordance with the specification of the manufacturer.

PS L 3.11.6 Surface Boxes

Add the following to L 3.11.6:

The type of cast iron boxes shall be as specified on the drawings.

L 4 PLANT

PS L 4.3 TESTING

Add the following to L 4.3

The Contractor must ensure that the test equipment is in good order and that it is calibrated.

L 5 CONSTRUCTION

L 5.1 LAYING

PS L 5.1.1 General

Add the following to L 5.1.1:

Where fibre cement pipes are built into structures as indicated on the drawings, the length of pipe that is built in, must not exceed 600 mm.

In order to facilitate for movement between structures, a length of fibre cement pipe of a minimum of 600 mm must be connected to the section that is built into the structure or to the pipe, as indicated on the drawings.

PS L 5.1.4.2 **Deflection**

Substitute "1,5° per joint in the case of FC pipes" in L 5.1.4.2 with "3° per joint in the case of FC pipes with FC couplings and 4° in the case of FC pipes with cast iron short collar repair couplings".

The maximum deflection for a uPVC/Ductile iron pipes with uPVC/Ductile iron couplings is 3°.

L 5.6 VALVE AND HYDRANT CHAMBERS

PS L 5.6.1 General

Substitute the first sentence of L 5.6.1 with the following:

The drawings of valve and hydrant chambers which are bound into the document shall supersede the corresponding drawings in the standard specification.

PS L 5.9 LIFTING AND RELAYING OF EXISTING PIPES

Add the following to L 5.9:

Existing water pipes at certain points shall be lifted and relayed deeper in the same position. The Contractor must make timeous arrangements with the local authority.

PS L 5.11 STAND PIPES

Stand pipes shall comprise a CI saddle, of size suitable for the water main, drilled and tapped 28 mm; length of 28 mm copper pipe ending 750 mm above ground level; 25 mm brass hose biptap; all bends, fasteners and other fittings necessary; standpipe fixed to wall of building or fixed to and including 100 mm diameter wooden pole 1 400 mm long firmly installed in the ground.

PS L 7 TESTING

PS L 7.3 STANDARD HYDRAULIC PIPE TEST

PS L 7.3.1 **Test pressure and time of test**

Add the following to L 7.3.1.1:

Pipes shall not be tested against isolating valves. Special blank flanges or end caps, fully anchored, shall be provided for testing.

Substitute L 7.3.1.2 with the following:

The test pressure for field testing shall be 1,25 times the rated maximum working pressure of the pipe e.g. class 12 uPVC pipe (1,2 MPa rated working pressure) shall be tested to 1,5 MPa.

Substitute L 7.3.1.3 with the following:

The test pressure applied according to L 7.3.1.2, must, with allowance for any level differences along the pipeline, be such that the pressure at any point in the pipeline will be at least 1,0 times and not more than 1,5 times the rated working pressure of the pipe.

PSL 7.3.3 Permissible Leakage Rates

Delete in Clause (a) the figure of "0,075" and replace by :

"0,0161 for Class C, AC pipes 0,0186 for Class D, AC pipes"

Add : "See standard drawings PSL 5/1, PSL 5/2, PSL 5/3 and PSL 5/4 for tables of permissible leakage rates for uPVC, mPVC, AC and HDPE pipes. When testing reticulations made up of different types of pipes, the arithmetical sum of the respective calculated leakage rates for the various pipe types, diameters and lengths shall be taken as the maximum allowable leakage. Alternatively the Contractor may request that each section be tested separately in which case the additional tests, witnessing and connecting fees shall be at his expense."

PSL 7.3.4 Witnessing of a Successful Leakage Test by an Official of The Water Division

The Contractor shall take note that the Engineer's Representative is required to ensure that an official of the Water Division witnesses a successful leakage test of the whole new reticulation being put forward for acceptance. Visits to site of this official to witness the test after the initial visit will be charged at a rate determined by the Municipal Water Division.

This amount shall be payable directly to the Municipality by the Contractor prior to each subsequent visit.

PSL 7.3.5 **Removal of Test Equipment**

Upon the successful completion of the leakage test the new reticulation will be deemed to be Municipal property and the Contractor shall not carry out any work on the pipes apart from the disconnection of his pump (but not his flange and pipe system from the hydrant tee), the completion of the backfilling to the pipeline and construction of the hydrant and valve chambers. The Water Division will connect in the new reticulation as soon as possible and the Contractor shall supply such materials, pipes and specials as detailed by the Engineer. The completion of backfill at the connection points and the surface restoration/reinstatement shall be carried out by the Contractor.

PSL 7.5 Defects Liability Period

Should leaks or defects develop during the Defects Liability Period they shall be rectified by the Municipality at the Contractor's expense. This will include the cost of re-testing and subsequent sterilization. During the Defects Liability Period the Municipality may carry out further pressure

tests on the whole or part of the new reticulation and any necessary remedial work shall be carried out at the Contractor's expense.

PS L 8 MEASUREMENT AND PAYMENT

PS L 8.2 SCHEDULED ITEMS

PS L 8.2.3 Extra-over 8.2.1 For The Supplying, Fixing And Bedding Of Valves Unit : No

Add the following to L 8.2.3:

Valves are measured and paid for per item, complete with the inclusion of the cutting of pipes, couplings, extra excavation and all extra material and labour that is required, including tees, fittings, isolating valves (e.g. under air valves), complete as shown on the drawings. Flanged distance pieces shall be included in the rate for fire hydrants.

PS L 8.2.5 Supplying And Fixing Of Pipes And Specials Unit : Sum

Add the following to L.8.2.5:

The rate shall include the supply and fixing of the steel and cast iron pipes, fittings and jointing as listed in Schedule "X" and Bill of Quantities, as well as the lay, fix and cost of the items and also the corrosion protection as specified.

DG I 0 0 10	T	X7 I T	T T •4	
PS L 8.2.10	Temporary	valves, Etc.	 Unit :	Sum or No

Substitute L 8.2.10 with the following:

Temporary valves, end caps or blank flanges testing shall be included in the rate for the laying of pipes except where separate items are included in the schedule of quantities.

PS L 8.2.11 Anchor/Thrust Blocks And Pedestals Unit : m³

Anchor and thrust blocks shall be measured per cubic metre concrete and the tendered rate shall include for all formwork and reinforcement (where specified) for the required dimensions.

PS L 8.2.13 Valve And Hydrant Chambers, Etc Unit : No

Add the following to L 8.2.13:

The rate shall cover the cost for the supply and installation of air valve chambers complete as shown on standard detail drawing bound into this document. For scour-valve chambers it must also cover the cost of the supply and installation of the scour outlet as described in PS L 3.10.4 and indicated on the drawings.

PS L 8.2.14 Manholes Unit : No

Add the following to L 8.2.14:

Overflow boxes and pipe outlets shall, as in the case of manholes, be measured and paid for per number and shall be all inclusive as shown on the drawings.

PS L 8.2.15	Pipeline Markers	Unit : I	No
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The rate shall include the costs of all labour, material and equipment necessary to install the pipeline markers to the following specification;

A 90 mm dia MPVC pipe filled with concrete. The pipes shall have a total length of 1,5 m with height 1,0 m above ground level.

PS L 8.2.16 Cut Into And Connect To Existing Mains Unit : No

The cutting into existing mains shall be measured by the number of each type and diameter of pipe cut into.

The tendered rate shall include full compensation for all arrangements with the relevant authorities, isolating the main, cutting into the main to accommodate the connecting fitting, dewatering, excavating, removing of excess material, taking steps to prevent the ingress of soil, stones and other material into the main as well as all material and labour to connect the pipe.

PS L 8.2.17 Stand Pipes Unit : No

Separate items will be scheduled for each diameter and type of water main.

The tendered unit rate shall cover the cost of the all material described in PS L 5.11, and of the plant and labour necessary for the complete construction of a stand pipe.

PS L 8.3	WATER METERS	Unit :]	No
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The rate for water meters shall cover the cost of the supply of a flanged water meter, with the necessary couplings to be connected to the appropriate pipes, the installation, testing and putting into operation of the complete meter.

PS L 8.4	CONTROL VALVES	
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The rate for control valves shall cover the cost of the provision of a flanged control valve with a flanged gate valve of the same diameter, with the required fittings, couplings, piping, etc. to be connected to the appropriate pipes, as well as for the pilot valve, copper pipe, etc. and for the complete installation, testing and putting into operation of the valve.

SABS 1200 LB : BEDDING (PIPES)

LB 1 SCOPE

PS LB 1.1 SCOPE

Add the following to LB 1.1:

This specification also covers the bedding required for electric cables and cable ducts.

LB 3 MATERIALS

PS LB 3.1 SELECTED GRANULAR MATERIAL

Substitute LB 3.1 with the following:

Selected granular material shall be an aggregate, sand or granular material, all of a non-cohesive nature and free from any organic material, of which the grading analysis shows 100 % passing a 13,2 mm sieve and not more than 5 % passing a 0,075 mm sieve.

In very wet conditions and if so ordered by the Engineer, a non-plastic crushed material with the specification as stated underneath should be used for bedding cradle.

a) Grading

Sieve size (mm)	% going t	hrou	ıgh
19,0	10	00	
13,2	84	-	100
9,5	70	-	84
4,75	45	-	65
2,36	29	-	47
1,18	19	-	33
0,600	13	-	25
0,300	10	-	18
0,150	6	-	13
0,075	4	-	10

b) Crusher value

The aggregate crushing value, calculated at minus 13,2 mm plus 0,5 mm fraction, may not exceed 29.

PS LB 3.2 SELECTED FILL MATERIAL

Substitute LB 3.2 with the following:

The requirements of PS LB 3.1 shall apply mutatis mutandis.

PS LB 3.3 BEDDING

Add the following to LB 3.3:

All PVC pipes shall be classified as flexible pipes and shall be laid according to SABS 1200 drawing LB-2. All MS, D1 and FC pipes shall be classified as rigid pipes and shall be laid on a Class C bedding, except water connections which shall be classified as flexible pipes. Cable bedding is specified separately.

PS LB 3.5 PROTECTIVE CONCRETE SLABS FOR CABLES

Protective concrete slabs shall be precast concrete slabs with dimensions of $1\ 000\ \text{mm}\ x\ 350\ \text{mm}\ x\ 50\ \text{mm}$, and shall comply with the requirements of SABS 1200 G for 25 MPa strength concrete. The slabs shall be reinforced with three 8 mm diameter high-tensile reinforcing bars in both directions.

PS LB 3.6 POLYETHYLENE WARNING TAPE

The danger tape shall be manufactured from Grade XJF 46/60 polyethylene at least 0,4 mm thick and with a nominal width of 150 mm, and which is completely impregnated with a light yellow pigment reasonably matching colour no B26 of SANS 1091.

A black triangle and lighting flashes for electricity, as depicted on sign WW7 of SABS 1186, as well as the word "DANGER " shall be printed clearly and permanently onto the tape. The whole pattern shall be repeated every 1 m.

The quality of all materials employed shall be such as to ensure the permanency of the tape under all environmental and soil conditions, as well as the stability of the orange pigmentation and the lettering and warning symbols.

LB 5 CONSTRUCTION

LB 5.1 GENERAL

PS LB 5.1.4 Compacting

Substitute "90 % of MAASHTO" in LB 5.1.4 with "93 % of MAASHTO (100 % for sand)".

LB 8 MEASUREMENT AND PAYMENT

LB 8.1 **PRINCIPLES**

PS LB 8.1.1 Supply Of Bedding Materials Measured Separately

Add the following to LB 8.1.1:

Payment for bedding material and selected fill material is only made if the selected trenchexcavation material cannot be used in the same position as bedding material but has to be obtained from another part of the site of works or designated borrow pits, or from commercial sources.

PS LB 8.1.4 Separate Items For Cradle And Blanket

Substitute LB 8.1.4 with the following:

No distinction shall be made as regards material for the bedding cradle and selected fill blanket, and the material shall comply with the requirements for material for bedding cradle.

PS LB 8.1.5 Disposal Of Displaced Material

Add the following to LB 8.1.5:

Surplus displaced material shall be dumped and levelled at the spoil site.

LB 8.2 SCHEDULED ITEMS

LB 8.2.2 Supply Only Of Bedding By Importation

PS LB 8.2.2.3 From commercial sources

Add the following to LB 8.2.2.3:

c) Bedding for wet conditions Unit : m³

The requirements of PS LB 3.1 for bedding in wet conditions must be noted. Payment will only be applicable if ordered by the Engineer.

PS LB 8.2.2.4 From stockpile (provisional)

a)	Selected granular material	 Unit : m ³

b) Selected fill material Unit : m³

The rate shall cover the cost of obtaining, handling and transport regardless the distance, of the required bedding material from the stockpile, the delivery thereof at positions that are spaced along the trench in such a way as suits the working method of the Contractor, as well as the removal of material displaced by this importation within a free-haul distance of 0,5 km.

PS LB 8.2.5 Overhaul Of Material For Bedding Cradle And Selected

	Fill B	Blanket	Unit : m ³ .km	
	Substitute LB 8.2.5 with the following:			
	a)	Limited overhaul	Unit : m ³	
	b)	Long overhaul	Unit : m ³ km	
	Excep DA 8	pt that the volume is calculated according to LB 8.1.3, the requirements of D 8.3.3, as applicable, shall apply for overhaul.	8.3.6 or	
PS LB 8.2.6	Beddi	ing For Cables Un	it : m trench	
	The tendered rate for cable bedding shall provide for the placing of material from any position along the trench within 50 m, the preparation and bedding for cables for the complete trench length			

along the trench within 50 m, the preparation and bedding for cables for the complete trench length, regardless of the number of cables. The tendered rate shall also make provision for the fact that long trenches have to be prepared (as specified PS DB 8.3.2), for all necessary arrangements with the electrical contractor to lay the cables, for the installation of the fill blanket and backfilling on the same day on which the cables are installed.

PS LB 8.2.7	Additional Bedding Unit : m trench
	The rate for additional bedding for electric cables is extra over LB 8.2.1 and LB 8.2.2 and provides for the preparation of each additional bedding level for cables, concrete slabs and protective layers over and above the preparation of the initial bedding level in the same trench.
PS LB 8.3	PROTECTIVE CONCRETE SLABS FOR CABLES Unit : No
	The provisions of G 8.6 shall apply mutatis mutandis.
PS LB 8.4	POLYETHYLENE WARNING TAPE Unit : m
	The rate shall cover the cost of the supply, handling and placing of the tape.

PROJECT SPECIFICATION

SABS 1200 LC : CABLE DUCTS

LC 3 MATERIALS

PS LC 3.1 DUCTS

Add the following to LC 3.1:

Class 6 uPVC pipes (dia 110 mm or 160 mm) shall be used as ducts for electric cables under streets. Ducts for Telecom Namibia shall be of pitch-impregnated fibre pipes.

PS LC 3.1.1 Supply Of Ducts By Telecom Namibia

Notwithstanding any provisions of the contract in terms of which the Contractor is required to provide all materials necessary for the construction of the works, Telecom Namibia will supply the ducts for telephone cables. Consequently, the Contractor's obligations under the contract shall include taking delivery, the construction, completion and maintenance of the works and the provision of all labour, materials (other than those that are to be supplied by Telecom Namibia), plant, temporary works, and everything, whether of a temporary or permanent nature, required in and for such construction, completion and maintenance, so far as the necessity for providing the same is specified in or reasonably to be inferred from the contract.

To assist Telecom Namibia in arranging for the goods to be supplied to suit the Contractor's construction programme, the Contractor shall submit to the Engineer, at agreed intervals, lists of his requirements. These lists shall be submitted at least 6 weeks (or another approved period) in advance of the date by which the goods are required. The Engineer will ascertain in advance the acacACtual dates of delivery of consignments and will advise the ContracACtor who shall adjust his construction programme as necessary to minimise any disruption of his work.

In the event of supply being effected, the ContracACtor shall, provided that appropriate due notice of dispatch has been given, be responsible for taking immediate delivery of such goods as they arrive at the site. He shall be responsible for checking the acACtual deliveries against delivery notes. From the time of taking delivery the ContracACtor shall be responsible for the handling, transportation and storage of the goods and he shall at the same time acACcept the risk of damage to or loss of the goods.

Should any goods reacACh the point(s) of delivery in a damaged or an apparently damaged condition, the ContracACtor shall report this ft to the Engineer, and he shall, before removing the goods from the transport vehicle, to avoid demurrage or similar charges, afford the Engineer reasonable opportunity to inspect such damaged goods.

On receipt of the goods, the Contractor shall issue a receipt to Telecom Namibia in an approved form. The Contractor shall accept full responsibility for checking deliveries and ensuring that the goods supplied to him are in sound condition.

The Contractor's receipt will be deemed to indicate that he has satisfied himself that the goods enumerated on it are in sound condition. Unless the Contractor at the time of receipt advises the Engineer that goods have been short delivered or are defective, and obtains the Engineer's approval to take delivery (which approval will not be unreasonably withheld), no subsequent claim for short deliveries or replacement of damaged goods will be considered by the Engineer.

PS LC 3.2 BEDDING

Substitute LC 3.2 with the following:

The provisions of SABS 1200 LB : Bedding (Pipes) and the relevant project specification shall apply mutatis mutandis and payment shall be made under the appropriate payment clauses of SABS 1200 LB.

PS LC 3.3 BACKFILL

Substitute LC 3.3 with the following:

The provisions of SABS 1200 DB : Earthworks (Pipe Trenches) and the relevant project specification shall apply mutatis mutandis and payment shall be made under the appropriate payment clauses of SABS 1200 DB.

PS LC 3.4 CABLE DUCT MARKERS

Add the following to LC 3.4:

Cable duct markers shall be provided as specified in PS LC 5.10.

LC 5 CONSTRUCTION

LC 5.1 EXCAVATION OF TRENCHES

PS LC 5.1.1 Trench Widths And Depths

Add the following to LC 5.1.1:

Trench widths shall be in accordance with the provisions of SABS 1200 DB : Earthworks (Pipe Trenches).

The minimum depth of cover over ducts shall be 600 mm from the final road level.

PS LC 5.1.3 Excavation Of Trenches At Road Crossings

The minimum depth of cover over ducts shall be 300 mm where construction traffic is liable to cross them. Road crossings shall therefore be constructed after the construction of the roadworks has reached the stage where the required cover is available.

PS LC 5.2 BEDDING AND COMPACTION OF BEDDING

Substitute LC 5.2.1 and LC 5.2.2 with the following:

All ducts shall be laid on a Class C bedding according to the provisions of SABS 1200 LB : Bedding (Pipes). Backfilling shall be according to the provisions of SABS 1200 DB : Earthworks (Pipe Trenches).

PS LC 5.4 BACKFILLING AND COMPACTION

Add the following to LC 5.4:

Road crossings shall be backfilled with sand from designated borrow pits, the site or commercial sources, whichever is applicable, up to underneath the subbase, and compacted to a minimum of 100 % of MAASHTO density.

PS LC 5.8 ROAD CROSSINGS

Substitute "0,5 m" in the last sentence of LC 5.8 with "1,0 m" and add the following:

Ducts for road crossings shall be effectively sealed by means of end caps.

PS LC 5.10 POSITION TO BE MARKED

Add the following to LC 5.10:

The lettering height shall be at least 70 mm.

The positions of ducts shall be marked by means of incisions on top of the kerb. The dimensions of such incisions shall be at least 40 mm long, 3 mm wide and 5 mm deep and the spacing, where more than one incision is required, shall be 20 mm. Ducts for Telecom Namibia crossings and electrical crossings shall be marked with green and red painted incisions respectively.

The draw wire, as specified in LC 5.3.3, shall be secured to a $150 \times 150 \times 150$ mm grade 20 MPa/19 mm concrete marker, which shall be installed with a depth of cover of 50-100 mm below the final level.

PS LC 5.12 DRAW AND JOINT BOXES FOR TELECOM NAMIBIA CABLES

Draw and joint boxes shall be constructed strictly in accordance with the positions and details given on the plans.

LC 7 **TESTING**

PS LC 7.2 COMPACTION TESTS

Substitute LC 7.2 with the following:

The Contractor shall, for at least one out of every five road crossings, submit density tests to the Engineer at his own expenses. The decision as to which road crossing densities shall be tested, rests with the Engineer. The Contractor shall, if such densities fail to meet the minimum requirements, prove at his expense that all the other densities do comply with the specified minimum requirements.

LC 8 MEASUREMENT AND PAYMENT

LC 8.2	SCHEDULED ITEMS
PS LC 8.2.5	Supply, Lay, Bed And Prove Duct Unit : m
	Substitute "GPO" in LC 8.2.5(a) with "Telecom Namibia".
	Add the following to LC 8.2.5(a):
	The rates for the installation of Telecom Namibia distribution ducts parallel to streets shall first be submitted by the Employer to Telecom Namibia for approval. The installation of these ducts will only form part of this contract if approved by Telecom Namibia.
PS LC 8.2.8	Cable Markers Unit : No
	Substitute LC 8.2.8 with the following:
	The rate shall also cover the cost of the end cap and the incisions, concrete marker and draw wire, as specified in PS LC 5.10.
PS LC 8.2.10	Concrete Slabs For Electrical Cable Ducts Unit : m
	The rate shall cover the cost of supplying, bedding and laying of precast 400 x 400 x 50 mm

grade 20 MPa/19 mm concrete slabs above electric cables as shown on the drawings.
SABS 1200 LD : SEWERS

LD 3 MATERIALS

PS LD 3.1 PIPES, FITTINGS, AND PIPE JOINTS

PS LD 3.1 **uPVC Pipes**

Add the following to LD 3.1.5:

uPVC pipes, class 34 (solid wall), shall be used.

PS LD 3.1.3 FC Pipes

Add the following to LD 3.1.3:

Double bitumen-dipped FC pipes and fittings shall be used.

Add the following to LD 3.1.5:

uPVC Class 34 pipes and fittings shall be used.

PS LD 3.1.8 GRP Pipes

Add the following to LD 3.1.5:

GRP pipes must comply with the applicable stipulations in ANSI / AWWA C950 - 88 and must have a suitable flexible joint.

PS LD 3.5 MANHOLES, CHAMBERS, ETC.

PS LD 3.5.2 Precast Concrete Sections

Add the following to LD 3.5.2:

Precast concrete sections with an inside diameter of at least 1 000 mm shall be used for manholes Rocla or similar approved.

Where the angle between the inlet and outlet of the manhole deviates by more than 45 $^{\circ}$ from the straight or where more then one inlet enter a manhole, the invert level of the outlet shall be 30 mm lower than the lowest inlet invert level.

Sectional spun concrete cylinders shall have been manufactured from dolomitic aggregate.

PS LD 3.5.3 Prefabricated FC Manholes

Substitute LD 3.5.3 with the following:

Prefabricated FC manholes shall comply with the requirements for fibre-reinforced cement sewer pipes according to SABS 819 with an internal diameter of 1 000 mm. All manholes shall be bitumen-dipped.

The joint between the manhole and the concrete roof slab shall be sealed effectively with a sealant, to the prescriptions of the manufacturers and approval of the Engineer, to prevent the infiltration of subsurface water or stormwater. Lifting holes shall be sealed off effectively, with an epoxy, after installation and before backfilling.

In the case of only one inlet pipe with the same diameter as the outlet pipe and with a deviation of less than 45° from the straight, the invert level of the outlet pipe shall be 10 mm lower than that of the inlet pipe.

Where the angle between the inlet and outlet of the manhole deviates by more than 45 $^{\circ}$ from the straight or where more then one inlet enter a manhole, the invert level of the outlet shall be 30 mm lower than the lowest inlet invert level.

The soffits of all inlet pipes in a manhole shall be on the same level. If the outlet pipe is bigger than all the inlet pipes, it shall have the same soffit level as the inlet pipes.

To prevent buoyancy of manholes, all manholes deeper than 1,5 m shall be bedded in grade 20 MPa/19 mm concrete to dimensions as specified on the standard detail drawings. The concrete bases may be partly precast, subject to approval by the Engineer.

All manholes complete with bottom, shall be able to accommodate a water pressure of the full manhole depth, as specified on the drawings, with an additional 50 % safety factor.

PS LD 3.5.7 Step Irons

Substitute LD 3.5.7 with the following:

Step irons shall be installed in all manholes deeper than 1,2 m at 300mm centre to centre. Step irons shall consist of polypropylene coated 12 mm high tensile steel, such as Calcamite or similar. The installation of the step irons shall be in accordance with the specification of the manufacturer.

PS LD 3.5.9 Locking Devices For Manhole Covers

Two 6 mm x 40 mm long stainless steel grub screws shall be installed in the cover as follows:

- i) Two holes must be drilled through the cover on opposite sides to host the screws.
- ii) Two threaded holes must be provided in the frame to suit the screws and must be at least 20 mm deeper than required for the screws to accommodate dirt etc. These holes must be drilled through the holes in the cover to ensure accurate alignment.
- iii) Incisions must be made in the frame to indicate the positions of the holes after the cover is in place.

PS LD 3.6 MARKER POSTS

Add the following to LD 3.6:

Marker posts consisting of a 1 m length of fibre-cement pipe shall be planted directly above of the end cap at the connection point. The one end of the pipe must extend to 500 mm above the natural ground level and shall be painted red. The bottom end of the marker post shall be connected to the end cap with a piece of wire.

LD 5 CONSTRUCTION

LD 5.4 CONNECTIONS TO MANHOLES

Add the following to LD 5.4:

If the gradient of a pipe is more than 1:10, a vertical bend shall be used to connect up to the manhole. The Contractor shall take care that no low point is formed in the pipe as a result of the bend. If a pipe lies at a gradient of $1:10 (5,71^{\circ})$, a $11,25^{\circ}$ bend cannot be used since a bend with an angle larger than the grade of the pipe will result in a low point. It is the responsibility of the Contractor to shorten the bend in order to create the required angle.

For pipes with a gradient of up to 1:10, the angle can be taken up by a joint in the manhole and if required, also by the joint between the short-length and first full pipe.

LD 5.6 MANHOLES, INSPECTION CHAMBERS, ETC

PS LD 5.6.1 General

Substitute LD 5.6.1(a) with the following:

Manholes shall be of fibre cement (FC) and shall be constructed as shown on drawings no's STE/R-01and STE/R-02, unless otherwise indicated on the drawings.

- 1. Final cover levels of manholes in streets and paved areas shall be to the same level as the street or paved area.
- 2. On side walks, lawns and garden areas the cover level shall be 20 mm above the final ground level.
- 3. In midblock sewers it shall be 50 mm above ground level.
- 4. In the veld 100 mm above natural ground level.
- 5. In the rivers and streams 1 m

If a manhole is positioned at a low point or in a hollow where stormwater infiltration may occur, the manhole cover level must be raised to a level to avoid the danger of infiltration, or to a level as agreed with the Engineer.

If the manhole needs to be raised with more than 300 mm, FC sections with the same diameter shall be installed and sealed with epoxy.

PS LD 5.6.2 Benching

Add the following to LD 5.6.2.3:

Benching for all manholes shall be in accordance with drawing no's STE-R/01, STE/R-02 and Figure 3.

Channels shall be half-section GRP or FC splits. No uPVC channels shall be allowed.

PS LD 5.6.3 Step Irons

Add the following to LD 5.6.3:

Step irons shall only be installed in manholes deeper than 1,2 m.

In the case of sand traps the lowest step iron will be installed 300 mm above the floor of the manhole. An additional step iron shall be installed on the opposite side of the sand trap at the same level as the lowest step iron, as shown on the drawings.

PSLD 5.6.8 Finished Cover Levels

Unless otherwise ordered or dimensioned explicitly on the working drawings, the level of the top surface of the cover shall be

- flush with the final surface of a carriageway, footway or any paved areas
- 50 mm above the surface of a grassed or gravelled verge, or service lane
- 250 mm above the finished ground level for manholes situated at the midblock of private or municipal property.
- 500 mm above ground level in undeveloped open space.

PSLD 5.6.9 Rectification of Infiltration of Water

Any infiltration visible in the manhole channels, pipe ends or benching shall be rectified by demolishing the base and rebuilding. Rectification of infiltration through the walls and/or joints may be attempted only by externally applied measures, failing which the manhole shall be demolished and rebuilt.

LD 5.9 CONNECTING SEWERS

PS LD 5.9.1 Location And Details

Add the following to LD 5.9.1:

Erf connections shall be installed on the exact positions as indicated on the drawings and shall extend as per drawings into the erf where it shall be blanked of with an end cap.

All connecting sewers shall be laid at a gradient of 1:60, except where otherwise ordered by the Engineer.

This excludes midblock sewers where connections on the topographical high side can be laid at steeper gradients to end at a minimum depth of 1,2 m or at such greater depth that any point on the erf is able to be connected.

PS LD 5.12 PUMP SUMPS

PS LD 5.12.1 General

Pump sumps shall be constructed as detailed on the drawings.

PS LD 5.12.2 Plaster

Brickwork shall be plastered externally and internally as specified in LD 5.6.4.3 with 1:3 cement plaster.

PS LD 5.12.3 Precast slabs

Floor and roof slabs shall be as detailed on the drawing and shall be manufactured of grade 30 MPa/19 mm concrete as specified in SABS 1200 G or SABS 1200 GA, as applicable. Floor slabs shall be bedded solidly on a 300 mm thick sand bed compacted to 100 % of MAASHTO density.

PS LD 5.12.4 Covers

Covers shall be SABS 558 Type 9E cast iron covers and frames (900 mm x 600 mm) and shall be grouted solidly onto the roof slab with concrete surround as shown on the drawing. The frame and cover shall be treated as specified in LD 5.6.1(e).

PS LD 5.12.5 Waterproofing

Brickwork shall be waterproofed with BITUTHENE 3000 as supplied by Darex Africa (Pty) Ltd. The waterproofing shall be applied as prescribed by the suppliers and to the satisfaction of the Engineer.

LD 7 TESTS

PS LD 7.1 GENERAL

Add the following to LD 7.1.5:

All tests shall be repeated after the completion of backfilling of pipe trenches.

PSLD 7.2.6 Water Tightness of Manholes

Especially in areas where the water table is low a test, as detailed hereafter, to verify the water tightness of any manhole may be requested by the Engineer's Representative.

Infiltration: The excavation surrounding the manhole shall be flooded to approximately the top of wall level and this depth of water maintained for at least 48 hours. The manhole will have satisfied the test requirements provided there is no sign of infiltration of water.

Exfiltration: The manhole shall be filled with water to the top of its wall level and this depth maintained for at least 24 hours. Water may be added to maintain this level.

At the end of the subsequent 24 hour period the drop in water level is to be measured. The manhole will have satisfied the test requirement provided the drop is less than 75 mm per metre in depth of the manhole measured from channel invert to the original height of the water. At the discretion of the Engineer's Representative a shorter testing time, minimum 3 hours, will be allowed in which case a 'drop in level' pro rata to the time tested ,shall be used.

PSLD 7.2.7 Torch and Mirror Test

For the pipeline to be acceptable the visibility of the plug/reflector shall be at least 50% of its area.

PSLD 7.2.8 Acceptance Criteria

The acceptance of the pipe length or manhole shall depend upon whether it satisfies the criteria set out in SABS 1200 LD clauses 6, 7 and the PS clauses above.

Where pipes other than vitro clay pipes are laid, only tests carried out on the pipelines after completion of the backfilling to ground level (excluding surface restoration) and completion of the construction of manholes to roof height, including benching, will be considered for acceptance purposes.

In the case where vitro clay pipes are being laid, no pipelines are to be covered prior to inspection and approval by the Engineer. Once the pipeline has been laid and bedded in the compacted bedding cradle (to half pipe) between control points, the Engineer must be called out to inspect the installation. The Contractor is to provide the necessary equipment in order for the Engineer to adequately assess that the pipeline has been laid to the specified tolerances. Further, an air test, in accordance with the specifications, is to be conducted and witnessed by the Engineer prior to the placing of the Fill Blanket.

LD 8 MEASUREMENT AND PAYMENT

LD 8.2 SCHEDULED ITEMS

PS LD 8.2.2 Extra-over Item 8.2.1 For Specials Unit : No

Add the following to LD 8.2.2:

The tendered rate for bends in mains shall include, over and above the cost of the material, the cost of the labour and cutting of the bends to the required angle, finishing of the cut edge and the painting thereof with bitumen.

The bends scheduled in the schedule of quantities are only measured according to standard sizes and the number of bends required. It remains the responsibility of the Contractor to cut the bends to the desired angle.

PS LD 8.2.3 Manholes

Add the following to LD 8.2.3:

The tendered rate shall be all inclusive for benching, step irons, cover and frame, etc. as indicated on the drawings and shall include all extra excavation and backfilling.

PS LD 8.2.3.4 Concrete manholes Unit : No

Concrete manholes shall be measured complete as indicated on the drawings and the rate shall be all inclusive for benching, step irons, heavy duty ductile iron hinged cover and frame, and it shall make provision for all additional excavation and backfilling.

Manholes deeper than 1,5 m shall be provided with an additional concrete base, if specified by the Engineer. All costs involved in additional excavation, backfilling, material and labour shall be included in the rate for the additional base. These bases will be measured as an extra-over item and shall not be included with manholes.

The depth of manholes as mentioned in the schedules of quantities shall be measured from the final cover level to the outlet invert level (flow level).

Substitute LD 8.2.6 with the following:

Erf connections shall be laid up to 1,0 m within the erf boundary.

There will be distinguished between long and short connections.

A long connection consists of a 100 mm dia x 45° junction, a 100 mm dia x 45° bend, >5 m of 100 mm dia pipe with a 100 mm dia end cap with marker. Long connections will be measured under short connections with excavations and pipe lines >5 m under main pipelines.

A short connection consists of a 100 mm dia x 45° junction, 1-5 m of 100 mm dia pipe with a 100 mm dia end cap with marker.

150 mm connections shall be the same as above, but 150 mm dia pipes and fittings shall be used.

There will be distinguished between the various connections to different main-pipe diameters, as well as between the various depth increments. The depth increment for the connection shall be determined by the depth of the junction.

The rate shall be all inclusive and shall cover the cost of excavation, backfilling, bedding, pipes and fittings. An extra-over item for variation in pipe lengths is provided for connections, shorter or longer than specified and shall include the necessary excavation, bedding, backfilling, all material, etc. and will be also be measured under depth increments in the schedule of quantities.

The depth increment for the extra pipe lengths shall be determined by the depth of the end caps. If the deviations are negative, payment shall be reduced accordingly.

The rate for new erf connections on existing sewers shall also cover the cost of additional excavation and backfilling around the mains, cutting of pipes, handling of sewage flow, etc.

Imported material for bedding, fill blanket and main fill shall be measured and paid for under the relevant items for mains.

PS LD 8.2.7 Encasing Of Pipes In Concrete Unit : m³

Add the following to LD 8.2.7:

The tendered rate for the encasing of pipes in concrete applies for the railway crossing and shall be all inclusive for all additional labour to lay the sewer in the channel, encase it in concrete and shall include steel reinforcement, joints, etc.

Add the following to LD 8.2.8:

Payment for anchor blocks shall be made for pipes with gradients steeper than 1:10 and shall be measured in m^3 .

PS LD 8.2.11 Connection To Existing Sewers Unit : No

Add the following to LD 8.2.11:

Separate items will be scheduled for each diameter of connecting pipe.

The tendered rate shall include full compensation for connecting the proposed pipe, any additional channelling and benching associated with the connection, cutting the pipe to suit the connection, supplying and building in the short junction pipe, extra couplings, dealing with existing flow, preventing foreign material from entering the sewer and making the connection.

The excavation for pipelines, pipes, backfilling and manholes shall be measured separately.

Where a direct connection is made to an existing pipe, the rate covers all labour involved in opening the existing pipe, the removal of the existing end cap and disconnection at the pipe.

PS LD 8.2.13	Lifting and relaying of existing sewer	•••••••••••••••••••••••••••••••••••••••	Unit	: m
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The rate shall cover the cost for the required lifting or lowering of existing manholes to the cover levels as indicated on the drawing. The cost shall include all labour, plant and material required to demolish the existing manhole, removal of the top slab, cover and frame and all rebuilding and finishing required to achieve the desired level. The rate shall also include the location of all of the existing manholes.

PS LD 8.2.14	Locking Devices For Manhole Covers	Unit : No
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The rate shall cover the cost of the supply of two 6 mm x 40 mm long stainless steel grub screws, the fitting thereof and the providing of two incisions on the frame all as specified in PS LD 3.5.9.

PS LD 8.2.15 Pump Sumps

c)	Sectional spun concrete cylinders Unit : m
	Each rate for each diameter and class of sectional spun concrete cylinder shall cover the cost of supplying and installing the cylinders.
d)	Precast slabs Unit : No
	The provisions of clause 8.6 of SABS 1200 G or SABS 1200 GA, as applicable shall apply mutatis mutandis.
e)	Cast iron covers Unit : No
	The rate shall cover the cost of supplying and installing the covers, including the concrete surround and reinforcement as detailed and the treatment as specified in LD 5.6.1(e).
f)	Step irons Unit : No
	The rate shall cover the cost of supplying and installing the step irons.
g)	Waterproofing Unit : Sum
	The sum shall cover the cost of supplying all materials as specified in PS LD 5.12.5 to render waterproof pump sumps and applying of such materials.

PS LD 8.2.16	Brick Structures		Unit	:]	No
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The tendered rate shall cover all costs for excavation, backfilling, compaction, blinding, concrete, reinforcement, chamfers, trimming, benching, weir plates, pipe work and additional connections, brickwork, plaster and all labour, handling and transport of material, complete as per detail drawing.

PROJECT SPECIFICATION

SABS 1200 LE : STORMWATER DRAINAGE

LE 3 MATERIALS

LE 3.1 CULVERT UNITS AND PIPES

PS LE 3.1 d) Skewed Ends

Substitute LE 3.1(d) with the following:

Where pipe culverts are to be constructed with a skew angle of more than 20° , the skew ends shall be cut on site.

PS LE 3.1 f) Materials For Subsurface Drains

i) Pipes : Perforated or slotted uPVC pipes (normal duty) shall, before perforations or slots are provided, comply with the requirements of SABS 791.

The size of perforations in perforated pipes shall in all cases be 8 mm in diameter $\pm 1,5$ mm and the number of perforations per metre shall be not less than 26 for 100 mm pipes and 52 for 150 mm pipes. Perforations shall be spaced in two rows for 100 mm pipes. The centre-lines of all perforations shall be contained within an arc of between 100° and 160°.

Slotted pipes shall have a slot width of 8 mm \pm 1,5 mm. The arrangement of slots shall be subject to the Engineer's approval, but the total slot area shall be not less than that presented for perforations.

Pipes without slots or perforations required for conveying ground water from the subsoil drainage proper to the point of discharge, shall be unperforated uPVC pipes of the type specified above, or concrete pipes complying with the requirements of SABS 677.

- ii) Geotextile : The provisions of PS DK 3.1.4 shall apply mutatis mutandis;
- iii) Aggregate : The nominal size shall be 19 mm and the aggregate shall comply with the requirements of SABS 1083 for concrete aggregate;
- iv) Filter sand : Sand obtained from approved commercial sources shall be clean, hard and durable and shall comply with the following grading requirements:

D15 : 0,2 mm to 0,4 mm D85 : 1,2 mm to 4,7 mm

LE 3.4 MANHOLES, CATCHPITS AND ACCESSORIES

PS LE 3.4.3 Manhole Covers, Grid Inlets, Etc.

Substitute the last sentence in LE 3.4.3 with the following:

Covers and frames for manholes and grid inlets shall comply with the requirements of SABS 558 for Type 2A and Type 9D, respectively.

PS LE 3.4.5 Locking Devices For Manhole Covers

Two 6 mm x 40 mm long stainless steel grub screws shall be installed in the cover as follows:

- i) Two holes must be drilled through the cover on opposite sides to host the screws.
- ii) Two threaded holes must be provided in the frame to suit the screws and must be at least 20 mm deeper than required for the screws to accommodate dirt etc. These holes must be drilled through the holes in the cover to ensure accurate alignment.
- iii) Incisions must be made in the frame to indicate the positions of the holes after the cover is in place.

LE 5 CONSTRUCTION

LE 5.1 TRENCH BOTTOM

PS LE 5.1.3 Unsuitable Founding Conditions

Substitute "90 % of MAASHTO maximum density" in LE 5.1.3 with "90 % of MAASHTO maximum density (100 % for sand)".

LE 5.2 BEDDING AND LAYING

PS LE 5.2.2 Pipe Culverts

Add the following to LE 5.2.2:

All pipes shall be laid on a Class C bedding, as specified in SABS 1200 LB.

Delete "Ogee type pipes need not be wrapped but shall be laid with the spigot ends pointing downstream".

PS LE 5.2.4 Pipes With Open Joints Laid With Geofabric Filter Wrapping

Substitute LE 5.2.4 with the following:

Pipes shall not be laid with open joints.

PS LE 5.4 BACKFILLING OF PREFABRICATED CULVERT UNITS

PS LE 5.4.2 **Portal And Rectangular Sections**

Add the following to LE 5.4.2:

Backfilling on the sides of portal and rectangular sections can, if indicated on the drawings and requested in writing by the Engineer, be done with a 1:3:6/38 mix concrete.

LE 5.5 CATCHPITS, MANHOLES, INLETS, AND OUTLET STRUCTURES

PS LE 5.5.3 Plaster

Add the following to LE 5.5.3:

No plaster is required for manholes or inlets, except where otherwise shown on the drawings or ordered in writing by the Engineer.

PS LE 5.5.5 Precast Manholes And PS LE 5.5.7 : Precast Inlet And Outlet Structures

Substitute LE 5.5.5 and LE 5.5.7 with the following:

Manholes and inlet and outlet structures shall be constructed in accordance with the details as shown on the drawings.

LE 8 MEASUREMENT AND PAYMENT

LE 8.2 SCHEDULED ITEMS

PS LE 8.2.1 Supply And Lay Concrete Pipe Culverts Unit : m

Add the following to LE 8.2.1:

The provisions of LE 8.2.1 shall apply mutatis mutandis to uPVC pipes.

PS LE 8.2.4 Extra-over Items LE 8.2.1 And LE 8.2.2 For Cutting End Units For Culverts On Site Unit : No

Add the following to LE 8.2.4:

Payment shall be made only for skew cuts greater than 20° at manholes, kerb inlets and inlet and outlet structures.

PS LE 8.2.8 Supply And Install Manholes, Catch pits, And The Like Unit : No

Substitute LE 8.2.8 with the following:

The unit of measurement shall be the number of each, in the depth increments as scheduled, fully installed in accordance with the details shown on the drawings.

The rate shall cover the cost of excavating and backfilling with approved selected material from site borrow pits, stockpile or commercial sources, compacted to 93 % of MAASHTO density (100 % for sand), supplying and installing of all material and accessories, the inlet kerbs and the channel adjacent thereto as well as for the removal and spoil of all surplus material. The rate shall also include the connection of pipes to manholes, catch pits, etc. and of building pipes into the walls of such structures, but not for the cutting of skewed ends.

PS LE 8.2.14 Supply And Install Subsurface Drains According To Drawings Unit : m

The length shall be measured on the centre line of the completed subsurface drain.

The rate shall cover the cost of supplying, transporting, off-loading and installing all materials as well as for cutting, wasting, overlapping and installing of the materials where applicable.

PS LE 8.2.15 Connecting Subsurface Drains To Manholes, Kerb Inlets, Etc Unit : No

The number is the number of subsurface drain pipes built in at manholes or kerb inlets.

The rate shall cover the cost of all labour, plant and materials necessary to connect the subsurface drain to manholes and/or kerb inlets, and making the structure watertight, all as shown on the drawings.

PS LE 8.2.16 In Situ Concrete Invert Slabs For Portal Culverts Unit : m

The rate covers the supply, delivery and placement of all material as indicated on the drawing, including all required formwork, as well as the wood-floated finishing thereof.

PS LE 8.2.17 Concrete Lined Channels Unit : m

Channels of different shapes and sizes will be scheduled separately.

The rate shall cover the cost of the supply, delivery and placing of all materials as specified on the drawings, including formwork, wood-floated finishing, steel reinforcement, weep-holes and filter materials wrapped in geotextile below and alongside the channels and compaction and preparation of the channel bed to 93 % of MAASHTO density, all as specified on the drawings.

PS LE 8.2.18 Expansion Joints Unit : m

Expansion joints for the different channels will be scheduled separately. The length shall be measured on the surface of the completed expansion joints.

The item shall be extra-over PS LE 8.2.17 and the rate shall cover all costs of the construction of the joint, complete as specified on the drawings.

PS LE 8.2.19 Rectangular Brick Channel Unit : m

The tendered rate shall cover the cost of the supply, handling and placing of all material, complete as indicated on the drawings, including the required formwork, casting of concrete invert slab, wood-floated finishing, brick walls, preparation and compaction of the channel bed to 93 % of MAASHTO density (100 % for sand).

The length shall be measured along the centre line of the channel.

PS LE 8.2.20 Locking Devices For Manhole Covers Unit : No

The rate shall cover the cost of the supply of two 6 mm x 40 mm long stainless steel grub screws, the fitting thereof and the providing of two incisions on the frame all as specified in PS LD 3.5.9.

PROJECT SPECIFICATION

SABS 1200 LF : ERF CONNECTIONS (WATER)

LF 1 SCOPE

Add the following to LF 1.1:

The water connections shall include a water meter box and stop valve sealed off 300mm outside the erf boundary with an end cap and marker 1m inside the erf.

LF 3 MATERIALS

LF 3.1 PIPES, FITTINGS AND COUPLINGS

PS LF 3.1.4 Polyethylene Pipes

Substitute the second sentence of LF 3.1.4 with the following:

Type IV class 12 high density polyethylene pipes, with diameters as scheduled and shown on the drawings shall be used. PVC or nylon couplings and fittings similar to Plasson type shall be used.

OR

Class 16 thermoplastic copolymer tubing similar to Polycop shall be used. The tubing shall be jointed with brass compression type copper tube fittings. Only SABS approved pipes shall be accepted.

PS LF 3.1.6 Ferrules

Substitute LF 3.1.6 with the following:

Ferrules shall be of the screw-in type, manufactured from bronze or gunmetal and similar to "Talbot" standard pattern, in accordance with BS 1400.

LF 3.2 STOP TAPS AND METERS

PS LF 3.2.2 Meters

Add the following to LF 3.2.2:

Water meters shall be of the multi-jet fan-wheel type with a dezincification resistant copper base brass alloy body with male threaded ends. The meter shall consist of a strainer and a calibration device and all moving parts shall be replaceable without removing the meter from its setting (Kent of similar approved). The meter shall be guaranteed for 5 years by the supplier to comply with the under mentioned specification.

Nominal size (mm)	15	20	25	32	40	50
Nominal flow (kl/h)	3	5	7	10	20	30
Minimum accuracy registration ± 2 % (l/h)	25	30	40	40	120	180
Minimum flow at which meter registers (l/h)	5	5	10	10	24	35
Flow at 30 kPa pressure drop (kl/h)	2	3	5,5	5,5	12,5	16,2
Continuous loading at 100 kPa pressure drop (kl/h)	3,8	5,6	10	10	20	30
Test pressure (MPa)	2	2	2	2	2	2

PS LF 3.4 BEDDING

Substitute LF 3.4 with the following:

The bedding shall be as specified in PS LB 3.1.

LF 3.5 VALVE AND METER CHAMBERS

PS LF 3.5.3 Surface Boxes

Add the following to LF 3.5.3:

Lockable PVC combination meter/valve chambers are to be provided.

These chambers are to be of an approved manufacture and samples are to be provided to the Engineer for approval prior to installation. The PVC chambers shall be installed 300mm outside the erven.

PS LF 3.6 MARKINGS AND MARKER POSTS

Add the following to LF 3.6:

House connections shall be marked by painting a 15 mm thick blue line on the kerb opposite the connection.

The water pipe shall be sealed effectively 1 m inside the erf boundary and the position shall be marked with a blue \pm 40 mm wooden stake, planted above the pipe end, so that it protrudes 750 mm above ground level.

LF 5 CONSTRUCTION

LF 5.2 LAYING FROM MAIN TO ERF

PS LF 5.2.2 Pipe Laying

Add the following to LF 5.2.2:

Erf connection pipes shall be laid to a depth so that the top of the pipe is not less than 450 mm nor more than 600 mm below the final road surface or sidewalk level, with the provision that where construction traffic is liable to cross the connections the pipes shall have a cover of at least 450 mm.

Erf connections shall be bedded as for flexible pipes except that the selected fill blanket will not be required. The bedding thickness above and below the pipe shall be 100 mm.

Where the erf connections cross areas subject to traffic loads the trench shall be backfilled in accordance with the requirements of PS DB 3.5 and PS DB 5.7.2.

PS LF 5.2.3 Service Connections

PS LF 5.2.3.1 General

Add the following to LF 5.2.3.1:

The working pressure in the mains for determining the test pressure at which tests for erf connections shall be done, will be as specified in PS L 7.3.1.

LF 8 MEASUREMENT AND PAYMENT

PS LF 8.2 SCHEDULED ITEMS

Substitute LF 8.2.1 with the following:

Measurement and payment for erf connections as shown on the drawings shall differentiate between double and single erf connections, as well as between short and long connections, each for the various pipe diameters and for each diameter of water main.

Connection rates shall cover the cost of all excavations (300 mm wide) backfilling, bedding, removal of surplus material, as well as the following, complete as indicated on the drawings:

- a) a saddle, ferrule and coupling to fit the relevant diameter of water main specified;
- b) all HDPE Type IV Class 12 piping for each type of connection required;
- c) all tees, 90° bends and reducers for each type of erf connection;
- d) the marking on the kerb as specified;
- e) the effective sealing of the connection pipe;
- f) lockable cast iron water meter chambers complete with Optima 2000 water meter, stop tap and adaptors.

Short connections are defined as connections to erven nearest to the main pipe in relation to the road and long connections as connections to erven across the road.

DESCRIPTION	25 mm DIA	20 mm DIA
DOUBLE CONNECTIONS		
Long	8,0 m	5,0 m
Short	0,5 m	0,5 m
SINGLE CONNECTIONS		
Long	5,0 m	5,0 m
Short	2,0 m	2,0 m

Pipe lengths for measurement and payment purposes shall be as follows:

Extra-over items for variation in pipe lengths are provided for connections, shorter or longer than specified and the rates shall cover the cost of the necessary excavation, bedding, backfill, all material, etc. If the variation is negative the payment will be reduced accordingly.

The rate for new erf connections on existing main lines shall also cover the cost of additional excavation and backfill around the main line and the handling of the water in the pipe.

Imported material for bedding, blanket and main fill will be measured under the relevant items for main pipes.

PROJECT SPECIFICATION

SABS 1200 LG : PIPE JACKING

LG 2 INTERPRETATIONS

PS LG 2.2 APPLICATION

Add the following to LG 2.2:

The information contained in this specification is not limited to jacking of circular prefabricated concrete pipe sections, but is also in general applicable to jacking of prefabricated concrete rectangular, square and arched sections.

LG 5 CONSTRUCTION

LG 5.1 GENERAL

PS LG 5.1.2 Competence

Add the following to LG 5.1.2:

The work shall at all times be executed under sufficient supervision and senior supervisory staff assigned to the site and approved by the Engineer, and they may not be assigned to other tasks or withdrawn from the site without written permission from the Engineer.

PS LG 5.1.3 Design Calculations By Contractor

Add the following to LG 5.1.3:

The civil engineer responsible for designing the jacking shall be a registered professional engineer.

LG 5.2 SAFETY CONTROL REQUIREMENTS

LG 5.2.3 **Recording Of Movements**

Add the following sub clause to LG 5.2.3:

PS LG 5.2.3.3 Work under railway line

Before work is commenced under a railway line, the Contractor shall take level measurements on the railway surface directly above the jacking line and at least 5 m on both sides of the jacking line. These levels shall be taken at 500 mm intervals on both sides of the railway line.

In order to facilitate the control of level measurements, the exact position of each point of level shall be marked unobtrusively before the levels are taken.

At the beginning, halfway through and at the end of each day's work, the Contractor shall re-measure the levels of pre-marked points and record these measurements. If any settling occurs, the jacking shall be ceased immediately until the cause of settling is established and corrective measures are taken in terms of the approved programme of the contractor.

After completion of the works, the Contractor shall take level measurements in the same way as before and a record of the levels before and after jacking shall be submitted to the Engineer. The submission of such records is a prerequisite for any consideration by the Engineer concerning the acceptability of the works, or otherwise, or for the issuing of a completion certificate.

If within a period of twelve (12) months after completion of the works, signs of settlement in the vicinity of the jacked pipe is shown, TransNamib may re-measure levels on the site.

The Contractor shall be responsible to correct any deformity occurring on the railway line within the said period of one year in the vicinity of the jacked pipe to the satisfaction of TransNamib.

LG 5.4 EXCAVATION

PS LG 5.4.1 General

Add the following to LG 5.4.1:

No classification of the excavated material shall be applicable.

LG 5.5 JACKING PROCEDURE

PS LG 5.5.1 Procedure

Add the following to LG 5.5.1:

After each prefabricated section has been jacked forward and before the following section is placed in position, a complete set of invert levels shall be established at each joint between sections. For this purpose the sections shall be numbered in the sequence in which they will be jacked.

During the complete jacking operation and at predetermined and approved regular times during each working day, records shall be made of the pressure-meter readings, the time of day and the distance between the nearest section and the jack frame.

PS LG 5.5.2 Lubrication Of Structure During Jacking

Add the following to LG 5.5.2:

Lubrication by means of the injection of Bentonite, water or any other lubricating agent shall not be permitted.

LG 6 TOLERANCES

PS LG 6.2 **PERMISSIBLE DEVIATIONS**

Add the following to LG 6.2:

Deviations for pipes being jacked in a down-stream direction shall be positive, while deviations for pipes jacked in an up-stream direction shall be negative.

PS LG 8 MEASUREMENT AND PAYMENT

PS LG 8.1 PRINCIPLES

PS LG 8.1.1 General

Substitute the last sentence of the first paragraph of LG 8.1.1. with the following:

The Contractor shall state, in his detailed schedule, the dimensions of the pits for which his price makes provision.

PS LG 8.2 SCHEDULED ITEMS

PS LG 8.2.4 Excavation For Jacking

Substitute "within 0,5 km from the thrust pit" in LG 8.2.4 with "outside the site boundaries" and add the following:

The unit rates shall cover all transport costs outside the boundaries regardless of the distance.

Delete the last sentence.

PS LG 8.2.11 Works Concerning Existing Services Unit : Sum

The sum shall cover the cost of the following:

- a) Precautions during excavations due to the presence of such a service in or over the trench;
- b) Protection and maintenance of such service in working condition by application of temporary support or shoring, as required;
- c) Repairs as a result of damage caused by the Contractor, and
- d) Arrangements with the authority concerned for supervision of the works, when required.

Distinction shall be made between the various services.

PROJECT SPECIFICATION

SABS 1200 M : ROADS (GENERAL)

M3 MATERIAL

PS M 3.2 RESPONSIBILITY FOR LOCATION

Add the following to M3.2:

The subbase and base layers of all streets shall be constructed with material from designated borrow areas. The Contractor is responsible for the selection of the material in the borrow areas and if the material in the paving layers do not comply with the minimum requirements it shall be removed and replaced with suitable material at the expense of the Contractor.

M 5 CONSTRUCTION

Add the following paragraph:

PS M 5.1 SELECTION

The Contractor shall deal selectively with material when existing streets are broken up in order that suitable material is not contaminated with unsuitable material. If suitable material is contaminated, the Contractor shall replace such contaminated material with suitable material, at his own expense.

M 6 TOLERANCES

PS M 6.3 FREQUENCY OF CHECKS

Add the following to M 6.3:

These checks shall be submitted to the Engineer for his approval.

M 7 TESTING

PS M 7.3 ROUTINE INSPECTION AND TESTING

Substitute M 7.3.3 with the following:

Statistical evaluation of test results shall not be applicable to this contract and all tests shall meet the specified minimum requirements for the specific material.

M 8 MEASUREMENT AND PAYMENT

Add the following to M 8.1:

The cost of all routine testing done by the Engineer, and of which the results do not comply with specified minimum requirements for the material, shall be borne by the Contractor.

These costs shall be deducted from the Contractor's monthly payment certificates.

PROJECT SPECIFICATION

SABS 1200 ME : SUBBASE

ME 3 MATERIALS

ME 3.2 PHYSICAL PROPERTIES

PS ME 3.2.1 Subbase Material

Substitute ME 3.2.1 with the following:

- a) Materials of G5 quality for use in the unstabilised subbase shall comply with the requirements of SABS 1200 M 3.3.3.
- b) Materials of G7 quality for use in the unstabilised subbase shall comply with the requirements as specified in SABS 1200 M 3.3.3, except that the maximum aggregate size after compaction shall not exceed 63 mm.

PS ME 3.2.2 Gravel Shoulder And Gravel Wearing Coarse Material

Substitute ME 3.2.2 with the following:

The material used for gravel shoulders and/or gravel wearing course shall comply with the following requirements:

i)	Maximum aggregate size after compaction	37,5 mm
ii)	Oversize index (Io)	nil
iii)	Shrinkage product (Sp)	100-240
iv)	Grading coefficient (Gc)	16-34
v)	Minimum CBR at 95 % of MAASHTO of density	25

Where:

Oversize index (Io) is the mass of the material larger than 37,5 mm, expressed as a percentage of the total mass of material;

Shrinkage product (Sp) is the product of the linear shrinkage and the percentage smaller than 0,425 mm (expressed as a percentage of the material smaller than 37,5 mm) of the material;

and

Grading coefficient (Gc) is the product of the percentage of material smaller than 26,5 mm but larger than 2,0 mm and the percentage smaller than 4,75 mm (expressed as a percentage of the material smaller than 37,5 mm) divided by 100.

ME 3.3 STABILISING AGENT

PS ME 3.3.1 General

Substitute ME 3.3.1 with the following:

Where ionic stabilisation is required, the stabilising agent shall be approved by the Engineer, and the rate of application shall be $0,03 / \ell m^2$ for layer thickness of 150 mm and $0,02 \ell/m^2$ for layer thicknesses of 100 mm.

ME 5 CONSTRUCTION

ME 5.4 PLACING AND COMPACTION

PS ME 5.4.1 Placing

Substitute "the project specification" in the second paragraph of ME 5.4.1 with "ME 6.1.4".

PS ME 5.4.5 Work In Restricted Areas

No additional payment shall be made for work in restricted areas and any relevant costs shall be deemed to be included in the tendered rates.

ME 5.7 TRANSPORT

PS ME 5.7.1 Free-haul

Substitute ME 5.7.1 with the following:

An unlimited free-haul distance shall apply to subbase material.

ME 7 TESTING

ME 7.2 PROCESS CONTROL AND ROUTINE INSPECTION AND TESTING

PS ME 7.2.1 Process Control

Substitute "1 500 m²" with "1 200 m²" and "5 000 m²" with "3 000 m²" in Table 2 of ME 7.2.1.

PS ME 7.2.2 Routine Inspection And Testing

Substitute the second sentence of ME 7.2.2 with the following:

No density shall be less than the specified minimum density for the relevant layer.

ME 8 MEASUREMENT AND PAYMENT

PS ME 8.2 COMPUTATION OF QUANTITIES

Substitute ME 8.2 with the following:

Measurement and payment shall be to the exact dimensions as shown on the drawings.

ME 8.3 SCHEDULED ITEMS

PS ME 8.3.8 Stabilising Agent

Add the following subitem to ME 8.3.8:

g) Ionic stabilising agent Unit : ℓ

The rate shall also cover the cost of application and mixing in of the stabilising agent.

PS ME 8.3.11	Preparation of Road bed to a depth of 150 mm as subbase	
	compacted to 95 % of MAASHTO density (100 % for sand) U	Unit : m ³

The rate covers the cost of crust breaking up to a minimum depth of 150 mm, watering, shaping, building and compaction of subbase, final scraping, compliance with the tolerances and testing.

PROJECT SPECIFICATION

SABS 1200 MF : BASE

MF 3 MATERIALS

MF 3.3 PHYSICAL AND CHEMICAL PROPERTIES

PS MF 3.3.1 Natural Gravel (Unstabilised or Stabilised)

Substitute the requirements of MF 3.3.1 for unstabilised natural gravel with the following:

- 1) Natural gravel, of G4 quality which is placed in the base shall, after compaction, comply with the requirements of SABS 1200 M 3.3.3.
- 2) Natural gravel, of G5 quality which is placed in the base shall, after compaction, comply with the requirements of SABS 1200 M 3.3.3.

PS MF 3.3.2 Graded Crushed Stone

Substitute the requirements of MF 3.3.2 with the following:

Graded crushed stone placed in the base shall, after compaction, comply with the requirements for type G1 as specified in 3.3.3 in SABS 1200 M.

PS MF 3.3.3 Graded Crushed Stone And Soil Fines

Substitute the requirements of MF 3.3.3 with the following:

Graded crushed stone that is admixed with soil fines, placed in the base shall comply with the requirements for type G2 or G3 as specified in 3.3.3 in SABS 1200 M.

MF 5.4 PLACING AND COMPACTION OF A BASE OTHER THAN A WATER BOUND MACADAM BASE

PS MF 5.4.6 Work In Restricted Areas

No additional payment shall be made for work in restricted areas and any relevant costs shall be deemed to be included in the tendered rates.

MF 5.9 **TRANSPORT**

PS MF 5.9.1 Free-haul

Substitute M 5.9.1 with the following:

An unlimited free-haul distance shall apply to base course material.

MF 6 **TOLERANCES**

- MF 6.1 **DIMENSIONS, LEVELS, ETC**
- PS MF 6.1.2 Grade

Add the following to MF 6.1.2:

In addition to the above-mentioned requirements the surface shall be of such a grade that all surface water shall drain freely to the adjacent kerbs and/or channels, and all subsequent costs to rectify the surface to comply hereto shall be borne by the Contractor.

MF 7 **TESTING**

PS MF 7.2 **PROCESS CONTROL**

Substitute "1 500 m²" with "1 200 m²", "1 500 m³" with "1 200 m³" and "5 000 m²" with "3 000 m²" in Table 3 of MF 7.2.

MF 7.3 ROUTINE INSPECTION AND TESTING

Substitute MF 7.3.2 with the following:

No density shall be less than the specified minimum density for the relevant layer.

MF 8 MEASUREMENT AND PAYMENT

PS MF 8.2 COMPUTATION OF QUANTITIES

Substitute MF 8.2 with the following:

PS ME 8.2 shall apply mutatis mutandis.

PROJECT SPECIFICATION : PORTION 2

SABS 1200 MM : ANCILLARY ROADWORKS

MM 3 MATERIALS

MM 3.2 ROAD SIGNS

PS MM 3.2.1 General

Add the following to MM 3.2.1:

All road signs and road markings shall be in accordance with the SA Road Traffic Signs Manual and as shown on the drawings.

No special breakaway devices are required.

PS MM 3.2.2 Structural Steel

Substitute the second paragraph of MM 3.2.2 with the following:

All structural steel, including steel tubes, shall have a hot-dip (galvanised) zinc coating that complies with the requirements of SABS 763 for coatings of type A1 or B1 articles, as applicable.

MM 5 CONSTRUCTION

MM 5.2 ROAD SIGNS

PS MM 5.2.1.6 Galvanising

Substitute the second paragraph of MM 5.2.1.6 with the following:

Galvanised mild steel supports for road signs shall be painted in accordance with PS MM 5.2.2.4.

MM 5.2.2 Painting

PS MM 5.2.2.4 Painting of structural steelwork

The provisions of MM 5.2.2.4 shall apply mutatis mutandis to the painting of galvanised surfaces, except for the following:

a) **Surface preparation**

Galvanised surfaces shall be thoroughly scrubbed down using an approved galvanised iron cleaning agent to remove all traces of the resin protective coating.

The surface shall be washed down and scrubbed to remove all traces of grease, oil, dirt, etc;

b) **Priming**

Two coats of calcium plumbate primer shall be applied to a dry film thickness of at least 25 microns. The undercoat shall follow within one week after the priming.

d) Finishing coat

The colour of the finishing coat shall be dark grey, as specified in MM 3.2.8.2.

PS MM 5.3.2 Surface Preparation

Substitute "48 h" in MM 5.3.2 with "7 days (168 h)".

MM 8 MEASUREMENT AND PAYMENT

PS MM 8.3.1 Sign Faces With Painted Background And Symbols Unit : m²

Add the following to MM 8.3.1:

No additional payment shall be made for the aluminium extrusions for road signs and all relevant costs shall be deemed to be covered by the tendered rates for such road signs.

PS MM 8.3.8 a) Removal And Re-erection Of Traffic Lights By EmployerUnit : Sum Stated

b) Overheads, cost and profit on (a) above Unit : % = R

The rate for PS MM 8.3.8(b) includes the cost of all arrangements concerning the removal of the traffic lights, control of traffic and re-erection of the traffic lights.

MM 8.4 SCHEDULED ITEMS FOR ROAD MARKINGS

PS MM 8.4.1 Non-reflectorised Paint Applied At Nominal Rate Of 0,42 /m² Unit : km or m²

Add the following to MH 8.4.1:

Markings for parking bays shall be measured and paid for as "characters and symbols".

No additional measurement and payment shall be made for "(e) Traffic island markings" and payment shall be made under the appropriate rates of payment item MM 8.4.1.

PS MM 8.4.4 Setting Out And Premarking Unit : km, Sum or No

Add the following to MM 8.4.4:

No additional payment shall be made for the premarking and/or dotting of lines or special markings and all relevant costs are deemed as covered by the tendered rates for MM 8.4.1.

PROJECT SPECIFICATION

PARTICULAR SPECIFICATION PA: FENCING

PA 1 SCOPE

This section covers the moving of existing fences where necessary and the erection of new fences.

This section also covers the dismantling of existing fences and the stacking of the fencing material.

PA 2 INTERPRETATIONS

PA 2.1 SUPPORTING SPECIFICATIONS

- (a) Project Specifications;
- (b) SABS 1200 A or SABS 1200 AA as applicable;
- (c) SABS 1200 C.

PA 2.2 APPLICATION

This specification contains clauses which apply to fencing in general. The interpretation of and variations from this specification are explained in Part 2 of the project specifications preceding this specification in the contract document.

PA 3 MATERIALS

PA 3.1 POSTS, STAYS, STANDARDS AND DROPPERS

Posts, stays, standards and droppers shall be of the type and size indicated on the drawings. Steel sections shall comply with the requirements of CKS 82 and wooden posts shall comply with the requirements of SABS 457. Timber posts shall be treated at the Engineer's option with either creosote or copper chrome arsenate, the latter preservative not to be used in the case of hardwoods.

Unless otherwise specified or shown on the drawings rolled steel posts shall be 15 or 22 kg/m rails as shown on the drawings. Standards shall be 2,50 kg/m Y-sections.

Droppers shall be 0,56 kg/m ridge-back pattern droppers.

Where tubular posts are specified they shall be galvanised in accordance with SABS 763 for class B1 articles and have a wall thickness of 2,95 mm minimum. The length, diameter and hole spacing shall be as shown on the drawings. Unless otherwise shown on the drawings all tubular sections shall be provided with a 230 x 230 mm footplate and a pressed-steel or cast-iron cap.

Rolled steel sections shall be provided with a protective coating of tar or other approved material.

Tubular stays shall have a nominal bore of at least 60 mm and a wall thickness of at least 2,00 mm. They shall be first class galvanised as specified in SABS 763.

PA 3.2 BOLTS FOR STAYS

Bolts shall be galvanised steel bolts of the required length and diameter which shall not be less than 12 mm. All the necessary bolts together with nuts and washers, shall be supplied with each post.

PA 3.3 **WIRE**

i) Barbed wire

Barbed wire shall comply with the requirements of SABS 675 and shall be one or more of the following types:

Mild-steel-grade

double-strand unidirectional twist wire, each strand 2,50 mm diameter, for use at any height above ground. The wire shall be either lightly galvanised or fully galvanised as specified in the schedule of quantities.

Barbs shall be manufactured from 2,0 mm galvanised wire and shall be spaced at not more than 152 mm.

ii) Smooth wire

Smooth wire shall comply with the requirements of SABS 675 and shall be of the types specified below:

(a) **Straining wire**

shall be 4,0 mm diameter lightly galvanised wire.

(b) Fencing wire

shall be high-tensile-grade 2,24 mm diameter wire either lightly or fully galvanised as specified in the schedule of quantities.

(c) **Tying wire**

shall be 2,50 mm diameter mild-steel lightly galvanised wire for tying fencing wire to standards and droppers and 1,6 mm mild-steel lightly galvanised wire for tying netting and mesh wire to fencing wire.

PA 3.4 **DIAMOND MESH**

Diamond mesh (chain-link fencing) shall comply with the requirements of SABS 1373. The width shall be as shown on the drawings and the edge finish shall be both sides clinched or barbed.

The nominal diameter of the wire shall be 2,5 mm and the mesh size shall be 50 mm x 50 mm.

The wire shall be fully galvanised.

PA 3.6 GATES

Gates shall be manufactured to the dimensions shown on the drawings.

Gates shall be complete in every respect including hinges, washers, bolts and locking chain attached to the gate.

PA 3.8 MANUFACTURING TOLERANCES FOR WIRE

The actual diameter of wire supplied shall nowhere be less than the specified diameters by more than the following tolerances:

Specified Diameter		Diameter	Tolerance		
1,0	-	1,8 mm	0,05 mm		
2,0	-	2,8 mm	0,08 mm		
3,15	-	4,0 mm	0,10 mm		

PA 4 IMPLEMENTS

No special implements are specified.

PA 5 CONSTRUCTION

PA 5.1 **TYPES OF FENCING**

The following types of fences shall be erected in accordance with the dimensions shown on the drawings:

- (a) **Stock-proof fences** (of various heights with horizontal barbed and smooth fencing wire).
- (b) **Vermin-proof fences** (horizontal barbed wire fence above a mesh wire fence).
- (c) **Pedestrian fences** (full height diamond mesh fence).
- (d) **Security fences** (verandah type with diamond mesh on the vertical portion and barbed wire on the overhang).
- (e) Where existing fences have to be dismantled and re-erected, they shall be re-erected either to the same design as originally constructed with such modifications as the Engineer may require or they shall be erected to one of the standards specified above, all as ordered by the Engineer.

PA 5.3 CLEARING OF FENCE LINE

The fence line shall be cleared over a width of at least 1 m on each side to the centre-line of the fence and surface irregularities shall be graded so that the fence will follow the general contour of the ground. Clearing shall include the removal of all trees, scrub, stumps, isolated loose boulders or stones and other obstructions which will interfere with proper construction of the fence. Stumps within the cleared space shall be grubbed as described in SABS 1200 C. The bottom of the fence shall be located an uniform distance above the ground line in accordance with the requirements shown on the drawings. All material removed shall be burnt or disposed of in disused borrow pits.

PA 5.4 INSTALLING POSTS AND STANDARDS

Straining posts shall be erected at all ends, corners and bends in the line of fences and at all junctions with other fences. Straining posts shall not be spaced further apart than shown on the drawings. The length of posts above ground shall be such that the correct clearance between the lowest wire and the ground can be obtained.

Posts shall be accurately set in holes, and where shown on the drawings, provided with concrete bases to the dimensions shown on the drawings.

Holes shall be dug to the full specified depth of the posts. Where, due to the presence of rock, the holes cannot be excavated by means of hand or pneumatic tools and the Contractor has to resort to the use of explosives, he will be paid separately for the drilling and blasting operations required.

Corner, gate end and straining posts shall be braced by means of stays or anchors as shown on the drawings or as directed by the Engineer. Pipe stays shall be bolted to the posts. Gate posts shall not be used as straining posts, but at each gate post a straining post shall be placed as shown on the drawings and stayed by means of an anchor consisting of six strands of wire.

Standards shall be firmly planted into the ground at the spacing shown on the drawings or as directed by the Engineer. The spacing of standards between any two straining posts shall be uniform and not greater than shown on the drawings. In rock or hard material standards shall be either driven or set in holes drilled into the rock. The size of drilled holes shall be such that a tight fit is obtained. Care shall be exercised when driving standards to prevent buckling or damaging them.

All posts and standards shall be accurately aligned and set plumb. Where verandah-type security fencing is used, the posts shall be planted with the overhang on the road side and perpendicular to the direction of the fence. After posts and standards have been firmly set in accordance with the foregoing requirements, the fence wire shall be attached thereto at the spacings shown on the drawings.

PA 5.5 **INSTALLING WIRE**

All fencing wire shall be wired to the sides of standards or posts to prevent the wires from being displaced or becoming loose. The wire shall be carefully tensioned without sagging and with true alignment, care being exercised not to stretch the wire to such an extent that it will break, that end, corner, straining or gate posts will be pulled out, or that it will be easily damaged during veld fires.

Each strand of fencing wire shall be securely fastened in the correct position to each standard with soft galvanised binding wire. The binding wire for each horizontal fence wire shall pass through a hole or notch in the standard to prevent slipping of the fence wire in a vertical direction, while the ends of the wire shall be wound at least four times around the fencing wire to prevent it moving in a vertical direction.

At end, corner, straining and gate posts the fencing wire shall be securely wrapped twice around the post and secured against slipping by tying the end tightly around the wire by means of at least six snug tight twists.

In the case of high-tensile wire, two long windings may first be made before the six tight twists, to prevent the wire from breaking at the first twist. When using smooth wire the loose end shall preferably be bent over and hooked into the notch between the fencing wire and the first twist.

Splices in the fencing wire shall be permitted if made in the following manner using a splice tool. The end of each wire at the splice shall be carried at least 75 mm past the splice tool and wrapped snugly around the other wire for not less than six complete turns, the two separate wire ends being turned in opposite directions. After the splice tool is removed the space left by it in the splice wire

shall be closed by pulling the wire ends together. The unused ends of wire shall be cut close so as to leave a neat splice.

The gaps between posts and the adjacent straining posts shall be fenced off with short fencing wires.

Droppers shall be tied to each fence wire with soft binding wire in the required position as specified for standards to prevent slipping in a vertical direction. The spacing of droppers between any two straining posts shall be uniform. Anchoring to structures shall be done as shown on the drawings.

PA 5.6 INSTALLING DIAMOND MESH OR WIRE NETTING

In the case of vermin-proof, pedestrian and security fences, or where instructed by the Engineer, wire netting or diamond mesh shall be stretched against the fence and properly tied to the fencing wire as shown on the drawings. The diamond mesh or wire netting shall be secured by means of soft binding wire at 1,2 m centres along the top and bottom wires and at 3 m centres along each of the other fencing wires unless otherwise shown on the drawings.

In the case of vermin-proof fencing, vermin shall be prevented from creeping under the fence by either one of the two methods described below as ordered by the Engineer.

- (a) By folding back the bottom 130 mm of the wire netting so that it lies flat on the ground and packing stones (minimum dimension 200 mm) end to end on this flap to secure it in position.
- (b) By embedding the lower 130 mm of the wire netting into to the ground and compacting the earth around it thoroughly on both sides to secure the netting.

PA 5.7 CLOSING OPENINGS UNDER FENCES

At ditches, streams, drainage channels or other hollows where it is not possible to erect the fence so that it follows the general contour of the ground, the Contractor shall close the opening under the fence by means of horizontal barbed wires at distances of 150 mm from each other, stretched between additional posts or straining posts as shown on the drawings or directed by the Engineer. In the case of pedestrian, vermin-proof and security fences the opening shall be covered with strips of wire netting of diamond mesh 1 000 mm wide fixed to the barbed wires.

In the case of larger streams where damming of debris against the fence would constitute a danger, the opening below the lower fencing wire shall be closed by means of loose-hanging wire nets. For this purpose additional straining posts shall be planted on either side of the stream with a cable consisting of at least five strands of smooth fencing wire stretched between them. Onto this cable vertical strips of diamond mesh, hanging down to ground level, shall be fixed. The sides of the different strips of diamond mesh shall be fixed to each other so that the whole mat may be raised by water flowing underneath and so leave a free stream area. These mats at streams shall only be erected on instructions from the Engineer. If it should be necessary to keep the bottom of the mats on the ground, the Engineer may order that timber posts or pipes be fixed horizontally to the lower ends of the diamond mesh strips.

PA 5.8 **EXISTING FENCES**

Where a new fence joins an existing fence whether in line or at an angle, the new fence shall be erected with a new straining post positioned at the terminal of the existing fence.

Existing fences that require be taking down or moving to a new location shall be dismantled. Material not required for re-erection or declared unsuitable for re-use shall be neatly stacked at approved locations in accordance with the Engineer's instructions. Fencing wire or netting shall be stacked clear of the ground.

In the case of fences that require moving the Contractor shall re-use all materials, declared suitable for this purpose by the Engineer, plus such new material as may be required to re-erect the fence to the standard specified for new fences. The Engineer shall not be responsible for any delays or costs arising from breakage of re-used wire during straining.

PA 5.9 INSTALLING GATES

Gates shall be installed at the positions indicated by the Engineer. The gates shall be hung on gate fittings in accordance with the requirements shown on the drawings. Gates shall be so erected as to swing in a horizontal plane at right angles to the gate posts, clear of the ground in all positions. At pedestrian and security fences the double swing gates shall leave a gap not exceeding 25 mm between them when closed and other gates shall not be further that 25 mm from the gate post when closed.

PA 5.10 GENERAL REQUIREMENTS

The completed fence shall be plumb, taut, true to line and ground contour, with all posts, standards and stays firmly set. The height of the lower fencing wire above the ground at posts and standards shall not deviate from that shown on the drawings by more that 25 mm. Other fencing wires shall not vary by more than 10 mm from their prescribed relative vertical positions.

Where temporary fences are erected they shall be firm and of sufficient height with a sufficient number of wires to prevent the passage of stock.

The Contractor shall, on completion of each section of fence, remove all cut-offs and other loose wire or netting so as not to create a hazard to grazing animals or a nuisance to the owners of the ground.

PA 6 TOLERANCES

The maximum deviations are mentioned under the relevant items of PA 5.

- PA 7 TESTS
- PA 7.1 Not applicable to this specification.
- PA 8 MEASUREMENT AND PAYMENT
- PA 8.1 LISTED ITEMS

The tendered rate shall be in full compensation for the clearing of the fence line as specified, including the removal of trees, stones and other obstructions and the disposal as directed of all material resulting from clearing operations.

The removal of trees and stumps with a girth exceeding 1 m shall be paid for as specified in SABS 1200 C.

PA 8.2 SUPPLY AND ERECTION OF NEW FENCING MATERIAL

The quantity of material used shall be determined by measuring the quantities of individual items of material installed in the complete fence. No linear measure of completed fence shall be applicable. The applicable units of measurement are as follows:

(a) Posts Unit : Number (No)

All straining posts erected in accordance with the maximum specified spacing or such lesser spacing as authorised by the Engineer, all corner posts authorised by the Engineer and all end posts. Gate posts for new gates shall not be measured for payment.

(b) Standards and droppers Unit : Number (No)

The unit of measurement shall be the number of standards and droppers erected to be maximum specified spacing or such lesser spacing as authorised by the Engineer.

(c) Fencing wire Unit : metre (m)

The unit of measurement shall be the kilometre of each type of fencing wire measured between end posts. Binding wire and wire used for bracing and anchoring of posts, shall not be measured for payment.

(d) Diamond mesh and wire netting Unit : Square metre (m²)

The quantity shall be calculated using the prescribed width and the length between straining posts or gate posts, or the length of strips for covering openings under fences, or the length used for the covering of gates.

The tendered rate for each post, standard, dropper, for each kilometre of fencing wire and each square metre of diamond mesh or wire netting shall include full compensation for the provision of all materials including all concrete, binding wire, straining wire, bolts, washers and nuts, for excavation, drilling of holes for standards; for installation of posts, standards and droppers and the complete erection of the fence as specified and as shown on the drawings. No separate payment will be made in respect of stone packing and/or trenching in the case of wire netting. The tendered rate for posts shall include for the construction of the stays of the types shown on the drawings.

PA 8.3 NEW GATES Unit : Number (No)

At pedestrian- and security fences the pair of gates shall be measured as one.

The tendered rate shall include full compensation for the procuring and furnishing of all material, including gates, gate posts, hinges, bolts, concrete and straining wire, and the erection of the gates as specified and as shown on the drawings. It shall not include for any fencing wire or mesh erected on the gate.

PA 8.4 MOVING OF EXISTING FENCES AND GATES

Each type of fence shall be measured separately and the quantity shall be taken as the length of fence which is permanently erected using material arising from fences which have been dismantled elsewhere. Additional new material used during the re-erection of existing fences shall be measured under item 8.2.

(a) **Fences**

(b)

Gates		Unit	: Nui	nber
iv)	Security fences	Unit :	metro	e (m)
iii)	Pedestrian fences	Unit :	metro	e (m)
ii)	Vermin-proof fences	Unit :	metro	e (m)
i)	Stock-proof fences	Unit :	metro	e (m)

The tendered rate for each kilometre of existing fence moved, or for each existing gate moved shall include full compensation for dismantling old fences, coiling and stacking of material not suitable for re-use, moving all material, including posts and wire and the reerection of the fence or gate in the new position and the provision of binding, typing and straining wire. Additional new material used during the re-erection of the old fence shall be paid for under item 8.2.

The tendered rate for each gate moved shall include full compensation for taking down the gate and re-erecting it where required including all new bolts, nuts and other accessories required, but excluding new gate posts.

PA 8.5 DISMANTLING OF EXISTING FENCES Unit : metre (m)

The unit of measurement shall be the kilometre of existing fencing and gates taken down and dismantled on instructions of the Engineer.

Payment at tendered rates shall include full compensation for taking down existing fences and gates, coiling wires, rolling netting into rolls, transporting the material to designated sites and stacking the material.
PROJECT SPECIFICATION

PARTICULAR SPECIFICATION PB : BUILDING WORK

1. **SCOPE**

This section specifies the general requirements for the construction of buildings.

2. **INTERPRETATIONS**

2.1 SUPPORTING SPECIFICATIONS

- (a) Project Specification;
- (b) SABS 1200 A or SABS 1200 AA as applicable;
- (c) SABS 1200 C;
- (d) SABS 1200 D or SABS 1200 DA as applicable;
- (e) SABS 1200 G or SABS 1200 GA or SABS 1200 GB as applicable.

2.2 **GENERAL**

Building work shall be carried out in accordance with the National Building Regulations and Building Standards Act, 1977, and these specifications.

References to specifications and codes of practice of the South African Bureau of Standards shall be taken to be references to the latest edition of such specifications and codes of practice as amended. Where possible the SABS mark shall appear on all articles, materials or items where it is required to comply with such SABS specification.

2.3 **COMMERCIAL PRODUCTS**

In all instances where the Contractor handles, stores, uses, applies or fixes commercial products, the work shall be strictly carried out according to the instructions of the manufacturer of such products.

2.4 SAMPLES

The Contractor shall furnish without delay, such samples as called for or may be called for by the Engineer. Materials or workmanship not corresponding with approved samples, may be rejected by the Engineer and shall be removed from the works at the cost of the Contractor.

3. MATERIALS

3.1 **CEMENT**

Cement for masonry work comply with the requirements of SANS EN 431-1 and cement for concrete work shall be CEM I portland cement or CEM III blast-furnace cement complying with the requirements of SANS EN 197-1.

Separate storage facilities shall be provided fort he various types of cement.

3.2 WATER

Water shall be clean and free from clay, silt, oil, acid, alkali, organic or other matter which would impair the required strength and durability of mortar, plaster or floor screed.

3.3 LIME

Lime shall be hydrated bedding mortar lime complying with the requirements of SABS 523.

3.4 **AGGREGATE**

Sand for plaster and mortar shall comply with the requirements of SABS 1090, whereas the aggregates for normal and granolithic floor creeds shall comply with the requirements of BS1199 and BS1201 respectively.

3.5 **BURNT CLAY BRICKS**

Burnt clay bricks shall comply with the requirements of SABS 227 and shall also be equal in all respects to the three samples of each type of brick furnished by the Contractor prior to commencement of the works and as approved by the Engineer.

General purpose (special) bricks shall be used in foundation walls and lintels.

The colour and texture of face bricks shall be as specified in the project specifications. Care shall be taken to avoid damage to arisses and faces during transport and handling.

Fire bricks shall be of well burnt refractory fire clay, resistant to spalling and cracking and of same size as the ordinary bricks.

3.6 CONCRETE MASONRY UNITS

Pre-cast concrete masonry units shall comply with the requirements of SABS 1215 and shall be solid unless specified otherwise in the project specifications.

3.7 CALCIUM SILICATE MASONRY UNITS

Calcium silicate masonry units shall comply with the requirements of SABS 285.

3.8 WALL TIES

Wall ties shall comply with the requirements of SABS 28.

3.9 AIR BRICKS

Air bricks shall be well-burnt terra-cotta air bricks in external faces of walls and 250 mm x 150 mm rectangular gypsum air bricks covered with copper mosquito gauze in internal faces.

3.10 BRICK REINFORCEMENT

Brick reinforcement shall be hard drawn mild steel comprising two 3,15 mm diameter wires spaced 75 mm apart and 2,8 mm diameter cross wires spaced at not exceeding 300 mm apart welded to main wires.

3.11 **QUARRY TILES**

Quarry tiles shall be of approved quality, even in thickness, truly square, free from cracks, twists and blemishes and uniform in colour and unless otherwise specified, shall be of approved red colour.

3.12 CERAMIC TILES

Glazed ceramic tiles for walls shall comply with the requirements of SABS 22 and, unless otherwise specified, shall be white, size 150 mm x 150 mm x 6,5 mm thick.

Ceramic tiles for floors shall comply with the requirements of SABS 1449 and, unless otherwise specified, shall be unglazed, size 240 mm x 115 mm x 20 mm thick and of approved colour.

3.13 CONCRETE PAVING SLABS

Concrete paving slabs shall be precast units of grade 25 MPa/13 mm concrete and shall be of approved manufacture, at least 50 mm thick and sizes 250 mm x 250 mm minimum and 600 mm x 600 mm maximum.

Concrete slabs shall be even in thickness, truly square, free from cracks, twists and blemishes, with a uniform natural cement colour and surface finished smoothly in the mould and shall also be equal in all respects to the samples furnished by the Contractor prior to commencement of the works and as approved by the Engineer.

3.14 **DAMP-PROOF MEMBRANE**

Damp-proof membrane under floors, unless otherwise specified, shall be of polyethylene sheeting complying with the requirements of SABS 952 as Type C-plain surfaces specified therein, 250 microns in dry areas and 375 microns in wet areas.

3.15 **DAMP-PROOF COURSE IN WALLS**

Horizontal and vertical damp-proof course, unless otherwise specified, shall be of bituminous sheeting complying with the requirements of SABS 248 and as Type FV (Fibre Base) sheeting or as Type GH (Hessian Base) sheeting specified therein, or of polyethylene sheeting complying with the requirements of SABS 952 and as Type A-plain surfaces 450 microns or as Type B-embossed surfaces 375 microns as described therein.

3.16 **TREATMENT OF TIMBER**

All timber shall be given a preservative treatment suitable for the duty for which the timber is intended in accordance with SABS code of practice 05, and no untreated timber shall be used. The preservative treatment shall not impair the final finish. The timber shall be impregnated throughout. When surface coating is specified, the compounds applied on the surfaces of the timber shall form an unbroken film.

3.17 STRUCTURAL TIMBER

Structural timber, unless otherwise specified, shall be of South African softwood (pine) complying with the requirements of SABS 563 or SABS 1245 and, unless otherwise specified or shown on the drawings, shall be of Grade 4 and shall be marked as laid down in the specification.

Roof battens and other structural timbers not less than 50 mm or more than 65 mm in width and not less than 38 mm or more than 50 mm thickness, shall be of South African softwood (pine) complying with the requirements of SABS 653.

All structural timber shall bear the full standardisation mark of the South African Bureau of Standards.

The tolerance by which "actual" dimensions may vary from the "nominal" dimensions specified or stated on drawings of South African sawn structural softwood, shall be as laid down in SABS 563, SABS 653 and SABS 1245 where relevant.

3.18 STRUCTURAL LAMINATED TIMBER

(a) Stock glued laminated timber of S.A. pine

Stock glued laminated timber of S.A. pine shall comply with the requirements of SABS 1089 and shall be marked as laid down in the specification and shall also bear the standardisation mark of the SABS.

(b) **Designed glued laminated timber**

Structural glued laminated timber shall comply with the requirements of SABS 876 and shall be marked as laid down in the specification and shall also bear the standardisation mark of the SABS.

The timber shall be of -

- (i) softwood or hardwood;
- (ii) the density group and grade;
- (iii) the exposure category;
- (iv) moisture content; and
- (v) of Class A or Class B appearance;

as specified and, in services having timbers treated against infestation by insect pests, shall be treated against pests as laid down in the specification for laminated timber.

3.19 GALVANISED STEEL ROOFING SHEETS

Galvanised steel roofing sheets shall be of the profile as scheduled or shown on the drawings, of 0,60 mm thick mild steel (before galvanising) and shall be galvanised on both sides to the requirements of SABS 934 for a Class Z250 coating, unless a Class Z600 coating is specified, and shall be passivated.

Galvanised iron ridging for ridges and hips of steel covered roofs shall be of 0,60 mm thick flat mild steel (before galvanising), galvanised as specified for roofing sheets in clause 3.19.

3.21 FIBRE CEMENT ROOFING SHEETS

Fibre cement roofing sheets shall be of the profile scheduled or shown on the drawings and shall comply with the requirements of SABS 685. The sheets shall be not less than 6 mm thick.

3.22 ADJUSTABLE FIBRE CEMENT RIDGING

Adjustable fibre cement ridging for ridges of fibre cement covered roofs, shall be of same manufacture as the roofing sheets, of not less than 6 mm thick material, with overlapping end joints and shall suit the profile of the roofing sheets. Width of wing shall be not less than 300 mm measured from the centre of roll.

3.23 FASCIAS AND BARGE BOARDS

Fascias and barge boards shall be, unless otherwise specified, of pressed fibre cement boards of section described in long lengths.

3.24 FIBRE CEMENT FLASHINGS

Fibre cement flashing for horizontal top edges of roofs butting against vertical wall or other surfaces, shall be of same manufacture as the roofing sheets of not less than 6 mm thick material and with overlapping end joints. The flashings shall suit the profile of the roofing sheets and shall extend not less than 300 mm onto the roof sheeting, shall have plain upstands against the vertical surfaces and shall be flashed over with metal as described.

3.25 FIBRE CEMENT GUTTERS

Fibre cement gutters shall be of approved manufacture, of not less than 6 mm thick material and with spigot and socket ends.

Gutter brackets shall be heavy quality galvanised steel or non-ferrous metal brackets as supplied by the manufacturers of the gutters.

3.26 FIBRE CEMENT RAINWATER DOWN PIPES

Fibre cement rainwater downpipes shall be of approved manufacture, with spigot and socket ends. The material in circular rainwater downpipes 75 mm diameter shall be not less than 6 mm thick, and in circular pipes over 75 mm diameter and in all sizes of square and rectangular pipes, shall be not less than 8 mm thick.

Holderbats for rainwater downpipes shall be heavy quality galvanised steel or non-ferrous metal holderbats.

3.27 CONCRETE ROOFING TILES

Concrete roofing tiles shall comply with the requirements of SABS 542, except that the concrete in the body of the tile need not be coloured where tiles have natural stone granular finish, and shall be of pattern and colour specified.

Unless otherwise specified, the tiles shall have natural stone granular finish.

3.28 COVERING TO CEILINGS

(a) **Gypsum plasterboard ceilings with plaster finish**

Gypsum plasterboard for ceilings shall be 6,4 mm thick gypsum ceiling board, complying with the requirements of SABS 266.

The cover strips shall be galvanised or lacquered wire gauze not less than 60 mm wide. The plaster shall be a retarded semi-hydrate wood-fibre plasterboard bonding gypsum plaster.

(b) **Fibre cellulose board ceilings**

Fibre cellulose board for ceilings shall comply with the requirements of SABS 803 and, unless otherwise specified, shall be 6 mm thick and of flat (unpressed) type.

3.29 COVE CORNICES TO CEILINGS

(a) **Gypsum plasterboard cornices**

Cove gypsum plasterboard cornices to ceilings shall comply with the requirements of SABS 622 and shall be of 82 mm or 120 mm girth as specified.

(b) **Timber cornices**

Timber cornices to ceilings shall be 32 mm hardwood Scotia's.

3.30 FLAT FIBRE CEMENT SHEETS

Flat fibre cement sheets other than fibre cellulose boards described in subclause 3.28(b), shall comply with the requirements of SABS 685.

3.31 TIMBER FOR JOINERY

Softwood for joinery shall comply with the requirements of SABS 1359 and hardwood with the requirements of SABS 1099.

Timber for joinery shall be of clear grade, unless otherwise specified. Counter tops and other tops, where only one face side is visible, shall be of semi-clear grade timber.

3.32 FRAMED AND LEDGED BATTEN DOORS

(a) Softwood doors

To be 44 mm thick framed and ledged batten doors complying with the requirements of SABS 545, but the timber shall comply with the requirements of SABS 1359 and shall be of clear grade.

(b) Hardwood doors

To be 44 mm thick framed and ledged batten doors complying with the requirements of SABS 545, but the timber shall comply with the requirements of SABS 1099 and shall be of clear grade. The hardwood shall be solid without any laminations.

3.33 FLUSH DOORS

Flush doors shall be solid laminated, chip core or hollow-core as specified and shall comply with the requirements of SABS 545. All glue used in the manufacture of the doors shall comply with the requirements of the above specification.

Unless otherwise specified, face veneers shall be rotary cut, and shall be of timber specified or where doors are to be painted shall be of timber suitable for painting.

Edge-strips to conceal the vertical edges of doors shall be not less than 10 mm thick and of the same timber as face veneers; edge strips to meeting edges of doors in two leaves where edges are to be rebated, shall be not less than 20 mm thick.

Faces of doors shall be machine-sanded to a smooth and even surface.

All glueing together of core strips and glueing on of veneers, edge-strips, etc. shall be done under hydraulic pressure.

The top and bottom edges of doors showing end grain, shall be sealed with lacquer, or other suitable material, before leaving the manufacturer's works, and similarly sealed after doors are fitted into frames if the edges of doors are disturbed during fitting.

3.34 **IRONMONGERY**

All ironmongery shall be of best quality and shall be approved by the Engineer, before fixing.

Screws for fixing of articles shall be of similar metal than the articles.

Locks shall comply with the requirements of SABS 4 and shall be supplied with two keys each.

Unless otherwise specified, interior and exterior doors shall be fitted with two and four lever heavy-duty mortice locks respectively, which shall be master-keyed.

No key shall pass a second lock. On no account shall the keys be delivered with the doors or locks to the building site. Failure to observe these instructions may entail the provision of new locks and keys.

3.35 HOT-DIP GALVANISING TO STEELWORK

Where prescribed, all steelwork built in as the work proceeds, shall be hot-dip galvanised after fabrication and before leaving the manufacturer's works, in accordance with SABS 763.

Where they occur, site welds shall be zinc sprayed in order that the zinc coating be even and continuous over all surfaces.

3.36 PRESSED STEEL DOOR FRAMES

Pressed steel door frames shall comply with the requirements of SABS 1129 and shall be constructed of 1,6 mm thick mild steel sheeting, pressed or rolled to the required shapes, properly mitred, welded and reinforced.

Frames shall be of widths required to suit the thickness of walls into which they are built and shall be fitted with suitable tie-bars and braces at bottom, and lugs for building in, three to each jamb of frames without fanlights and four to each jamb of frames with fanlights.

Where fanlights are shown over doors, the frames shall be fitted with transoms of pressed or rolled steel sheet as above and rebate for fanlights and for doors if required.

The rebates in frames and transoms for doors and fanlights shall be of width required to suit the thickness of doors and fanlights.

Frames shall each be fitted in the rebate of one jamb with a pair of approved 100 mm steel butt hinges, and transom to opening fanlights hung at bottom shall each be fitted with a pair of approved 75 mm steel butt hinges, all set flush into recesses in frames and either fixed with countersunk screws or securely welded on.

Frames shall be holed as and where required for screws fixing fanlight openers, keeps of spring catches, etc. Where fanlights are shown to be fixed into frames, the frames shall be holed in the rebates, for screws, securing the fanlights, four to each frame.

Frames shall each be fitted in one jamb, with approved chromium plated or stainless steel (unless otherwise specified) adjustable striking plate keep, boxed in at back of frame with sheet metal box welded on, and not less than two rubber buffers.

All welding shall be cleaned off smooth and flush on exposed faces and frames shall be cleaned and primed as described for steel windows before leaving the manufacturer's works.

3.37 STEEL DOORS, SIDELIGHTS AND FANLIGHTS

Steel doors, sidelights and fanlights shall, in the case of stock types, comply with the requirements of SABS 727, and in the case of purpose made types with the constructional and other requirements of the above specification wherever applicable, and shall in addition be equipped with the following:

- (a) Suitable weather bars where required to render doors, etc., perfectly watertight;
- (b) Suitable lugs, or holes at the same spacing as the standard fixing lugs, for screwing frames to plugs in the concrete, where frames of doors, etc. are to be fixed to concrete columns, beams, etc.,
- (c) A primer as described for steel windows, except where hot-dip galvanising is prescribed.

Doors, sidelights and fanlights, unless otherwise shown shall be of "one piece" construction, but where shown to be in two or more "one piece" units, the units shall be coupled together with standard coupling-mullions and/or transoms.

Bottom openings in doors and sidelights shall be fitted with kicking plates of one thickness of 1,6 mm thick mild steel sheet fixed with metal beads.

Frames of outward opening doors shall be fitted at bottom with sills of door framing section (stepped sills) and of inward opening doors with metal ties, welded to frames, for embedding in thresholds (flush sills).

Stock doors, sidelights and fanlights shall be of the types shown on drawings and purpose made doors, sidelights and fanlights shall be constructed to the forms and sizes shown on drawings.

Unless otherwise specified, the doors shall be of not less than 33 mm universal sections and the sidelights and fanlights of standard 25 mm sections.

Fanlights shall be hung and fitted as described for steel windows in clause 3.39.

3.38 BALANCE TYPE STEEL DOOR

The balance type steel door shall be of the "back track" type tip-up door, constructed of not less than 0,8 mm thick mild steel sheeting, pressed to form troughed or fluted pattern horizontal panels, each approximately 200 mm wide, all strongly reinforced at back with 1,2 mm thick top hat section mild steel braces and/or stiffeners and provided all round exposed edges with 1,2 mm thick mild steel channels, all properly welded together and with all welding cleaned off smooth and flush.

The door is to be hung on two galvanised flexible steel cables of not less than 5 mm diameter, connected at lower ends to 125 mm diameter steel encased counterweights of such length and mass as will balance the door in the full open position and connected at upper ends to door unit by passing cables over 140 mm diameter bushed cast aluminium pulleys, securely fixed to 2,50 mm thick mild steel top plates.

The movement of door is to be controlled by means of sintered metal rollers, (nylon rollers are not acceptable) securely fixed at top and centre of outer edges to door unit to operate in horizontal and vertical runner guides respectively. The guides are to be formed of 37 mm x 32 mm x 25 mm mild steel channels and with vertical channels fitted at upper ends with horizontal channels, welded on to form back track for top rollers. Each vertical channel is to be four times bolted to jamb of door opening and each horizontal channel is to be secured in position to internal wall with mild steel angle bracket, twice bolted to wall to form rigid construction.

The counterweights to door to be encased with 2,50 mm thick mild steel cover plates, each the full height of door and securely fixed to wall and channel guide.

Door to be fitted near bottom with cast aluminium lifting handle for operating the door and with chromium plated locking handle, complete with control rods and with striking plate bolted to lintel, over door opening. The locking handle is to be operated from outside and is to be provided with two keys.

Before leaving the manufacturer's works, all metal is to be given a protective priming coat of paint in accordance with the requirements of SABS 909.

3.39 STEEL WINDOWS

Stock residential and industrial type steel windows shall comply with the requirements of SABS 727 and all other types both stock and purpose made shall comply with the constructional and other requirements of the above specification wherever applicable, and shall in addition be equipped with the following:

- (a) Suitable weather bars where required to render the windows perfectly watertight;
- (b) Suitable lugs, or holes at the same spacing as the standard fixing lugs, for screwing frames to plugs in the concrete where frames of windows are to be fixed to concrete columns, beams, etc.;
- (c) Windows and components, except where specified to be hot-dip galvanised, shall before leaving the manufacturer's works, be cleaned by acid pickling rinsing and drying, as laid down in SABS code of practice 064, or by other approved means, to remove all scale, rust, grease, oil and foreign matter and then primed with red oxide zinc chromate primer complying with the requirements of SABS 909, applied by dipping or by means of spray gun.

Ventilators hung at side to open out in windows above ground floors and not accessible for cleaning from an adjoining opening ventilator in the same window or from verandas, balconies and the like, shall be hung on projecting hinges.

Windows, unless otherwise specified, shall be of "one piece" construction, but where shown to be in two or more "one piece" units, shall be coupled together with standard coupling mullions and/or transoms.

Windows shall be fitted with solid brass handles, stays, catches and other fittings, those to windows constructed of universal sections having polished finish and to all other windows rumbled finish. The fittings shall be fixed in such a way as to be removable after windows are glazed.

3.40 **RESILIENT FLOOR FINISHINGS**

Semi-flexible vinyl (vinyl-fibre) floor tiles shall comply with the requirements of SABS 581; flexible vinyl (PVC) floor tiles and sheeting shall comply with the requirements of SABS 786 and thermoplastic (asphaltic) floor tiles shall comply with the requirements of SABS 586. Unless otherwise described, the flooring shall be of marbled pattern and of approved light colour and tiles shall be 230 mm x 230 mm or 250 mm x 250 mm in size.

Vinyl cove skirtings shall be of approved manufacture and colour and unless otherwise stated, 70 mm in height.

3.41 GLASS FOR GLAZING

Glass for glazing shall comply with the requirements of CKS 55.

Glass not exceeding 0,75 square metre surface area of glass pane, shall be flat drawn clear sheet glass of "QQ" quality (ordinary glazing quality) and of 3 mm thickness.

Glass exceeding 0,75 square metre and up to 1,5 square metres surface area of glass pane, shall be clear float glass of "GG" quality (glazing quality) and of 4 mm thickness.

Laminated safety glass for glazing shall be of "SQ" quality (selected glazing quality) and of 6 mm thickness unless otherwise specified. If high impact strength glass is used, whether cut to size or not, the stencil mark is to appear in a prominent place on the glass.

Toughened safety glass for glazing up to 3 square metres shall be, unless otherwise specified, of 4 mm thickness and must be ordered to the correct size as toughened glass can not be cut, and each piece of glass to be marked in a clear and permanent fashion. (For bigger sizes, manufacturer's instructions are to be followed).

Any pane of glass installed in any door shall, where not made of safety glass, be not more than 1 m^2 in area and shall have a nominal thickness of not less than 6 mm.

Obscure glass for glazing, unless otherwise specified, shall be Arctic or other similar approved figured rolled glass, of a nominal thickness of not less than 3 mm for glass panes up to a surface area of 0,75 square metre and not less than 5 mm over 0,75 square metre.

Putty for glazing shall comply with the requirements of SABS 680, of Type I for glazing in wood and of Type II for glazing in steel windows, doors, etc. Putty used for glazing in unpainted hardwoods, shall be tinted to match the colour of the wood.

3.42 **PAINTS**

All materials for paint work for which South African Bureau of Standards specifications have been published, shall comply with the requirements of such specifications and shall bear the standardisation mark of the South African Bureau of Standards on the container or packing. Materials for paint work for which no SABS specifications have been published shall be of brand and manufacture approved by the Engineer.

All materials for paint work must be brought on to the site in unopened containers and no adulteration will be allowed.

Undercoats for paint work shall be as supplied by the manufacturer of the paint being used for the finishing coat.

Paints shall be suitable for application on the surfaces on which they are to be applied, and those used externally shall be of exterior quality or suitable for exterior use.

If necessary, paints shall be strained free from skins and similar impurities immediately before application.

The various primers, undercoats, paints and distempers shall comply with the requirements of the specifications quoted hereunder and shall be of the type of grade stated, viz:

(a) **Primers**

(i) For wood:

SABS 678. Type I shall be used on exterior woodwork and Type III on interior woodwork.

(ii) For metal:

Dip or spray application (red oxide zinc chromate). For steel windows, doors, door jambs, and other articles normally dip or spray primed in the manufacturer's works: SABS 909.

Brush application (zinc chromate). For all metal surfaces primed on site and then painted: SABS 679, Type I.

(iii) For structural steel (red lead)

SABS 312, Type II, Grade I.

(iv) For galvanised iron

SABS 912.

(v) For galvanised metal surfaces and surfaces of non-ferrous metals

Wash primer (metal etch primer) : SABS 723.

(b) Undercoats

For all surfaces under HIGH GLOSS, OIL GLOSS, FLAT and EGGSHELL finishing paints : SABS 681, Type II.

(c) Paints

(i)	High gloss	:	SABS 630				
(ii)	Oil gloss	:	SABS 631				
(iii)	Flat and eggshell	:	SABS 515				
(iv)	Emulsion paint (interior)	:	SABS 633, Grade I				
(v)	Emulsion paint (exterior)	:	SABS 634, Synthetic Polymer Base Type, but pure acrylic resin base for fibre cement surfaces				
(vi)	Aluminium paint	:	SABS 682, Grade II				
(vii)	Roof paint	:	SABS 683, Type B				
(viii)	Structural steel paint	:	SABS 684, Type B				
(ix)	Epoxy tar	:	SABS 801 (types as specified)				
Distemper							

SABS 322

(d)

(e) Varnish for interior use

SABS 887, Type I with eggshell finish.

4. PLANT

4.1 **GENERAL**

The Contractor shall have at his disposal the normal plant necessary for the proper and neat completion and rounding off of all facets of the building work.

5. **CONSTRUCTION**

5.1 **BRICKLAYER**

5.1.1 Cement Mortar

Cement mortar shall, unless otherwise specified, be composed of four parts by volume of sand and one part by volume of cement for normal brickwork, and three parts by volume of sand and one part by volume of cement for reinforced brickwork.

The ingredients for cement mortar shall be measured in proper gauge boxes on a boarded platform and thoroughly mixed. Alternatively mixing may be by means of an approved mechanical batch mixer. Only when the dry ingredients have been thoroughly mixed and a mixture of uniform colour has been obtained may the water be added in sufficient quantity to obtain mortar with the required consistency.

Care shall be taken in mixing cement mortar to remove from the mixing machine or platform any old mortar that has already set, as such mortar must not be incorporated in any new batch.

Cement mortar shall be produced in such quantities as can be used before commencing to set, as no cement mortar that has once commenced to set shall be used in any way.

5.1.2 Brickwork

Brickwork, wherever practicable and not otherwise specified, shall be built in English bond. No false headers shall be used, and none but whole bricks employed, except where legitimately required to form bond.

The brickwork, unless otherwise specified, shall be built in 4:1 cement mortar. Brick arches and brick lintels shall be built in 3:1 cement mortar.

The bricks shall be laid on a solid bed of mortar and all joints thoroughly grouted up solid throughout the whole width of each course.

The brickwork shall be carried up in a uniform manner, no portion being raised more than 1,2 m above an adjacent portion.

The bricks shall be well saturated with water, in the stack or dump, approximately two hours before being used. The tops of walls left off, shall be well wetted before work is recommenced.

All rough and fair cutting and cutting of splays, skew backs, chamfers, etc., shall be properly performed.

All necessary openings for pipes, etc., shall be formed or left and made good after pipes, etc., are fixed in position.

Walls generally shall be taken up two courses above panelled ceilings in the same mortar as the wall below and cut between ties, etc.

Where hollow concrete masonry units are used brick-force shall be built into the walls every third course. Mortar for hollow concrete masonry units shall consist of one part cement, two parts lime and nine parts sand by volume. All cavities below floor level shall be filled with Grade 15 MPa/19 mm concrete.

5.1.3 Mortar Joints

Mortar joints to brickwork generally shall be 10 mm in thickness.

The joints in brickwork receiving plaster, tiling or similar finishings, shall be raked out whilst the mortar is soft to form key for the plaster or mortar backing. The depth of the raking out will depend on the condition of the bricks; the rougher the bricks on face the shallower the raking out and the smoother the bricks the deeper the raking out.

The joints in brickwork shall be flushed off where walls are to be bagged, in readiness for the bagging.

5.1.4 Brickwork In Thicknesses

Walls built in two or three thicknesses shall be tied together with and including metal ties of sufficient length to allow not less than 75 mm of each end to be built into brickwork and shall be spaced not more than 1 m apart to every third course and staggered.

5.1.5 Brickwork In Linings

Linings to concrete shall be tied with and including 4 mm diameter galvanised crimped wire ties of necessary length to allow 75 mm to be bedded into concrete and 75 mm of the other end to be built into brickwork and evenly spaced 1 m apart to every third course and staggered.

5.1.6 Half Brick Thick Walls

Half brick thick walls shall be built in 4:1 cement mortar and reinforced with 75 mm wide brick reinforcement, one row to every eighth course in height, and built 100 mm into main connecting walls. The reinforcement shall be lapped 150 mm at end joints, where these are necessary, and 75 mm at angles.

5.1.7 Cavity Walls

Cavity walls, unless otherwise specified, shall be built with two half brick thicknesses of brickwork in stretcher bond with 50 mm cavity between, and the two thicknesses tied together with 200 mm long metal wall ties of the butterfly type, spaced at not more than 1 m centres alternately to every third course of brickwork.

The cavities shall be carried up from one course of brickwork below damp course level up to two courses below wall plate level, unless otherwise shown or specified. The brickwork above cavities shall be built solid, and where 270 mm thick shall be cut and well bonded where possible. Cavities in foundation walls of cavity walls shall be filled with Grade 15 MPa/19 mm up to 150 mm below the damp-proof course level.

The cavities shall be kept free of all rubbish, mortar droppings and projecting mortar.

The tops of walls shall be covered with planks or sacking during wet weather to prevent rain from entering the cavities.

The cavities shall not be ventilated.

At door, windows and other openings, the cavities shall be stopped 110 mm back from jambs of openings with the inner thickness of brickwork returned and stopped against the outer thickness and not bonded to same. A 110 mm wide strip of damp-proof sheeting as described for damp-proof course in clause 3.15 shall be built in between the two thicknesses in the joint formed by the return and the outer thickness. The damp-proof strip shall be lapped at least 50 mm on to the sheeting between the two thicknesses of sills and between the two thicknesses of lintels.

Sills to windows shall be divided into external and internal thicknesses with strips of dampproof sheeting as above, built in line with the damp-proof sheeting in jambs and extending 100 mm beyond the jambs of openings.

The lintels shall be provided with damp-proof sheeting as described under lintels.

Unless otherwise specified, cavities shall be stopped one course below and one course above and 110 mm from sides of openings for air bricks and the like.

5.1.8 Reinforced Brick Lintels

Reinforced brick lintels shall be built with sound machine made bricks, in 3:1 cement mortar, with all vertical and horizontal joints filled solid with mortar throughout the required number of courses and to a distance of at least 330 mm on either side of the clear opening.

The number of courses in lintels over the various size openings shall be as specified in table hereunder, and reinforcing steel wires or rods shall be built into the first horizontal joint over the bottom course as laid down therein, viz.:

1. SPAN	LINTEL	2. NUMB ER OF COURSES			3.	REINFORCEMENT					
4. 1 m	Not exceeding	5. 4		6. reinforc	One cement fo	row or each	of half	75 brick	mm width	wide soffit.	brick

7. 1,5 m	Over 1 m tot	8.	6	9. One row of 75 mm wide brick reinforcement for each half brick width soffit.
10. 2,1 m	Over 1,5 m tot	11.	7	12. Three 6,3 mm diameter mild steel rods for each half brick width of soffit.

The reinforcing wires and rods shall be of length at least equal to the width of the clear opening plus 330 mm at each end. The reinforcement shall be evenly spaced in the brick joints, with the outer wires or rods having at least 20 mm cover from face of brickwork.

Brick lintels in 270 mm thick cavity walls shall be built in two half brick thicknesses in stretcher bond, with inner face of outer thickness for a depth of three courses above soffit, covered with sheeting as for damp-proof course, the full length of lintels, and space between the two thicknesses for the depth of the sheeting filled in solid with Grade 15 MPa/19 mm concrete. Where cavities continue above lintels, the sheeting shall be taken up and turned on to top of first course of brickwork to inner thickness of wall, above the concrete filling in lintels.

The lintels, except where built over pressed steel door frames and the like, shall be supported on temporary formwork left in position for at least fourteen (14) days.

5.1.9 Beam Filling

Beam filling, unless otherwise specified, shall be half brick thick, built in similar mortar as used in the walls below, cut in between roof timbers and carried hard up to underside of roof covering, and flushed up in mortar.

5.1.10 Bagged Finish To Brickwork

Bagged finish to brickwork, if done whilst the mortar in joints is still soft, shall be formed by rubbing over the wall surfaces with wet rough sacking, until all joints and crevices are filled up and an even surface is obtained. Mortar, as used for building the brickwork, shall be added as may be necessary.

If bagging to walls is done after the mortar in joints has set the wall surfaces shall be rubbed over with wet rough sacking as above, but cement grout shall be added as necessary to fill up the joints and crevices and to obtain an even surface.

5.1.11 Building In Inbrick Work

Ends of timbers, hold-fasts, cramps, gratings, air bricks, dowels, etc., shall be built-in in cement mortar.

Door and window frames and the like shall be set up in positions for building in and securely strutted to prevent distortion whilst the brickwork, lintels, etc., are being built.

Pressed steel door frames shall be grouted in solid at back with cement mortar as the work proceeds.

Wood slips, fixing bricks, hoop iron, roof ties, etc., shall be built in as the work proceeds.

Ventilators shall be built into openings formed in the walls, in 3:1 cement mortar, and grouted in solid with similar mortar and wall finishes made good if disturbed.

Wood frames to doors, windows, etc., shall be set up in position for building in as described and built in as the work proceeds with cramps to jambs of 1,6 mm thick galvanised hoop iron, 32 mm wide, with ends turned 50 mm up against stiles of frames and each twice screwed to frame, and built 450 mm into wall with end turned up into brickwork joint. Cramps shall be built in approximately 0,3 m up from bottom and approximately 0,3 m down from head of frames and intermediately at not exceeding 0,85 m apart. No frame shall have less than two cramps to each jamb irrespective of height.

Cramps to frames in 270 mm thick cavity walls shall be cranked as necessary and built into inner and outer thicknesses of walls alternately.

The stiles of wood door frames, and similar frames not having sills framed in, shall be doweled to concrete, brick, stone and similar thresholds with 10 mm diameter mild steel dowels 75 mm long, one to each stile.

5.1.12 Securing Of Roofs

Roof trusses shall be fixed at each support to walls with ties of 1,2 mm thick galvanised hoop iron, 30 mm wide, built 750 mm deep into brickwork or embedded 300 mm deep into concrete or wrapped around bottom layer of reinforcing in a reinforced concrete beam and, unless otherwise specified, wrapped over truss and fixed with four galvanised nails, 60 mm long and taken up to and lapped round the nearest purlin and well spiked thereto.

5.1.13 Bedding And Pointing

All door, window and similar frames shall be bedded and pointed in 3:1 cement mortar. All wall plates shall be set true and level and bedded in 4:1 cement mortar.

Steel door and window frames shall be carefully pointed all round and made perfectly watertight.

Where steel door and window frames are specified to be pointed with mastic compound they shall be pointed all round externally with an approved waterproof compound, of such composition that it will not stain surrounding surfaces, and that it will adhere tenaciously, remain plastic without sagging or running, be capable of accommodating any normal movement of the joint sealed, and will receive paint without "bleeding". The pointing material shall be forced into the joints, which shall have been previously prepared to receive same, by means of a pressure gun, or by other suitable method, all in accordance with the manufacturer's instructions.

5.1.14 Faced Brickwork

Faced brickwork shall be built fair and the joints shall be square recessed to a depth of approximately 6 mm, formed with a square jointing tool well pressed into the joints as the work proceeds.

The Contractor shall construct a test section of 10 m^2 which shall be approved by the Engineer, before continuing with faced brickwork.

Face bricks shall be sorted by the brick manufacturer at his yard or by the Contractor on the site, to ensure that proper mixing of the bricks within the colour range of each type of facing brick being used is obtained; sudden changes in the general colour of face work in any one type of facing brick will not be acceptable.

Sand in mortar for all faced brickwork shall all be from one source.

Faced brickwork shall be kept perfectly clean and rubbing down of the brickwork shall not be allowed. Scaffold boards shall be turned back during rain to avoid splashing. Soiled brickwork shall be cleaned at the Contractor's expense, and the cleaning method shall be approved by the Engineer.

5.1.15 Fibre Cement Sills

Sills shall be in single lengths cut between reveals, fitted with fixing lugs and solidly bedded in 3:1 cement mortar with a slight projection beyond the finished wall face below.

Internal sills shall be level. External sills shall be set sloping on cut brickwork or on fine concrete filling under.

5.1.16 Laying Of Quarry Tiles

Joints to paving shall be continuous in both directions.

Tiles shall be solidly bedded and jointed in 3:1 cement mortar with joints, unless otherwise specified, 6 mm wide and slightly pointed with a round jointing tool. Tiles shall be well soaked in water before fixing and thoroughly cleaned off after fixing.

Tiles in sills, copings, etc., shall be set with slight projection over finished wall face, and where full tiles do not fit into the length, two cut tiles shall be used, symmetrically placed as directed.

5.1.17 Installation Of Electrical Service

The Contractor shall embed in the concrete and/or brickwork, as the work proceeds, all conduits, boxes, etc., which will be fixed in position by the electricians, and must cut all necessary chases and holes in walls for conduits and form recesses in walls for distribution boards, all in the positions directed, notwithstanding whether the installation of the electrical service is carried out by the Contractor or under a separate contract. Alternatively, distribution boards may be built into walls as the work proceeds, providing prior approval is obtained from the Engineer.

The Contractor shall afford every facility and shall render reasonable assistance to the electricians in carrying out their work, and shall make good where necessary, in all trades, after installation has been completed.

5.1.18 Installation Of Mechanical Equipment

Where the installation of mechanical equipment is carried out under a separate contract the Contractor shall arrange for the building in of special fittings, leaving holes and openings or forming chases in floors, walls, etc., for pipes, cables etc., and for the building in of pipes, sleeves, pipe clips, bolts, etc., as required or directed.

All cutting of holes through finished floors, walls, etc., after the concrete or mortar has set, must be avoided as far as possible, and the Contractor must give ample notice to the Engineer who will ascertain the exact positions where pipe sleeves, pipes, pipe clips, etc., are to be built in.

5.1.19 **Protect And Clean Down Brickwork, Etc.**

Angles of face brickwork, reveals, steps, etc., liable to damage shall be covered up and protected during the progress of the remaining work, and any damage done shall be made good at the Contractor's expense and to the satisfaction of the Engineer.

Face brickwork and brick and tile sills, copings, etc., shall be cleaned down as the work proceeds, and surfaces liable to be soiled by mortar or plaster splashes during the progress of the remaining work shall be covered with paper, pasted on, or by other approved means. At completion of the works the coverings shall be removed and the surfaces again cleaned down to the satisfaction of the Engineer.

Any detergent or other materials used in the cleaning down of face brickwork, etc., shall be of such nature that will not harm adjoining paint and other finishings in any way.

All tile and other pavings shall be thoroughly cleaned off after laying to remove all traces of mortar and other substances, covered up and protected from damage during the progress of the works, and again cleaned off at completion.

5.2 TILER

5.2.1 Laying Of Glazed Ceramic Wall Tiles

The tiles shall be fixed direct to walls in 3:1 cement mortar with horizontal and vertical joints continuous, and shall have all joints rubbed in solid with neat white cement grout. Tiles shall be well soaked in water before fixing and thoroughly cleaned off after fixing.

Unless otherwise specified, the wall tiling shall project approximately 4 mm beyond face of adjoining plaster with all exposed edges finished with glazed rounded edge tiles.

Tiling shall be returned into reveals of openings and on to window sills, and shall be butted at internal angles and provided with glazed rounded edged tiles to external angles, unless otherwise specified.

All necessary cutting to tiles shall be properly performed.

Walls shall be well wetted before tiling is commenced.

5.2.2 Laying Of Ceramic Floor Tiles

Ceramic tiles shall be bedded to a true and even surface on 3:1 cement mortar and with joints not exceeding 2 mm wide.

After the tiles have been allowed to set for a period of not less than twenty four hours the joints shall be grouted in to with approved epoxy compound, or acid proof cement mortar.

5.3 **PLASTERER AND PAVIOR**

5.3.1 Cement Plaster

Cement plaster for one coat work on walls shall be composed of four parts of sand and one part of cement for internal work, and five parts of sand and one part of cement for external work, all by volume, and mixed as described for cement mortar in clause 5.1.1.

Cement plaster on concrete surfaces shall be composed of three parts by volume of sand and one part by volume of cement.

5.3.2 Forming Key To Concrete For Plaster Finish

All surfaces of concrete receiving plaster, or similar finishings, shall be well wetted and wire brushed immediately after the formwork is removed and slushed over with 2:1 cement grout to form key for the finish, to the approval of the Engineer. The slushing to be allowed to set hard before the finish is applied.

Other methods may be used if approved by the Engineer.

Particular care shall be taken in forming the key for plaster where steel shuttering is used, and if considered necessary the surface of the concrete shall be hacked.

5.3.3 Thickness Of Plaster

Plaster on walls shall be not less than 12 mm or more than 20 mm in thickness, and plaster on concrete ceilings and beams shall be not less than 9 mm or more than 16 mm in thickness, unless otherwise specified.

5.3.4 Application Of Plaster

Walls shall be well wetted before plastering is commenced.

The surfaces of internal plaster shall be steel trowelled to a smooth, even and true finish. External plaster shall be finished to a true and even surface with a wood float. All plaster surfaces shall be free from blemish.

Plaster shall be returned into reveals and soffits of openings, and all angles shall be true and straight with salient angles slightly rounded.

The rendering coat of plaster in two coat work shall be approved by the Engineer before the setting coat is applied, and notice shall be given to the Engineer when it is ready for inspection.

All cracks, blisters and other defects shall be cut out and made good and the whole left perfect at completion.

5.3.5 Normal Screeds To Floors

Concrete sub-floors finished with wood mosaic, vinyl sheeting and tiles, and similar finishings, shall be screeded with 3:1 cement mortar, of thickness required, but in no case less than 12 mm, and steel trowelled to a true and smooth surface suitable to receive finishings.

The screeding shall be laid before the concrete sub-floors have matured otherwise the exposed surfaces of concrete shall be thoroughly cleaned with a wire brush, and a coat of neat cement grout applied immediately before the screeding is laid.

The screeding shall be laid in good time to allow of it being perfectly dry when the finishings are laid.

No traffic shall pass over nor shall any building operations take place on the screeding without proper covering first being provided.

5.3.6 Granolithic Screeds

Granolithic screeds shall be composed of two parts by volume of cement and three parts by volume of aggregate with sufficient water added to obtain a consistency as dry as may be practicable. The screed shall be rendered with a wood float and struck off with a steel trowel after set has commenced.

Granolithic screeds to floors, treads of steps, thresholds, and similar horizontal surfaces unless otherwise specified, shall be not less than 25 mm thick. Granolithic screeds to stair risers, sides of kerbs, and other vertical surfaces, shall, unless otherwise specified, be not less than 20 mm thick. Exposed salient angles of granolithic screeds shall be neatly rounded to approximately 20 mm radius, unless otherwise specified.

The granolithic screeds shall be laid before the concrete sub-floor has matured otherwise the exposed surface of concrete shall be thoroughly cleaned with a wire brush, and a coat of neat cement grout applied immediately before the granolithic screed is laid.

The granolithic screeds shall be laid in panels not exceeding 9 m^2 in area, and joined to lines of panels and lined into smaller squares as directed with sunk V-joints. The joints between the panels shall coincide with joints in the concrete sub-floor where possible.

Where granolithic screed is to be tinted it shall be laid in two layers, a lower layer laid to within 6 mm of the finished level, and an upper layer into which the requisite quantity of approved colouring pigment shall have been mixed. No dusting on of colouring material will be allowed.

All granolithic work shall be done by experienced workmen, and shall be protected from injury caused by rain or other extreme weather for twelve hours after being laid, and against too rapid drying whilst hardening, by being covered with wet sacks, or other suitable material, and shall be protected from injury and discolouration during the progress of the remaining work.

Edges of granolithic floors butting against different floor finishings, and edges of margins, etc. shall be true and sharp, and shall be protected by fixing temporary wood strips, which shall remain, in position until the commencement of the laying of the adjoining flooring material.

5.3.7 **Reedings To Steps, Etc.**

The treads of granolithic finished steps and upper surfaces of granolithic finished external thresholds shall be rendered non-slip by reeding same near front edges for a width of 100 mm stopped 100 mm from ends.

5.3.8 **Power Floated Finish**

Power floated finish to floors etc., unless otherwise specified, shall be floated mechanically to smooth and even surfaces before the concrete has set. Small surfaces and inaccessible places to be floated by hand in a similar way. Under no circumstances is cement mortar to be added while floating the concrete.

5.3.9 Laying Of Concrete Paving Slabs And Paving Bricks

Concrete paving slabs and paving bricks shall be bedded and jointed on a layer of 30 mm clean dry river sand. Joints shall be 6 mm wide, continuous in both directions, filled solidly with 3:1 cement mortar and slightly pointed with a round jointing tool. Lengths in excess of 10 metres shall be provided with expansion joints.

5.4 WATERPROOFING

5.4.1 **Damp-Proof Course In Walls**

The damp-proof course shall be the full thickness of walls above foundations and shall be laid without longitudinal joints. At end joints, angles and intermediate junctions the sheeting shall be lapped 150 mm.

Where so specified all laps in the damp-proof course shall be sealed over the whole area of laps, to an approved method. Care shall be taken not to tear or otherwise damage the sheeting.

5.4.2 Damp-Proof Membrane

The damp-proof membrane under floors, etc., shall be laid in the widest practical widths to minimise joints and shall be turned up, dressed to load bearing walls and if applicable lapped with the damp-proof course in the walls. All joints shall be sealed with pressure sensitive tape applied over the leading edge of the joint.

5.4.3 **Expansion Joints**

Expansion joints shall be at least 10 mm wide and filled in with approved bitumen impregnated soft board or closed cell expanded polyethylene strip. Expansion joints shall be

sealed with a two component poly-sulphide joint sealer, 12 mm deep, according to instructions of the manufacturers.

5.5 **CARPENTER AND JOINER**

5.5.1 **Protection Of Timber On Site**

Timber stored on site shall be properly stacked when received, and adequately protected against extremes of weather and exposure to the sun, until required for use.

5.5.2 Wrought Faces

Exposed woodwork, unless otherwise specified, shall be wrought to a smooth surface, and properly sand-prepared to remove all machine or other tool marks.

For each wrought face on structural timber, an allowance will be made off the "nominal" dimensions specified or stated on the drawings, as follows:

- (a) 2,5 mm for "nominal" dimensions up to and including 76 mm;
- (b) 3,5 mm for "nominal" dimensions over 76 mm.

For each wrought face on joinery timber, an allowance will be made off the "nominal" dimensions specified or stated on the drawings, as follows:

- (a) 3 mm for "nominal" dimensions up to and including 76 mm;
- (b) 5 mm for "nominal" dimensions over 76 mm.

The above will be the nett allowances permitted off the "nominal" dimensions specified or stated on the drawings and will not be additional to the tolerances specified for sawn timbers.

All exposed angles of wrought woodwork, unless otherwise specified, shall be arris rounded. The term "arris rounded" denotes that the angles shall be rounded off to approximately 3 mm radius.

Angles of wrought woodwork specified to be angle rounded shall be rounded off to 6 mm radius, unless otherwise shown on the drawings, and shall include, in framed joinery, for housed and mitred joints.

5.5.3 Lengths Of Timbers And Methods Of Jointing

Plates, purlins, battens, laths, slats, etc., shall be in single lengths, but where this is not possible the end joints will be formed as described below. The jointing of plates, battens, etc. at junctions and angles shall also be formed as stated hereunder, viz:

- (a) Wall plates shall be halved at joints and well spiked together, and also at junctions and angles;
- (b) Purlins shall be splayed or spliced at joints and, unless otherwise specified, using timber side plates of the same dimensions as purlins, not less than 600 mm long and four times bolted with M10 mild steel bolts, with two washers each. Adjacent purlins shall not be splayed or spliced in the same bay or on the same rafter;

(c) Sawn battens, laths, slats, etc., shall be butt jointed at heading joints and angles, and wrought battens, laths, slats, etc., shall be splayed at heading joints and mitred at angles, all over points of support and where adjacent, shall not be jointed on the same rafter.

5.5.4 Joints In Roof Trusses

(a) The number of connecting devices to be used at each intersection between two members at any heel joint or any splice in a truss shall be determined from the following table:

13.	SPAN m	14. 3 NAILS P BOLTS AS BEL	6 (90 x mm) LUS M10 SPECIFIED OW	15. BOLTS	M16 ONLY	16. TOOTHE CONNEC	50 mm ED RING CTIONS
17.	3	18.	2	19.	2	20.	1
21.	4	22.	3	23.	2	24.	1
25.	5	26.	3	27.	2	28.	2
29.	6	30.	4	31.	3	32.	2
33.	7	34.	5	35.	3	36.	2
37.	8	38.	5	39.	3	40.	2
41.	9	42.	6	43.	4	44.	3
45.	10	46.	6	47.	4	48.	3

(b) In the case of any joint other than a heel joint or splice, one M10 bolt plus three 90 x 4 mm nails shall be used.

5.5.5 Prefabricated Roof Trusses

Prefabricated timber roof trusses shall be constructed of South African pine as described in clause 3.17 to the designs shown on the detail drawings. The timber shall be of cross-sectional dimensions shown, cut to correct lengths with ends square or cut to the required angle, and shall be assembled in truss fabricating jigs with the truss having the proper camber, and tightly clamped together and joints secured with approved connector plates of galvanised steel sheet, pressed into the timber simultaneously on both sides of the truss with hydraulic press capable of exerting such pressure as will ensure complete penetration of the teeth into the timber. The connector plates shall be of such size as will ensure that the joints so made will adequately withstand the forces exerted on the joints, and to have at least two coats Epoxy Tar finish for coastal areas.

5.5.6 Valleys In Roofs

Valleys in roofs covered with galvanised steel or fibre roofing sheets or with roofing tiles shall each be formed with two 228 mm x 25 mm sawn boards, spiked down to roof timbers, and purlins fixed along outer edges where in galvanised steel and fibre sheet covered roofs and battens along outer edges where in tile covered roofs.

5.5.7 Purlins

Unless otherwise specified, purlins shall be 50 mm x 76 mm and shall be securely nailed to roof timbers at not exceeding 1,14 m centres, ranging perfectly straight and square to the

roof with but joints at heading joints and angles and in the case of wrought purlins splayed joints at heading joints and mitred joints at angles.

5.5.8 Brandering To Ceilings

The brandering shall be 38 mm x 38 mm, securely spiked up to the supporting timbers with 88 mm wire nails at 380 mm centre-to-centre. Cross brandering shall be cut in between the longitudinal brandering and securely skew nailed to same with 75 mm wire nails at joints in ceilings and at edges where required for fixing of cornices.

5.5.9 Steel Roofing Sheets

The sheets shall be secured to wood purlins with approved galvanised iron roofing screws each provided with a plastic or asphalt felt washer and a galvanised steel cup washer over the plastic or felt washer and secured to steel purlins with M6 galvanised hook bolts, provided with similar washers under nut.

Screws and bolts at ends of sheets and at end laps shall be spaced at not exceeding two corrugations apart wherever possible, but in no case more than three corrugations apart, and at intermediate purlins at not more than four corrugations apart; screws or bolts shall, in all cases, be provided in the outermost corrugations of the upper sheets.

All necessary cutting to sheets shall be properly performed. Cut edges at sides of valleys, and elsewhere exposed, shall be perfectly straight.

At exposed verges of roofs the iron shall be finished with neatly formed rolls.

The sheets shall have side laps of not less than one and a half corrugations. The minimum roof slopes and sheet end laps shall be, unless otherwise specified, as prescribed in Table 2 of Schedule 2 of Part L of the National Building Regulations and Building Standards Act, 1977.

5.5.10 Metal Ridging For Steel Covered Roofs

The ridging shall be 450 mm girth with roll top and bent down edges, and shall be lapped 225 mm at end joints, cut and properly lapped and fitted at intersections of ridges, hips and valleys, and close beaten into corrugations of roofing iron. Roll shall be closed at feet of hips and at end of ridging.

Ridging shall be fixed with screws to wood purlins and hook bolts to steel purlins, with washers under heads and nuts, respectively, all as described for fixing roofing sheets, and spaced at not exceeding 300 mm centres.

5.5.11 Fibre Cement Roofing Sheets

The sheets shall be mitre-cut at corners as necessary and laid with smooth surface on top, and shall be secured to wood purlins with 7 mm diameter galvanised drive screws not less than 114 mm long, and to steel purlins with M8 galvanised hook bolts, each provided with a

plastic or asphalt felt washer and a galvanised steel cupped washer over the plastic or felt washer.

Screw and bolt holes in sheets shall be drilled (not punched), and shall be 0,2 mm larger than the diameter of screws and bolts.

The fixing screws, and nuts on fixing bolts, shall not be tightened more than is necessary for the holding down of the sheets and for the proper seating of the washer over the corrugations, so as to allow for slight movement between the sheets and the supporting structure. On no account shall sheets be deflected at the intermediate purlins in an attempt to make the sheets bear on such purlins.

The side laps of sheets shall be sheltered from the prevailing wind by laying the sheets from left to right, or from right to left, depending on the direction of the prevailing wind, the sheets being laid in the opposite direction to that of the wind.

All necessary cutting to sheets shall be properly performed. Cut edges at sides of valleys, and elsewhere where exposed, shall be perfectly straight.

The minimum roof slopes and sheet end laps shall be, unless otherwise specified, as prescribed in Table 1 of Schedule 2 of Part L of the National Building Regulations and Building Standards Act, 1977.

The manufacturer's instructions regarding laying and fixing of sheets, including side laps, mitring of corners and spacing of screws or bolts, shall be followed in all cases.

One month after fixing, the roof covering shall be thoroughly examined, any defects made good and loose screws or bolts tightened.

Roof boards shall be used by all workmen for safety and to avoid damage to the sheeting.

5.5.12 Adjustable Fibre Cement Ridging

The ridging shall be secured to wood purlins with screws and to steel purlins with hook bolts, passed through the roofing sheets, and provided with plastic or felt and steel washers, all as described for fixing fibre cement roofing sheets.

The manufacturer's instructions regarding laying and fixing of the ridging, including spacing of screws or bolts, shall be followed in all cases.

5.5.13 Fascias And Barge Boards

Fascias and barge boards of pressed fibre cement boards shall be butt jointed with 75 mm wide x 3 mm thick galvanised steel plates four times bolted with M6 galvanised bolts over joints.

5.5.14 Fibre Cement Flashings

Fibre cement flashings shall be secured to wood purlins with screws and to steel purlins with hook bolts, passed through the roofing sheets, and provided with plastic or felt and galvanised steel cupped washers, all as described for fixing fibre cement roofing sheets.

The manufacturer's instructions regarding fixing of the flashings, including spacing of screws or bolts shall be strictly adhered to.

5.5.15 Fibre Cement Gutters

Fibre cement gutters shall be bedded in approved bituminous mastic compound and secured with M6 galvanised gutter bolts with heads of bolts on inside of gutters and each bolt provided with asphaltic felt and galvanised steel washer under head and nut, all in accordance with the manufacturer's instructions. The inside surfaces of sockets and the outside surfaces of spigot ends shall be coated with a thin solution of bitumen to enable the compound to adhere fast when applied, and surfaces of washers in contact with each other and with gutters hall be coated with bitumen. After tightening the bolts, all surplus compounds from the joints shall be removed, and the joints externally finished with neatly trowelled fillets of 2:1 cement mortar.

The spigot ends of gutters shall be lapped on to the socket ends in the direction of the flow wherever possible.

The gutters shall be fixed with proper falls on gutter brackets of the fascia type where fixed to fascia boards and of the purlin type where fixed to purlins. Brackets shall be securely screwed to the roof timbers, at not exceeding 1 m centres, and with extra brackets at angles and outlets.

Gutters shall be provided with all necessary angles, stopped ends, outlet nozzles, etc., jointed to gutters as described above.

5.5.16 Fibre Cement Rainwater Down Pipes

Fibre cement rainwater downpipes shall be jointed with tarred hemp rope gasket caulked into each joint, and the joint filled with a suitable bitumen compound and finished off with neatly trowelled fillet of 2:1 cement mortar.

The pipes shall be fixed to walls with holderbats, bolted around pipes immediately below the socket, and with tails builds into walls in 3:1 cement mortar.

Rainwater downpipes shall be provided with all necessary swan necks, branch pieces, plinth bends, radius bends, shoes, etc., jointed to pipes as described above.

5.5.17 Concrete Roofing Tiles

Tiling shall be "straight or broken bond", and vertical joints between tiles and bottom edge of each course of tiles shall range perfectly straight. Unless otherwise specified, interlocking tiles shall be laid to a lap of at least 100 mm and plain tiles to a lap of at least 62 mm.

Half tiles in the case of interlocking tiles, and tile and a half in the case of plain tiles, shall be provided as required at abutments and at verges of roofs. Plain tile roofs shall be provided with double course at eaves.

Unless otherwise specified, each tile in every third course in the case of interlocking tiles, and in every fifth course in the case of plain tiles; all tiles in eaves courses and ridge courses; end tiles in every course at each side of hips and valleys; all tiles adjoining bonnet

hip tiles in plain tile roofs; half tiles, full tiles and tile and a half at verges, and all tiles to open eaves and open overhanging verges, shall be fixed to the battens with galvanised nails of such length as will penetrate the battens to a depth of at least 25 mm.

Tiling shall be carefully cut and dressed at hips and valleys and, where necessary at abutments, etc. Mitred portions of tiles at hips and valleys shall be holed and properly secured.

Hip and ridge tiles for interlocking tile roofs shall be socketed V-type, shall match general tiling, and shall be bedded solid in 3:1 cement mortar with strip of approved bituminous sheeting laid under the mortar bedding, of such width as will give a lap of at least 25 mm on to the roof tiling at each side, and lapped not less than 75 mm at end joints. Socketed joints of hip and ridge tiles shall be bedded in mortar as above and pointed with neatly recessed joints, and hip iron of 25 mm x 4,5 mm mild steel 300 mm long, suitably bent, twice holed and securely nailed to hip rafter, shall be provided at foot of each hip. The mortar bedding shall be trowelled smooth at open ends of ridges.

Ridge tiles for plain tile roofs shall be as above but half-round and but jointed and neatly pointed in tinted 3:1 cement mortar, and hip tiles shall be round pattern bonnet type, to course and bond in with general tiling, and with each tile bedded and neatly pointed in mortar as above and nailed to hip rafter with galvanised nail.

Hip and ridge tiles shall be neatly cut and fitted together at junctions between ridges and hips or valleys, and shall be bedded solid and neatly pointed in tinted 3:1 cement mortar with approved bituminous sheeting under the mortar bedding, cut to shape required and with lap of 25 mm on to the roof tiling.

5.5.18 Covering To Ceilings

(a) **Gypsum plasterboard ceilings with plaster finish**

The ceiling boards shall be in 900 mm or 1 200 m widths, with board at ends of ceilings of widths required to suit length of ceilings. Ceiling board shall be in single lengths to the width of ceilings wherever possible.

The boarding shall be nailed to the brandering, with GREY surface to underside, with 2 mm diameter galvanised or cadmium plated clout headed nails, 38 mm long, spaced at not more than 100 mm apart at edges of boards and 150 mm apart along the intermediate brandering.

The joints between boards shall be loose butt joints and covered with wire gauze strips nailed through the boarding to the brandering at 400 mm centres with 38 mm galvanised clout headed nails.

The bonding plaster shall be applied in two layers by the trowel-float-method to a total thickness of not less than 6 mm, and well pressed into the wire scrim over the joints between the ceiling boards, and finished smooth, even and true.

(b) Fibre cellulose board ceilings

The ceiling boards shall be in the same widths, and fixed as specified for gypsum plasterboard ceilings in paragraph (a).

The joints between the boards shall be covered with 25 mm half-round wood cover beads fixed with 38 mm long nails spaced at not exceeding 300 mm.

5.5.19 Cove Cornices To Ceilings

(a) **Gypsum plasterboard cornices**

Cove gypsum plasterboard cornices shall be nailed through the ceiling boards to the brandering and to wall plugs, at not exceeding 200 mm centres, with 2 mm diameter galvanised or cadmium plated clout headed nails, 38 mm long, or fixed to walls with hardened steel nails driven into the brickwork.

Cornices shall be scribed at internal angles and mitred at external angles and shall be in long lengths with splayed heading joints where necessary.

(b) **Timber cornices**

Scotia's shall be fixed to walls with hardened steel nails driven into the brickwork.

5.5.20 Trapdoors In Ceilings

Openings for trapdoors in ceilings shall be formed with 38 mm x 38 mm brandering all around each opening, spiked together and to bottom edge of the supporting timbers. Size of opening, unless otherwise specified, shall be 650 mm x 650 mm.

Trapdoor shall be formed with skeleton frame of 50 mm x 38 mm brandering, covered on underside with boarding as for ceiling, and hung on a pair of 75 mm steel butts and fitted on underside near closing edge with 100 mm brass bow handle. Soffit of trapdoor shall be flush with soffit of ceiling when closed, and trapdoor shall flap back on to top of the brandering, between tie beams or ceiling joists when open.

When trapdoor is closed it shall rest on 50 mm x 19 mm fillets, fixed on soffit of ceiling all around opening, mitred at angles and securely screwed up to the trimmers. Fillets shall project 12 mm into the opening to carry the trapdoor.

Trapdoors larger than 650 mm x 650 mm shall each be provided with 38 mm x 38 mm brandering across centre, spiked to the skeleton frame.

5.5.21 Ceiling Insulation

Ceilings shall be insulated, where so specified, with approved resin bonded or stitched fibre glass or mineral wool insulation blanket 38 mm thick, cut to size and laid over brandering between ceiling joists and tie beams, etc.

Where insulation is to be in two thicknesses a total thickness of 76 mm is required and the joints shall be staggered.

5.5.22 Framed Joinery

Where the word "Framed" is used it is to include for all mortice and tenon joints, dovetail joints, grooves, stop grooves, rebates, stop rebates, housings, notchings, etc., including housing ends of shelves, divisions, etc.

5.5.23 **Joinery**

Joinery work shall be put in hand immediately after the order has been given to commence work, or after the receipt of detail, where such are to be supplied, and shall not be wedged or glued up until just before fixing in the building.

No framed joinery for services situated inland shall be manufactured in the humid coastal belt, and no framed joinery for the services situated in the coastal belt shall be manufactured inland. This applies to both purpose made and stock joinery.

All exposed softwood timber in joinery which is not to be painted shall be free from large, loose or dead knots, knot holes, checks, splints, wane or other defects, and in joinery which is to be painted shall be free from all defects other than those which can be filled or otherwise made good in such a way as will not impair the paint finish. All exposed hardwood joinery timber shall be free from all knots, knot holes, checks, splints or other defects and, unless otherwise specified, shall also be free of sapwood.

Purpose made joinery shall be manufactured strictly in accordance with detail drawings.

Stock joinery shall be of approved quality. Joinery shall not be primed until it has been inspected and approved.

Skirting, rails and the like shall be in long lengths. Heading joints where necessary shall be splayed. Counter tops, table tops, drainers, and the like, shall be formed with wide boards, jointed with grooved, cross-tongued and glued joints or with grooved rebated and glued joints of approved type; cross-tongues shall be stopped 25 mm back from ends where ends are exposed to view. The boards shall be in single lengths to top, etc., but where this is not possible the heading joints shall be staggered and jointed as above.

Skirting, rails, angle moulds and beadings of all kinds, shall be close fitted, mitred or scribed at angles, and securely fixed; skirtings, rails and the like shall be fixed with hardened steel or other suitable nails driven into the brickwork or shall be nailed to wall plugs spaced at not more than 700 mm apart. Glazing beads and the like shall be mitred at angles and, unless otherwise specified, shall be fixed with panel pins.

5.6 **METALWORK**

5.6.1 Manufactured Steelwork Generally

Welding is to be done electrically in the most up to date manner by skilled workmen and cleaned off on completion.

All welds are to be welded with welding rods of the same chemical composition as the tubes, rods, bars, etc., to be welded and all external welds are to be filed clean and smooth.

Welding to be continuous fillet welding to all exposed edges unless otherwise described.

No scaffolding shall be allowed to rest on or fixed to steel windows, doors, frames, etc., in any way.

5.7 **RESILIENT FLOOR FINISHINGS**

5.7.1 Laying And Fixing

Vinyl sheeting and tiles and such like floor finishings shall be laid in strict accordance with the manufacturer's instructions, on a perfectly dry and clean screeded surface, using an adhesive supplied or recommended by the manufacturer of the flooring material, and rolled with a suitable roller to ensure complete adhesion of the material. The flooring shall be cut where required and neatly fitted against adjoining floors, thresholds, etc. Vinyl skirtings shall be close fitted to floors and walls, butted at end joints, neatly mitred at internal angles and dressed round external angles, and fixed with adhesive as for flooring.

Unless otherwise described, sheet flooring shall be in standard widths with cut sheets at sides of floors as necessary.

5.8 GLAZIER

5.8.1 Fixing Of Glass

Glass fixed with glazing beads in unpainted hardwood doors shall be bedded on strips of rubber, velvet, leather, or felt turned over on to both sides of glass in the rebates to form a soft packing between the glass and the woodwork. In all other cases the glass shall be well bedded in back putty in the rebates.

Glass rebates, other than in unpainted hardwood doors, shall be primed before glazing.

Glass panes exceeding 0.5 m^2 in surface area and fixed with putty only in wood doors, sashes and the like shall be secured in addition with glazing sprigs, and in steel windows and doors with glazing pegs or clips inserted in holes in the steel framing.

Glass panes shall have adequate clearance between the edges of glass and the rebates.

Putty shall be carefully trimmed and cleaned off with front putty worked to within 3 mm of the sight lines.

5.9 **PAINTER**

5.9.1 **Preparatory Work**

(a) General

All floors must be swept clean and walls dusted down, and surfaces not being painted such as face brickwork, sills, floors and stained woodwork covered up and protected against spotting, before any painting is commenced.

No sweeping or dusting shall be done whilst painting is in progress or whilst paint is still wet.

(b) **On woodwork**

Woodwork being painted shall be well brushed down, knots treated with knotting, and all surfaces primed, stopped with hard stopping and rubbed down to an even surface ready to receive the paint.

Woodwork being oiled or stained shall have all plaster stains, pencil marks and other surface discolourations and blemishes carefully removed, and stopped with tinted stopping and well rubbed down.

(c) **On metalwork**

All metal surfaces being painted, except steel structures shall be cleaned of all rust, scale and dirt by scraping or by means of steel wire brushes; also all oil and grease shall be removed and a perfectly clean surface obtained. If necessary the surface shall be decreased immediately before applying the priming coat, by the use of a suitable grease-removing solvent; any salt deposits on the metal surfaces as may occur in industrial and marine atmospheres shall be removed by the use of a suitable detergent and the surface then thoroughly rinsed and allowed to dry.

New galvanised metal surfaces and surfaces of all non-ferrous metals, which are to be painted, shall be cleaned down as above and given one coat of wash primer (metal etch primer).

Protective coatings on new galvanised metal surfaces, applied by the manufacturers to prevent storage stain and white rust, shall be completely removed by the use of a suitable cleaning agent and the surfaces thoroughly rinsed and allowed to dry, before the surfaces are primed or painted.

After cleaning off rust on metalwork those portions so affected shall be treated with an approved rust inhibitor.

(d) **On plaster**

All plastered wall, ceiling and such like surfaces being painted or distempered shall be filled where necessary with suitable stopping or patching plaster and the whole rubbed down ready to receive the finishings.

(e) **On ceilings**

Boarded ceilings, cover strips and cornices being painted or distempered, shall be filled where necessary with suitable stopping and all nail heads in ceilings, cover strips and cornices being distempered shall be primed with flat paint.

5.9.2 Surfaces To Be Dry

All plastered wall, ceiling and similar surfaces shall be perfectly dry and in a fit state to receive the finishings, before the work is put in hand.

5.9.3 **Priming**

Wood, metal and other surfaces normally primed before being painted shall be prepared and primed as before described in readiness to receive the specified paint system.

Backs of wood door and similar frames and surfaces of other new or re-fixed joinery in contact with brickwork, etc., and built in as the work proceeds, shall be primed before

building in whether the articles are to be painted or not, to prevent moisture seeping into the wood from the mortar bedding.

Wood surfaces shall be knotted, primed and stopped before being coated with emulsion paint or distemper.

Tongued and grooved and rebated edges of boards in batten doors, and other suchlike inaccessible parts of joinery shall, before the joinery is assembled, be primed or where the joinery is to receive a finish other than paint, be given one coat of such other finishing material.

Priming to external structural timbers shall be applied before the timbers are fixed in position and shall include all wrought surfaces, such as backs of fascia and barge boards.

5.9.4 Application Of Paint

All coats of paint shall be thoroughly dry before subsequent coats are applied and rubbed down where necessary.

All work shall be finished to colour approved by the Engineer. The tints of undercoats shall approximate those of the finishing colour and in order to indicate the number of coats applied and to avoid misses when applying a succeeding coat, a slight difference shall be made in tint of each coat.

Priming on wood surfaces shall be by brush application. Priming on surfaces other than wood shall be by brush application or if in the opinion of the Engineer, the primer and the surfaces are considered suitable for roller application, the primer may be so applied. Priming applied by brush application shall be well brushed in to obtain maximum penetration.

Undercoat and finishing coats may be applied by brush or roller.

The use of spray gun on site for application of paint will not be permitted, except in the case of cellulose and other special cases where spraying is the accepted method of application; in cases where spraying is permitted all surrounding surfaces shall be properly masked.

The finishing coat on woodwork and metalwork, unless otherwise specified, shall be of high gloss paint. All materials shall be used in strict accordance with the manufacturer's instructions.

5.10 **PROTECTION AND CLEANING OF WORKS**

The Contractor shall provide all necessary dust sheets, covers, etc., and shall exercise all necessary care to prevent marking surfaces of walls, floors, ceilings, glass, electrical fittings, etc., and shall keep all parts of the works perfectly clean and free at all times from spotting, accumulation of rubbish, debris or dirt arising from the operations. Any surface disfigured or otherwise damaged shall be completely renovated or replaced as necessary, to the Engineer's approval, by the Contractor at his own expense.

The Contractor shall test all doors, fanlights and windows and all other fittings for proper operation and effect the required rectification prior to the handing over of the building.

The premises shall be left clean and fit for occupation at the completion of the work.

6. TOLERANCES

6.1 **BASIS OF MEASUREMENT**

6.1.1 General

Permissible deviations will apply in the case of linear dimensions, position, and level. The Contractor shall construct each of the various parts of the works within the limits of the applicable permissible deviations set out in clause 6.2 unless some other degree of accuracy is required in terms of the project specification or is shown on the drawings.

6.1.2 Methods Of Measurement Of Deviations

Certain deviations will be measured as set out below:

- (a) Any deviation from flatness of a plane surface, will be measured as the maximum deviation of the surface from any straight line of length 3 m joining two points on the surface, determined by means of a straight edge the ends of which are supported on identical blocks of suitable thickness placed one over each of the points.
- (b) Any abrupt change in a continuous surface, including a local depression or peak in a floor or wall, will be measured as specified in (a) above.
- (c) Out-of-squareness of a corner or an opening or an element such as a column will be measured by taking the longer of two adjacent sides as the base line, and determining any departure from the perpendicular of the side at either end of this base line.

6.2 **PERMISSIBLE DEVIATIONS**

The permissible deviations for elements or components shall be as follows:

(a)	Posit neare	Position on plan of any edge or surface measured from the nearest grid line or agreed centre line ± 25 mm					
(b)	Linea	Linear (other than cross-section) dimensions $\dots \pm 30 \text{ mm}$					
(c)	Cross-section dimensions10 + 20 mm						
(d)	Level (deviation from designed level with reference to the nearest transferred datum (TD) of the upper or lower surface, as may be specified, of any slab or other element or component) ± 10 mm						
(e)	(e) Out-of-squareness of a corner or an opening or an element such as a column (See claus 6.1.2(c)) for short side of length:						
	(i)	up to and including 0,5 m \pm 5 mm					
	(ii)	over 0,5 m up to and including 2 m \pm 15 mm					
	(iii)	over 2 m up to and including 4 m ± 20 mm					

7.	TEST	S	
	(h)	Surface	e of plaster and normal or granolithic screeds $\pm 5 \text{ mm}$
		(ii)	Abrupt changes in a continuous surface $\pm 5 \text{ mm}$
		(i)	Flatness of plane surface $\pm 10 \text{ mm}$
	(g)	Expose	ed surface to be plastered or receive normal or granolithic screeds:
		(ii)	Abrupt changes in a continuous surface $\pm 5 \text{ mm}$
		(i)	Flatness of plane surface $\pm 5 \text{ mm}$
	(f)	Expose	ed surface (including floor slabs and paving):

7.1 **GENERAL**

The Engineer shall have free access to the works for taking samples and carrying out tests. The Contractor shall render any assistance necessary. If so required, the Contractor shall provide storage and protection of such samples on site.

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19019-C-13	Water Details
19019-C-D-100	Dormitory Foundation Layout and Details
19019-C-D-101	Dormitory Foundation Reinforcement layout and BS
19019-C-D-102	Dormitory Stormwater Channel Reinforcement and BS
19019-C-D-200	Dormitory Roof Layout
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D-JS.02	Work Table
D-JS.03	Bench
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D-JS.6	Mirror
	D-PL FLOOR PLANS
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	D-RP ROOF PLAN
D-PL.01	Dormitory Roof Plan
	D-S SECTIONS
D-S.01	Dormitory Sections
D-S.02	Sections D5, D6 and D7
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	D-SL SANITARY LAYOUTS & ELEVATIONS
D-SL.01	Para WC & Shower
D-SL.02	Ladies Toilet
D-SL.03	Gents Toilet and Sanitary Layout
D-SL.04	Gents Toilet Urinal Area and Sanitary Layout
	D-SS SANITARY SCHEDULES
D-SL.01	Dormitory Sanitary Schedule
D-SL.02	Dormitory Sanitary Schedule
D-SL.03	Dormitory Sanitary Schedule
D-SL.04	Dormitory Sanitary Schedule
D-SL.05	Dormitory Sanitary Schedule
	D-WS WINDOW SCHEDULES
D-WS.12	WS Window Schedule
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	INTERNAL WATER
19019-M-WS-01	Internal Water Reticulation Layout - Kitchen
19019-M-WS-02	Internal Water Reticulation Layout - Dormitory Ablution
19019-M-WS-03	Internal Water Reticulation General Notes & Specifications
	INTERNAL SEWER
19019-M-SW-01	Internal Sewer Reticulation Layout - Kitchen
19019-M-SW-02	Internal Sewer Reticulation Layout - Dormitory Ablution
	VENTILATION
19019-M-VENT-01	Ventilation Layout - Dormitory
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20001-001	Site Reticulation Layout
20001-E-B1-00-100	Block B1 Dormitory Electrical Installation Power Layout
20001-E-B1-00-200	Block B1 Dormitory Electrical Installation Lighting Layout
20001-E-B1-1100	Block B1 (Dormitory) Single line Diagram
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Supplementary Information

PART 3 – Conditions of Contract and Contract Forms

Section VII. General Conditions of Contract

These General Conditions of Contract (GCC), read in conjunction with the Particular Conditions of Contract (PCC) and other documents listed therein, should be a complete document expressing fairly the rights and obligations of both parties.

These General Conditions of Contract have been developed on the basis of considerable international experience in the drafting and management of contracts, bearing in mind a trend in the construction industry towards simpler, more straightforward language.

The GCC can be used for both smaller admeasurement contracts and lump sum contracts.

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General Conditions of Contract

A. General

1.	Definitions	1.1	Boldfa	ace type is used to identify defined terms.
			(a)	The Accepted Contract Amount means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
			(b)	The Activity Schedule is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.
			(c)	The Adjudicator is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.
			(d)	Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.
			(e)	Compensation Events are those defined in GCC Clause 41 hereunder.
			(f)	The Completion Date is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 52.1.
			(g)	The Contract is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC Sub- Clause 2.3 below.
			(h)	The Contractor is the party whose Bid to carry out the Works has been accepted by the Employer.
			(i)	The Contractor's Bid is the completed bidding document submitted by the Contractor to the Employer.
			(j)	The Contract Price is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.

- (k) Days are calendar days; months are calendar months.
- (l) Dayworks are varied work inputs subject to payment on a

time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

- (m) A Defect is any part of the Works not completed in accordance with the Contract.
- (n) The Defects Liability Certificate is the certificate issued by Project Manager upon correction of defects by the Contractor.
- (o) The Defects Liability Period is the period **named in the PCC** pursuant to Sub-Clause 33.1 and calculated from the Completion Date.
- (p) Adjudicator means the single person appointed under Clause 23.
- (q) Drawings means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.
- (r) The Employer is the party who employs the Contractor to carry out the Works, **as specified in the PCC**.
- (s) Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
- (t) "In writing" or "written" means hand-written, typewritten, printed or electronically made, and resulting in a permanent record;
- (u) The Initial Contract Price is the Contract Price listed in the Employer's Letter of Acceptance.
- (v) The Intended Completion Date is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the PCC. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.
- (w) Materials are all supplies, including consumables, used by the Contractor for incorporation in the Works.
- (x) Plant is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.
- (y) The Project Manager is the person named in the PCC

(or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

- (z) PCC means Particular Conditions of Contract
- (aa) The Site is the area **defined as such in the PCC**.
- (bb) Site Investigation Reports are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.
- (cc) Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.
- (dd) The Start Date is **given in the PCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.
- (ee) A Subcontractor is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.
- (ff) Temporary Works are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.
- (gg) A Variation is an instruction given by the Project Manager which varies the Works.
- (hh) The Works are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the PCC.
- 2. Interpretation 2.1 In interpreting these GCC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
 - 2.2 If sectional completion is **specified in the PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion

Date for the whole of the Works).

- 2.3 The documents forming the Contract shall be interpreted in the following order of priority:
 - (a) Agreement,
 - (b) Letter of Acceptance,
 - (c) Contractor's Bid,
 - (d) Particular Conditions of Contract,
 - (e) General Conditions of Contract,
 - (f) Specifications,
 - (g) Drawings,
 - (h) Bill of Quantities,⁸ and
 - (i) any other document **listed in the PCC** as forming part of the Contract.
- **3. Language and** 3.1 The language of the Contract and the law governing the Contract are **stated in the PCC**.
- 4. Project
Manager's
Decisions4.1Except where otherwise specifically stated, the Project Manager
shall decide contractual matters between the Employer and the
Contractor in the role representing the Employer.
- 5. Delegation 5.1 Otherwise specified in the PCC, the Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may revoke any delegation after notifying the Contractor.
- 6. Communications6.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.
- **7. Subcontracting** 7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.
- 8. Other
 8.1 The Contractor shall cooperate and share the Site with other contractors
 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the PCC. The Contractor shall also provide

⁸ In lump sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

- 9. Personnel and Equipment
 9.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid, to carry out the Works or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.
 - 9.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.
- 10. Employer's
and
Contractor's
Risks10.1 The Employer carries the risks which this Contract states are
Employer's risks, and the Contractor carries the risks which this
Contract states are Contractor's risks.
- **11. Employer's**
Risks11.1 From the Start Date until the Defects Liability Certificate has
been issued, the following are Employer's risks:
 - (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to
 - (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or
 - (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.
 - (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.
 - 11.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage

due to

- (a) a Defect which existed on the Completion Date,
- (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or
- (c) the activities of the Contractor on the Site after the Completion Date.
- 12. Contractor's Risks
 12.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.
- 13. Insurance 13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the PCC for the following events which are due to the Contractor's risks:
 - (a) loss of or damage to the Works, Plant, and Materials;
 - (b) loss of or damage to Equipment;
 - (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
 - (d) personal injury or death.
 - 13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
 - 13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
 - 13.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.
 - 13.5 Both parties shall comply with any conditions of the insurance

policies.

- 14. Site Data 14.1 The Contractor shall be deemed to have examined any Site Data referred to in the PCC, supplemented by any information available to the Contractor.
- 15. Contractor to Construct the Works in accordance with the Specifications and Drawings.
- 16. The Works to Be Completed by the Intended Completion Date
 16.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.
- 17. Approval by
the Project
Manager17.1 The Contractor shall submit Specifications and Drawings
showing the proposed Temporary Works to the Project Manager,
for his approval.
 - 17.2 The Contractor shall be responsible for design of Temporary Works.
 - 17.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.
 - 17.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.
 - 17.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.
- **18. Safety** 18.1 The Contractor shall be responsible for the safety of all activities on the Site.
- 19. Discoveries19.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
- 20. Possession of the Site
 20.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the PCC, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
- **21. Access to the** 21.1 The Contractor shall allow the Project Manager and any person

Site

authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

- 22. Instructions, Inspections and Audits22.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.
 - 22.2 The Contractor shall permit, and shall cause its Subcontractors and subconsultants to permit, the Government and/or persons appointed by the Government to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract and the submission of the bid, and to have such accounts and records audited by auditors appointed by the Government if requested by the Government. The Contractor's and its Subcontractors' and subconsultants' attention is drawn to Sub-Clause 57.1 which provides, inter alia, that acts intended to materially impede the exercise of the Government's inspection and audit rights provided for under Sub-Clause 22.2 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to ZPPA's prevailing sanctions procedures).
- 23. Appointment of the Adjudicator
 23.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the PCC, to appoint the Adjudicator within 14 days of receipt of such request.
 - 23.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority **designated in the PCC** at the request of either party, within 14 days of receipt of such request.
- 24. Procedure for Disputes24.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.

- 24.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.
- 24.3 The Adjudicator shall be paid by the hour at the **rate specified in the PCC**, together with reimbursable expenses of the types **specified in the PCC**, and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision shall be final and binding.
- 24.4 The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and in the place specified **in the PCC.**

B. Time Control

- 25. Program 25.1 Within the time stated in the PCC, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.
 - 25.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
 - 25.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period **stated in the PCC.** If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount **stated in the PCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.
 - 25.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and

Manager

Compensation Events.

26. Extension of the Intended Completion Date
 26.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

- 26.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 27. Acceleration 27.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
 - 27.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
- 28. Delays 28.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
- 29. Management Meetings29.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
 - 29.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
- 30. Early Warning 30.1 The Contractor shall warn the Project Manager at the earliest

opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.

30.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

- 31. Identifying Defects31.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
- 32. Tests32.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
- 33. Correction of Defects33.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the PCC. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
 - 33.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
- 34. Uncorrected Defects34.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.

D. Cost Control

- **35. Contract Price** 35.1 In the case of an admeasurement contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.
 - 35.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.
- **36. Changes in the** 36.1 In the case of an admeasurement contract: **Contract Price**
 - (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.
 - (b) The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.
 - (c) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.
 - 36.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.
- **37. Variations** 37.1 All Variations shall be included in updated Programs, and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.
 - 37.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the

quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

- 37.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.
- 37.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
- 37.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 37.6 In the case of an admeasurement contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in Sub-Clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.
- 38. Cash Flow
 Forecasts
 38.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.
- **39. Payment Certificates** 39.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.
 - 39.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.
 - 39.3 The value of work executed shall be determined by the Project Manager.
 - 39.4 The value of work executed shall comprise:

- (a) In the case of an admeasurement contract, the value of the quantities of work in the Bill of Quantities that have been completed; or
- (b) In the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule.
- 39.5 The value of work executed shall include the valuation of Variations and Compensation Events.
- 39.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
- 40. Payments 40.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.
 - 40.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.
 - 40.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.
 - 40.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

41. Compensation Events

- 41.1 The following shall be Compensation Events:
 - (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 20.1.
 - (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the

Contract.

- (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
- (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- (e) The Project Manager unreasonably does not approve a subcontract to be let.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effects on the Contractor of any of the Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.
- 41.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
- 41.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed

	based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.
41.4	The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
42.1	The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days

unreasonable, the Project Manager shall adjust the Contract Price

- 42. Tax42.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC Clause 44.
- **43. Currencies** 43.1 Where payments are made in currencies other than the currency of the Employer's country **specified in the PCC**, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.
- 44. Price 44.1 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the PCC. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type indicated below applies to each Contract currency:

$$P_c = A_c + B_c Imc/Ioc$$

where:

P_c is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."

 A_c and B_c are coefficients⁹ **specified in the PCC**, representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency "c;" and

Imc is the index prevailing at the end of the month being

⁹ The sum of the two coefficients A_c and B_c should be 1 (one) in the formula for each currency. Normally, both coefficients shall be the same in the formulae for all currencies, since coefficient A, for the nonadjustable portion of the payments, is a very approximate figure (usually 0.15) to take account of fixed cost elements or other nonadjustable components. The sum of the adjustments for each currency are added to the Contract Price. [To be transferred to the User Guide]

invoiced and Ioc is the index prevailing 28 days before Bid opening for inputs payable; both in the specific currency "c."

- 44.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next payment certificate. The index value shall be deemed to take account of all changes in cost due to fluctuations in costs.
- **45. Retention** 45.1 The Employer shall retain from each payment due to the Contractor the proportion **stated in the PCC** until Completion of the whole of the Works.
 - 45.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC 51.1, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an "on demand" Bank guarantee.
- 46. Liquidated Damages
 46.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the PCC for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the PCC. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.
 - 46.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC Sub-Clause 40.1.
- 47. Bonus47.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in the PCC for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.
- **48. Advance Payment 48.1** The Employer shall make advance payment to the Contractor of the amounts **stated in the PCC**,

against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

- 48.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.
- 48.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
- 49. Securities49.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount specified in the PCC, by a bank or surety acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Completion Certificate in the case of a Performance Bond.
- **50. Dayworks** 50.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.
 - 50.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.
 - 50.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.
- **51. Cost of** 51.1 Loss or damage to the Works or Materials to be incorporated in

Repairs the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

- **52. Completion** 52.1 The Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the whole of the Works is completed.
- **53. Taking Over** 53.1 The Employer shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.
- 54. Final Account
 54.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.
- 55. Operating and Maintenance Manuals
 55.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the PCC.
 - 55.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the PCC** pursuant to GCC Sub-Clause 55.1, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the PCC** from payments due to the Contractor.
- **56. Termination** 56.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
 - 56.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:
 - (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;

- (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
- (c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager's certificate;
- (e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
- (f) the Contractor does not maintain a Security, which is required;
- (g) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as **defined in the PCC**; or
- (h) if the Contractor, in the judgment of the Employer, has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC Clause 57.1.
- 56.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC Sub-Clause 56.2 above, the Project Manager shall decide whether the breach is fundamental or not.
- 56.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.
- 56.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.
- 57. Fraud and Corruption
 57.1 If the Employer determines that the Contractor and/or any of its personnel, or its agents, or its Subcontractors, subconsultants, services providers, suppliers and/or their employees has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 56 shall apply as if such expulsion had been made under Sub-Clause 56.5 [Termination by

Employer].

- 57.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with Clause 9.
- 57.3 For the purposes of this Sub-Clause:
 - (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party¹⁰;
 - (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation¹¹;
 - (iii) "collusive practice" is an arrangement between two or more parties¹² designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - (iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party¹³;
 - (v) "obstructive practice" is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Government investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
 - (bb) acts intended to materially impede the exercise of the Government's inspection and audit rights provided for

¹⁰ "Another party" refers to a public official acting in relation to the procurement process or contract execution]. In this context, "public official" includes Government staff and employees of other organizations taking or reviewing procurement decisions.

¹¹ "Party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

¹² "Parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

¹³ "Party" refers to a participant in the procurement process or contract execution.

under Sub-Clause 22.2.

58. Payment upon Termination 58.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the PCC. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

- 58.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.
- **59. Property** 59.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
- 60. Release from Performance60.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.
- 61. Suspension of
Contractor61.1 In the event that ZPPA suspends the Contractor pursuant to the
Public Procurement Act of 2008:
 - (a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received ZPPA's suspension notice.
 - (b) If the Contractor has not received sums due it within the 28 days for payment provided for in Sub-Clause 40.1, the Contractor may immediately issue a 14-day termination notice.

Section VIII. Particular Conditions of Contract

Except where otherwise indicated, all PCC should be filled in by the Employer prior to issuance of the Bidding Documents. Schedules and reports to be provided by the Employer should be annexed.

A. General						
GCC 1.1 (r)	The Procuring Agent is: SNV on behalf of Ministry of Agriculture					
	The Employer is: SNV					
GCC 1.1 (v)	The Completion Date for the whole of the Works shall be <i>15th January 2021</i>					
	Deadlines and deliverables are below:					
	1. By 10 th December 2020- All materials delivered on site					
	2. 11 th December 2020- works start on site					
	3. 30 th December 2020- 60% of works done					
	4. 15 th January 2021- works completed					
GCC 1.1 (y)	The Project Manager is					
	WML Consulting Engineers					
174 Nelson Mandela Street, Eros, Windhoek, Namibia						
	Telephone: +264 (0)61220285					
	Email: <u>wml@wmleng.com</u>					
	Att: Claus Heydenrych					
GCC 1.1 (aa)	The Site is located at the exsiting Farmers Training Centre, Katete, Eastern Province.					
GCC 1.1 (dd)	The Start Date shall be 5 calendar days after signing of the Contract .					
GCC 1.1 (hh)	The Works consist of Renovations and Additions Of Infrastructure At The existing Farmer Training Centre (FTC) In Katete.					

GCC 2.2	Sectional Completions are: <i>N/A</i>			
GCC 3.1	The language of the contract is English			
	The law that applies to the Contract is the law of Zambia .			
GCC 5.1	The Project manager <i>may</i> delegate any of his duties and responsibilities.			
GCC 13.1	The minimum insurance amounts and deductibles shall be:			
	(a) for the Works, Plant and Materials:			
	Full Contract amount of the works plus 25%			
	(b) for loss or damage to Equipment:			
	Contractor's own responsibility for the replacement value of the equipment that the contractor intends to use on site until the taking over by the Employer.			
	(c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract:			
	Contractors own responsibility for an amount representing the value of the properties that are exposed to the action of the contractor in the execution of the works including the employer's property.			
	(d) for personal injury or death:			
	(i) of the Contractor's employees:			
	ZK 2,000,000.00 for each and every claim occurrence without a limit to the number of occurrences.			
	of other people:			
	 (ii) for loss or damage to materials on-site and for which payment have been included in the Interim Payment Certificate, where applicable. 			
	To be covered by insurance for the Works, Plant and Materials.			
	The Contractor shall choose to take the insurance covers indicated above as separate covers or a combination of the Contractor's All Risks coupled with the Employer's liability and First Loss Burglary, after approval of the Employer. All insurance covers shall be of nil or the minimum possible deductibles at sole expense of the contractor.			

GCC 14.1	Site Data are: Existing Farmers Training Centre, Katete Eastern Province.			
GCC 20.1	The Site Possession Date(s) shall be: 17 th November 2020			
GCC 23.1 & GCC 23.2	Appointing Authority for the Adjudicator: To be Nominated by the President of the Engineering Institution of Zambia (EIZ).			
	(a) No Adjudicator shall be appointed at the issuance of the Notification of Award.			
	An Adjudicator will be appointed if and when disputes may arise during the contract.			
GCC 24.3	Hourly rate and types of reimbursable expenses to be paid to the Adjudicator:			
	Hourly rate and types of reimbursable expenses to be paid to the adjudicator: as per the National Adjudicator List (NAL)			
GCC 24.4	Institution whose arbitration procedures shall be used: Zambian Law			
	The place of arbitration shall be: Zambia			
B. Time Control				
GCC 25.1	The Contractor shall submit for approval a Program for the Works within 3 calendar days from the date of the Letter of Acceptance.			
GCC 25.3	The period between Program updates is thirty (30) calendar days.			
	The amount to be withheld for late submission of an updated Program is ZK3,000.00			
	C. Quality Control			
GCC 33.1	The Defects Liability Period is: 365 (three hundred sixty-five) days.			
	D. Cost Control			
GCC 43.1	The currency of the Employer's country is: Zambian Kwacha			
GCC 44.1	The Contract is not subject to price adjustment in accordance with GCC Clause 44, and the following information regarding coefficients does <i>not</i> apply.			
GCC 45.1	The proportion of payments retained is: 10% (ten percent) of the value of the works and materials valued, until such time as the amount retained equals 5% (five percent) of the contract sum, excluding added taxes.			
GCC 46.1	The liquidated damages for the whole of the Works are 1/75 of a percent of			

	the contract value per calendar day.			
	The maximum amount of liquidated damages for the whole of the Works is: 2.5% of the accepted bid.			
GCC 47.1	The Bonus for the whole of the Works is N/A .			
GCC 48.1	The Advance Payments shall be: N/A			
GCC 49.1The Performance Security amount is				
	(a) Bank Guarantee: 10% of contract price			
E. Finishing the Contract				
GCC 55.1	The date by which operating and maintenance manuals are required is within fourteen (14) calendar days of substantial completion.			
	The date by which "as built" drawings are required is 30 days after completion of project			
GCC 55.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required in GCC 58.1 is ZK5,000.00			
GCC 56.2 (g)	The maximum number of days is: N/A			
GCC 58.1	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is 10%			

Section IX - Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

Table of Forms

Letter of Acceptance	
Contract Agreement	
Performance Security	
Advance Payment Security	

Letter of Acceptance

[on letterhead paper of the Employer]

.....[date].....

To: [name and address of the Contractor]

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the of the Performance Security Form included in Section IX (Contract Forms) of the Bidding Document.

[Choose one of the following statements:]

We accept that ______ [insert the name of Adjudicator proposed by the Bidder] be appointed as the Adjudicator.

[or]

We do not accept that _______*[insert the name of the Adjudicator proposed by the Bidder]* be appointed as the Adjudicator, and by sending a copy of this Letter of Acceptance to _______*[insert name of the Appointing Authority]*, the Appointing Authority, we are hereby requesting such Authority to appoint the Adjudicator in accordance with ITB 42.1 and GCC 23.1.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement
Contract Agreement

WHEREAS the Employer desires that the Works known as[name of the Contract].... should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.

- (a) the Letter of Acceptance
- (b) the Bid
- (c) the Addenda Nos [insert addenda numbers if any]. . . .
- (d) the Particular Conditions
- (e) the General Conditions;
- (f) the Specification
- (g) the Drawings; and
- (h) the completed Schedules,

3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of **Zambia** on the day, month and year indicated above.

Signed by: for and on behalf of the Employer Signed by:

for and on behalf the Contractor

in the

presence of: Witness, Name, Signature, Address, Date in the presence of: Witness, Name, Signature, Address, Date

Performance Security

[Bank's Name, and Address of Issuing Branch or Office]

Beneficiary:	[Name and Address of Employer]
Date:	
Performance Guarantee No.:	

We have been informed that *[name of the Contractor]*. . . . (hereinafter called "the Contractor") has entered into Contract No. . . . *[reference number of the Contract]*. . . . dated *[name of contract and brief description of Works]*. (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we [name of the Bank].... hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [name of the currency and amount in figures]¹.... (..... [amount in words].....) such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than sixty (60) calendar days after issue of the Substantial Completion Certificate, and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.

[Seal of Bank and Signature(s)]

Note –

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

¹ The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Employer.

Advance Payment Security

[Bank's Name, and Address of Issuing Branch or Office]

Beneficiary:	[Name and Address of Employer]	•••••
Date:		
Advance Payment Guarantee No •		
Ruvance i ayment Gaarantee 1000	•••••••••••••••••••••••••••••••••••••••	

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum \dots [name of the currency and amount in figures] $1, \dots, (\dots, [amount in words], \dots)$ is to be made against an advance payment guarantee.

At the request of the Contractor, we [name of the Bank]..... hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [name of the currency and amount in figures]*..... (......[amount in words].....) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the day certified as the Date of Substantial Completion, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

Note –

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

1 The Guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer