

# **ZIMBABWE REVENUE AUTHORITY**

## **STANDARD BIDDING DOCUMENT**

### **For the Procurement of Non- Complex Works**

December 2020



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
CONSTRUCTION OF A SEVEN - STOREY ZIMRA HEADQUARTERS**

**PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB 02/2020**

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**Standard Bidding Document for the Procurement of: Works for the  
construction of a 7-storey ZIMRA Headquarters**

**Procurement Reference No: ZIMRA ICB 02/2020**

**Procuring Entity: Zimbabwe Revenue Authority (ZIMRA)**

**Date of Issue: 11 December 2020**

**Site Meeting date/time: Wednesday 13 January 2021, 1000hrs (Local Time)**

**Site Meeting Venue: Stand 865 Mount Pleasant Township of Lot 53A  
Mount Pleasant, (situated in the District of Salisbury, Corner Golden Stairs &  
Norfolk Road, Mt Pleasant, Harare) – Adjacent to British Embassy**

**Submission deadline: Thursday 11 February 2021, at 1000hrs (Local Time)**



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
CONSTRUCTION OF A SEVEN - STOREY ZIMRA HEADQUARTERS**

**PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB 02/2020**

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**Procurement Notice**

**Invitation to Tender (ITT)**

**Procuring Entity: Zimbabwe Revenue Authority (ZIMRA)**

**Country: Zimbabwe**

**Reference No.: ZIMRA ICB 02/2020**

1. The Procuring Entity invites sealed Bids from eligible contractors registered under Category A with the Ministry of Public Works, CIFOZ and ZBCA, to bid for the construction of ZIMRA Headquarters
2. The *contract* to be concluded will be “single - User” The single -User entitled to purchase under the *contract* is Zimbabwe Revenue Authority (ZIMRA).
3. Bidding will be conducted through International Competitive Bidding as specified in the Public Procurement and Disposal of Public Assets Act “Regulations (S.I. 5 of 2018): Procurement of Goods” and is open to all eligible Bidders as defined in the Regulations.
4. The document may be sent by via email upon request.



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
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**PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB 02/2020**

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**PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB 02/2020**

**PART I BIDDING PROCEDURES**

**PART 1: BIDDING PROCEDURES**

**References:**

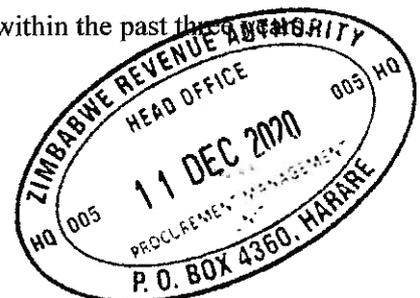
References to the Act are to the Public Procurement and Disposal of Public Assets Act [Chapter 22:23] and references to the Regulations are to the Public Procurement and Disposal of Public Assets (General) Regulations (Statutory Instrument No. 5 of 2018). The terms and requirements in the Act and Regulations govern the submission of Bids and should be read by all Bidders.

**Procurement Reference Number: International Tender ZIMRA ICB 02/2020**

**Preparation of Bids**

You are requested to bid for the items specified in the Statement of Requirements below, by completing and returning the following mandatory documentation:

1. the Bid Submission Sheet in this Part 1;
2. the Priced Bill of Quantities or Schedule of Activities (in Part 2) supported by an equipment schedule, manpower schedule and a financial disbursement schedule.
3. a copy of documentation necessary to demonstrate eligibility in terms of section 28 (1) of the Regulations;
4. Supplier Registration number showing that you are registered with the Procurement Regulatory Authority of Zimbabwe (PRAZ) for 2020 for Zimbabwean Companies ONLY. Foreign companies shall be required to register with PRAZ if awarded the contract.
5. A bid security.
6. The completed qualification forms provided in this Part 1;
7. A copy of CR 14, CR6 and a Certificate of Incorporation (foreign companies should submit similar company documents from country of company registration).
8. Basic Price List.
9. Current and Valid Tax clearance certificates
10. VAT registration documents
11. Detailed Company profile
12. List of Sub-contractors (registered with the PRAZ)
13. Proof of purchase of a bidding document (attach receipt)
14. At least three (3) reference letters showing bidders' direct experience in the successful construction of a similarly big project (Category A Projects)
15. Bankers' references.
16. Audited Financial Statements. Audited by a reputable firm and of within the past three years.
17. All bids must be signed and stamped by authorized personnel
18. All bids must be submitted in English.
19. Local and Foreign Bidders must quote in United States Dollars.
20. Bidders must provide detailed programme of works.



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**PART I BIDDING PROCEDURES**

You are also required to pay the administration fee of **ZW\$28,000.00 for Domestic Bidders and US\$350.00 for International Bidders** payable by bidders for bids subject to prior review by the Special Procurement Oversight Committee (SPOC) in terms of section 54 of the Act and as set out in Part IV of the Fifth Schedule to the Regulations. The above stated fees shall be paid directly to the Procurement Regulatory Authority of Zimbabwe and bidders are required to enclose the proof of payment of the Administration fee together with their bids.

**For Bank Transfers, use the below details;**

**Non Refundable (Local)**

Bank Name:	Commercial Bank of Zimbabwe
Account Name:	Procurement Regulatory Authority of Zimbabwe
Account Number:	01121064850020
Branch:	Kwame Nkrumah

**FCA Account (foreign deposits)**

Bank Name:	Commercial Bank of Zimbabwe
Account Name:	Procurement Regulatory Authority of Zimbabwe
Account Number:	01121064850040
Branch:	Kwame Nkrumah

You are advised to carefully read the complete Bidding Document, as well as the Special Conditions of Contract in Part 3: Contract, before preparing your Bid. The standard forms in this document may be retyped for completion but the Bidder is responsible for their accurate reproduction. All pages of the Bid must be clearly marked with the Procurement Reference Number above and the Bidder's name and any reference number.

**Number of bids allowed**

No Bidder may submit more than one bid, either individually or as a joint venture partner in another Bid, except as a subcontractor. Where the works are divided into lots and packages, only one Bid can be submitted. A conflict of interest will be deemed to arise if Bids are received from more than one Bidder owned, directly or indirectly, by the same person.

**Clarification**

Clarification of the bidding document may be requested in writing by any Bidder and should be sent to;

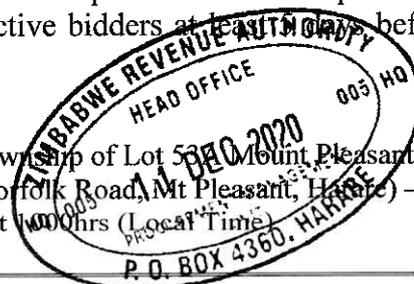
**The Principal Procurement Manager  
Zimbabwe Revenue Authority (ZIMRA)  
10<sup>th</sup> Floor, ZB Centre Building  
Corner Kwame Nkrumah Ave/ First Street  
Harare, Zimbabwe.**

Or via Email to [procurement@zimra.co.zw](mailto:procurement@zimra.co.zw)

Such queries should be submitted within 6 days from the date of publication and responses to questions / queries will be made in writing to all prospective bidders at least 48 hours before tender closing.

**Pre-bid meeting and Site Visit**

A pre-bid meeting will be held at Stand 865 Mount Pleasant Township of Lot 5360 Mount Pleasant (situated in the District of Salisbury, Corner Golden Stairs & Norfolk Road, Mt Pleasant, Harare) – Adjacent to British Embassy on Wednesday 13 January 2021, at 1000hrs (Local Time).



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**PART I BIDDING PROCEDURES**

**Bids**

The minimum period that the Bidder's bid must remain valid is *120 days* from the deadline for the submission of bids.

**Submission of Bids**

Bids must be submitted in writing in a sealed envelope to the address below, no later than the date and time of the deadline below. It is the Bidders' responsibility to ensure that they have completed the bid submission register with the correct details on submission of bids.

The Bidder must mark the envelope with the Bidder's name and address and the Procurement Reference Number.

Bids must be clearly marked "Bid for Contract Ref: ZIMRA ICB 02/2020"

Bid should be properly numbered,

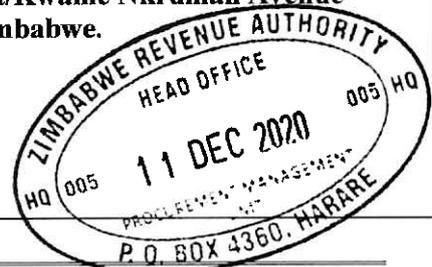
Any modification to the unit or total price shall be initialled by the representative of the bidder.

Representative of the Firm shall have power of attorney if not the owner on the company.

Bids should be submitted in triplicate with one (1) original copy marked "ORIGINAL" and two (2) copies each marked "COPY" All 3 copies should be in sealed envelopes clearly marked with the details of the tender, and should be deposited in a tender box situated at the below address. In the event of any discrepancy between the original and the copies, the original will prevail.

Late bids will be rejected. The Procuring Entity reserves the right to extend the bid submission deadline but will notify all potential bidders who have collected the bidding documents of the amended bid submission deadline.

Date of deadline	<b>Thursday 11 February 2021</b>	Deadline Time:	<b>1000hrs (Local Time)</b>
Submission address:	<p>Bids must be delivered and deposited in a tender box situated at ZB Centre , 6<sup>th</sup> Floor Reception, Corner Kwame Nkrumah Ave/ First Street , Harare, addressed to;</p> <p align="center"><b>The Principal Procurement Manager Zimbabwe Revenue Authority ZB Centre, Corner First Street/Kwame Nkrumah Avenue Harare, Zimbabwe.</b></p>		
Means of acceptance:	<p>Bids must be enclosed in a sealed envelope and endorsed on the outside with the advertised tender number, description and closing date. Bids must be delivered and deposited in a tender box situated at ZB Centre , 6<sup>th</sup> Floor Reception, Corner Kwame Nkrumah Ave/ First Street , Harare, addressed to;</p> <p align="center"><b>The Principal Procurement Manager Zimbabwe Revenue Authority ZB Centre, Corner First Street/Kwame Nkrumah Avenue Harare, Zimbabwe.</b></p>		



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**PART I BIDDING PROCEDURES**

**Bid opening**

Bidders and their representatives may witness the opening of bids, which will take place at the submission address immediately following the deadline.

**Withdrawal, amendment or modification of Bids**

A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative. However, 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 or any extension of that period.

**Time for Completion**

The time for completion of the Works is 24 months which is the Intended Time for Completion in GCC 1.1(q) of the Special Conditions of Contract (SCC) in Part 3.

**Bid Prices and Discounts**

The bid rates and prices must cover all costs of labour, materials, equipment, overheads, profits and all associated costs for performing the Works and must include all taxes and duties. The whole cost of performing the Works must be included in the items stated, and the cost of any incidental works will be deemed to be included in the prices quoted. Bidders must include a contingency of 10% of their Bid price, where indicated in the Summary of Bill of Quantities).

The Bidder must fill in rates and prices for all items of the Works described in the Bill of Quantities or Schedule of Activities. Items against which no rate or price is entered by the Bidder will be deemed to be covered by the rates or prices for other items in the Bill of Quantities or Schedule of Activities.

The price quoted in the Bid Submission Sheet must be the total price of the Bid, excluding discount. The Bidder must quote any discounts and the methodology of its application in the Bid Submission Sheet.

**Currency**

Bids should be priced in United States Dollars for both local and foreign companies. The currency of evaluation will be United States Dollars.

**Bid Security**

The Bidder must include Bid Security of **ZW\$500,000.00** *either* of the following forms;

**Option 1 ----- A certified Bank Cheque in the ZIMRA name.**

**Option 2 -----A Bank Guarantee in the ZIMRA name**

**Option 3 ----- A Cash Deposit to PRAZ**

The bid security shall be valid for a period of 120 days after the end of the bidding period.

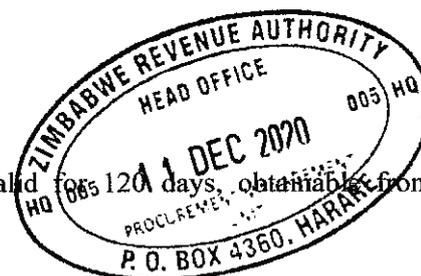
Any bid not accompanied by a Bid Security or Bid Securing Declaration, where this is a requirement of bidding, will be rejected as non-responsive.

**If a bidder chooses options 2 or 3, the following should be noted;**

**Option 2**

**Submission of bank guarantee**

A standard bank Guarantee of **ZW\$500,000.00** which is valid for 120 days, obtainable from a reputable Registered Commercial Bank.



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Please note: The required Bank Guarantee should include the following features and be redeemable in Zimbabwe in order for it to be considered valid:

1. Letterhead of registered commercial bank (i.e. the Supplier of the Bank Guarantee)
2. The Header has to clearly state that it is a Bank Guarantee.
3. Purpose of the Bank Guarantee to be clearly stated.
4. The date when the Common Seal of the said Surety was effected should be clearly shown.
5. Conditions of the said Obligations must be stated.
6. The physical address of the Surety should be given.
7. The validity period of the Bank Guarantee must be clearly stated.
8. Signature of surety and the date when it was endorsed must be clearly shown.
9. It must be an original document that is date stamped.
10. Bid Bonds from Insurance Companies are not acceptable.
11. All foreign Bank Guarantee to be confirmed by a local corresponding Commercial bank in Zimbabwe.

The Bank Guarantee of the unsuccessful bidders will be released immediately after the award of the tender while that of the winning bidder will only be released after signing of contract by both parties

**Option 3**

If **Option 3** is chosen bidders must pay **ZWS\$500,000.00** for the Bid Security that shall be Refundable at the end of the bid validity period plus another **ZWS\$60,000.00 for domestic bidders and US\$750.00 for International bidders**, that shall be non-refundable for cash bid bond establishment fee in line with Part IV of the Procurement Regulations (S.I.5 of 2018). The amount is payable at Procurement Regulatory Authority of Zimbabwe (PRAZ), 76 Samora Machel Avenue, Harare or to be deposited in the respective bank accounts below;

**Refundable (Local)**

**Payment Instructions: This account is to be used for refundable bid security only**

Bank Name: Commercial Bank of Zimbabwe  
Account Name: Procurement Regulatory Authority of Zimbabwe  
Account Number: 01121064850030  
Branch: Kwame Nkrumah

**Non-Refundable (Local)**

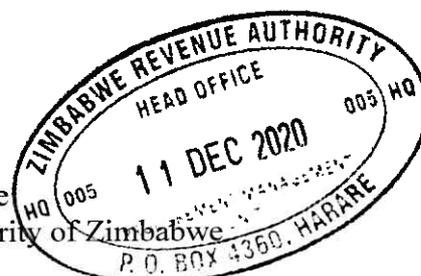
**Payment Instructions: This Account is to be used for Bid establishment Fees / Non-Refundable fees**

Bank Name: Commercial Bank of Zimbabwe  
Account Name: Procurement Regulatory Authority of Zimbabwe  
Account Number: 01121064850020  
Branch: Kwame Nkrumah

**FCA Account (Foreign Deposits)**

**Payment Instructions:**

Bank Name: Commercial Bank of Zimbabwe  
Account Name: Procurement Regulatory Authority of Zimbabwe



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Account Number: 01121064850040  
Branch: Kwame Nkrumah

The Bid Security of a Joint Venture (JV) must be in the name of the JV that submits the Bid. If the JV has not been legally constituted at the time of bidding, the Bid Security must be in the names of all intended partners.

**Origin of Materials, Equipment and Services:**

All materials, equipment and services to be used in the performance of the contract shall have as their country of origin an eligible country, as defined in the Special Conditions of Contract.

**Evaluation of Bids**

Bids will be evaluated using the methodology set out in Part V of the Regulations.

**Review by the Special Procurement Oversight Committee**

Section 54 of the Act provides for review by the Special Procurement Oversight Committee for certain especially sensitive or especially valuable contracts. This procurement requirement shall be subject to Special Procurement Oversight Committee's review in terms of Section 8(5)(b) of the second schedule to the Regulations (SI 5 of 2018). Five identical copies of the bidding documents are required and where the copies are not identical, the contents of the bid marked original will alone be considered.

**Domestic Preference**

A margin of preference, in accordance with the procedures outlined in section 8 of the Regulations, will not apply.

- (a) The percentage of preference to be given to domestic providers is *N/A*
- (b) Any additional preference to be given to women-owned businesses *N/A*
- (c) Eligibility for the margin of preference will be based on the following factors *N/A*

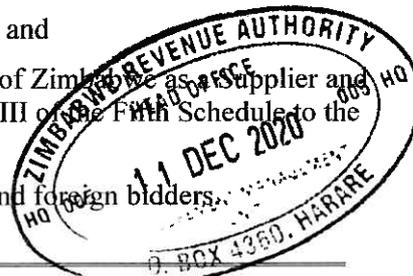
The documentation required from the Bidder as evidence of eligibility for the margin of preference is *N/A*

**Eligibility and Qualification Criteria**

Bidders are required to meet the criteria in section 28 of the Act and section 28(1) of the Regulations to be eligible to participate in public procurement and to be qualified for the proposed contract. They must therefore :

1. have the legal capacity to enter into a contract;
2. not be insolvent, in receivership, bankrupt or being wound up, not have had business activities suspended and not be the subject of legal proceedings for any of these circumstances;
3. have fulfilled their obligations to pay taxes and social security contributions in Zimbabwe;
4. not have a conflict of interest in relation to this procurement requirement;
5. not be debarred from participation in public procurement under section 72 (6) of the Act and section 74(1) (c), (d) or (e) of the Regulations or declared ineligible under section 99 of the Act;
6. have the nationality of an eligible country as specified in the Special Conditions of Contract;
7. passed the minimum qualification criteria indicated in this Part I; and
8. have been registered with the Procurement Regulatory Authority of Zimbabwe as a Supplier and have paid the applicable Supplier Registration Fee set out in Part III of the Fifth Schedule to the Regulations.

Participation in this bidding procedure is open to both Zimbabwean and foreign bidders.



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**Detailed Evaluation**

The Bids will be examined to confirm that all terms, conditions and requirements of the bidding document have been complied with by the Bidder. The assessment of responsiveness shall be determined in accordance with the criteria in section 28 of the Regulations.

Evaluation of Technical Bids will include an assessment of the Bidder's technical capacity to mobilize key equipment and manpower which is substantially responsive to the Procuring Entity's Requirements.

**Award of Contract**

The lowest evaluated bid, after the application of any additional evaluation criteria, including any margin of preference, which is substantially responsive to the requirements of this bidding document will be recommended for award of the Contract. The proposed award of contract will be by issue of a Notification of Contract Award in terms of section 55 of the Act which will be effective on receipt of a Letter of Acceptance in accordance with Part 3: Contract. Unsuccessful Bidders will receive the Notification of Contract Award and if they consider they have suffered prejudice from the process, they may, within 14 days of receiving this Notification, submit to the Procuring Entity a Challenge in terms of section 73 of the Act, subject to payment of the applicable fee set out in section 44 of and the Third Schedule to the Regulations.

**Right to Reject**

The Procuring Entity reserves the right to accept or reject any Bids or to cancel the procurement process and reject all Bids at any time prior to contract award.

**Corrupt Practices**

The Government of Zimbabwe requires that Procuring Entities, as well as Bidders and Contractors, observe the highest standard of ethics during the procurement and execution of contracts. In pursuit of this policy:

1. the Procuring Entity will reject a recommendation for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract or has been declared ineligible to be awarded a procurement contract under section 99 of the Act;
2. the Authority may under section 72 (6) of the Act impose the debarment sanctions under section 74(1) of the Regulations; and
3. any conflict of interest on the part of the Bidder must be declared.



## **Bid Submission Sheet**

*{Note to Bidders: Complete this form with all the requested details and submit it as the first page of your Bid. Attach the completed Statement of Requirements and any other documents requested in Part 1. Ensure that your Bid is authorised in the signature block below. A signature and authorisation on this form will confirm that the terms and conditions of this Bid prevail over any attachments. If your Bid is not authorised, it may be rejected. If the Bidder is a Joint Venture (JV), the Bid must be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives. Bidders should mark as "CONFIDENTIAL" information in their Bids which is confidential to their business. This may include proprietary information, trade secrets, or commercial or financially sensitive information.}*

Procurement Reference Number:

Subject of Procurement:

Name of Bidder

Bidder's Reference Number:

Date of Bid:

We offer to supply the items listed in the attached Statement of Requirements, at the prices indicated on the attached Price Schedule and in accordance with the terms and conditions stated in your Bidding Document referenced above.

We confirm that we meet the eligibility criteria specified in Part 1: Procedures of Bidding.

We declare that we are not debarred from bidding and that the documents we submit are true and correct.

The validity period of our bid is: .....{days} from the date of submission.

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



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**Bid Authorised By:**

<b>Signature</b> .....	<b>Name:</b> .....
<b>Position:</b> .....	<b>Date:</b> .....(DD/MM/YY)
<b>Authorised for and on behalf of:</b>	
<b>Company</b> .....	
<b>Address:</b> .....	
.....	
<b>Contacts:</b> .....	



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**PART I BIDDING PROCEDURES**

**Qualification Criteria**

Factor	Financial Situation					Documentation Required
Sub-Factor	Requirement	Criteria				
		Single Entity	Bidder			
			Joint Venture, Consortium or Association All partners combined	Each partner	At least one partner	
<i>1. Financial Resources</i>	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 the cash-flow requirement for the contract.	Must meet requirement	Must meet requirement	Must meet _____ percent (____%) of the requirement	Must meet _____ percent (____%) of the requirement	Form 3

Factor	Experience	
Sub-Factor	Criteria	Documentation Required



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**PART I BIDDING PROCEDURES**

	<i>Requirement</i>	<i>Bidder</i>				
		<i>Single Entity</i>	<i>Joint Venture, Consortium or Association</i>			
			<i>All partners combined</i>	<i>Each partner</i>	<i>At least one partner</i>	
1 General Experience	Experience under contracts in the role of contractor, subcontractor, or management contractor for at least the last 3 years prior to the bid submission deadline, and with activity in at least 9 months in each year.	Must meet requirement	N / A	Must meet requirement	N / A	Form 4
2 Specific Experience	Participation as contractor, management contractor, or subcontractor, must be at least a Category A Ministry of Public Works, CIFOZ and ZBCA registered contractors	Must meet requirement	Must meet requirements for all characteristics	N / A	Must meet requirement for one characteristic	Form 5



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PART I BIDDING PROCEDURES**

**PQ FORM 1 – FINANCIAL SITUATION**

**Historical Financial Performance**

Bidder's Legal Name: \_\_\_\_\_  
JV Partner Legal Name: \_\_\_\_\_

Date: \_\_\_\_\_  
Bidding No.: \_\_\_\_\_  
Page \_\_\_\_\_ of \_\_\_\_\_ pages

To be completed by the Bidder and, if Joint Venture (JV), by each partner

Financial information in USD	Information for previous year (USD)
Information from Balance Sheet	
Total Assets (TA)	
Total Liabilities (TL)	
Net Worth (NW)	
Current Assets (CA)	
Current Liabilities (CL)	
Information from 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 previous year as 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
- Must be audited by a certified accountant
- Must be complete, including all notes to the financial statements
- Must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted)



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**PQ FORM 2. ANNUAL TURNOVER (PREVIOUS YEAR)**

Bidder's Legal Name: \_\_\_\_\_  
JV Partner Legal Name: \_\_\_\_\_

Date: \_\_\_\_\_  
Bidding No.: \_\_\_\_\_  
Page \_\_\_\_\_ of \_\_\_\_\_ pages

Year	USD
	_____



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**PQ FORM 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.

Source of financing	Amount (USD)
1.	
2.	
3.	
4.	



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**PQ FORM 4. EXPERIENCE**

**GENERAL EXPERIENCE**

Bidder's Legal Name: \_\_\_\_\_  
JV Partner Legal Name: \_\_\_\_\_

Date: \_\_\_\_\_  
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 Purchaser: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Purchaser: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Purchaser: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Purchaser: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Purchaser: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Purchaser: Address:	_____

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



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
CONSTRUCTION OF A SEVEN - STOREY ZIMRA HEADQUARTERS  
PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB 02/2020  
PART I BIDDING PROCEDURES**

---

**PQ FORM 5. SPECIFIC EXPERIENCE**

Bidder's Legal Name: \_\_\_\_\_  
JV Partner Legal Name: \_\_\_\_\_

Date: \_\_\_\_\_  
Bidding No.: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Similar Contract Number: ___ [insert specific number] of ___ [insert total number of contracts required].	Information		
Contract Identification	_____		
Award date	_____		
Completion date	_____		
Role in Contract	<input type="checkbox"/> Contractor	<input type="checkbox"/> Management Contractor	<input type="checkbox"/> Subcontractor
Total contract amount	_____		UGX _____
If partner in a JV or subcontractor, specify participation of total contract amount	_____ %	_____	UGX _____
Procuring Entity's Name:	_____		
Address:	_____ _____ _____		
Telephone/fax number:	_____ _____		
E-mail:	_____		



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PART I BIDDING PROCEDURES**

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**PQ Form 5a. Specific Experience (cont.)**

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

<b>Similar Contract No. <i>[insert specific number]</i> of <i>[insert total number of contracts]</i> required</b>	<b>Information</b>
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	_____



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
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**PART II      PROCURING ENTITY'S REQUIREMENTS**

---

**PART 2: PROCURING ENTITY'S REQUIREMENTS**

**Scope of Works**

Procurement Reference Number: INTERNATIONAL TENDER ZIMRA ICB 02/2020

**Brief Description of Works**

Construction of a seven storey office block for the Zimbabwe Revenue Authority (ZIMRA) to be used as its head office.

**Location of Works**

Stand 865 Mount Pleasant Township of Lot 53A, Mount Pleasant, Harare

**Expected delivery period**

The Project is expected to be completed within 24 months.



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE CONSTRUCTION  
OF A SEVEN - STOREY ZIMRA HEADQUARTERS**

**PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB 02/2020**

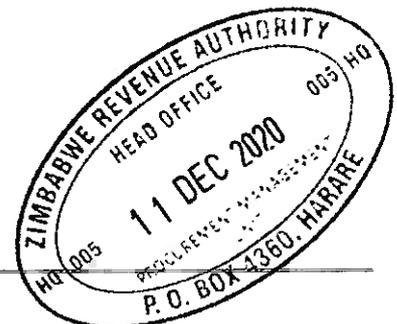
**PART II      PROCURING ENTITY'S REQUIREMENTS**

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## **Specifications**

The Works are to be performed in accordance with the following attached specifications:

1. Form Of Tender and Contract
2. Drawings
3. Preambles
4. Bills Of Quantities
5. Ps and G



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE CONSTRUCTION  
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**PART II      PROCURING ENTITY'S REQUIREMENTS**

---

## **Drawings**

*[See attached]*



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE CONSTRUCTION OF A SEVEN - STOREY ZIMRA HEADQUARTERS**

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**PART II     PROCURING ENTITY'S REQUIREMENTS**

**Bill of Quantities**

Name of Bidder: \_\_\_\_\_

Bidder's Reference Number: \_\_\_\_\_

Currency of Bid: \_\_\_\_\_

Item No	Description of Works	Quantity	Unit of Measure	Unit Price	Total Price
<b>Contingency *</b>					
<b>Grand Total</b>					

NB: See attached Bills of quantities



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE CONSTRUCTION OF A SEVEN - STOREY ZIMRA HEADQUARTERS**

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**PART II      PROCURING ENTITY'S REQUIREMENTS**

## Schedule of Activities

Name of Bidder:

Bidder's Reference Number:

Currency of Bid:   USD  

Item No	Activities of Works	Unit	Total Price
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
		Lump-sum	
<b>Grand Total</b>			



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**PART II      PROCURING ENTITY'S REQUIREMENTS**

---

## **Form of Bid Security**

*[This Bid Security should be on the letterhead of the issuing Financial Institution and should be signed by a person with the proper authority to sign the Bid Security. It should be included by the Bidder in its bid, if so indicated in the BDS]*

Date: *[insert date (as day, month and year) of Bid Submission]*

Procurement Reference No.: *[insert Procurement Reference number]*

To: *[insert complete name of Procuring Entity]*

Whereas, *[insert complete name of Bidder]* (hereinafter called "the Bidder") has submitted its bid dated *[insert date (as day, month and year) of bid submission]* for Procurement Reference number *[insert Procurement Reference number]* for the construction of *[insert brief description of the Works]* (hereinafter called "the bid").

KNOW ALL PEOPLE by these presents that We *[insert complete name of institution issuing the Bid Security]* of *[insert city of domicile and country of nationality]* having our registered office at *[insert full address of the issuing institution]* (hereinafter called "the Guarantor") are bound to *[insert complete name of Procuring Entity]* (hereinafter called "the Procuring Entity") in the sum of *[specify in words and figures the amount and currency of the Bid Security]* for which payment well and truly to be made to the said Procuring Entity, the Guarantor binds itself, its successors or assignees by these presents.

Sealed with the Common Seal of the said Guarantor this *[insert day in numbers]* day of *[insert month]*, *[insert year]*.

THE CONDITIONS of this obligation are:

- (1) If the Bidder withdraws its bid during the period of bid validity specified in the bid submission sheet; or
- (2) If the Bidder having been notified of the acceptance of its bid by the Procuring Entity during the period of bid validity fails or refuses to: (a) sign the Contract., or (b) furnish the required Performance Security as required, or (c) accept correction of its bid price.

we undertake to pay to the Procuring Entity up to the above amount upon receipt of its first written demand, without the Procuring Entity's having to substantiate its demand, provided that in its demand the Procuring Entity states that the amount claimed by it is due to it, owing to the occurrence of one or more of the above conditions, specifying the occurred conditions.

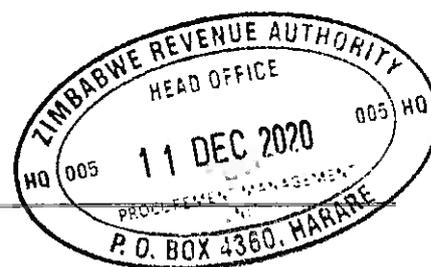
This security shall remain in force up to and including *[insert date, month and year in accordance with ITB Clause 18.3]* and any demand in respect thereof should be received by the Guarantor no later than the above date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

Signed: *[insert signature of person whose name and capacity are shown below]*

Name: *[insert complete name of person signing the Bid Security]*

In the capacity of *[insert legal capacity of person signing the Bid Security]*



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**PART II      PROCURING ENTITY'S REQUIREMENTS**

---

**Declaration by the Accounting Officer**

I declare that the procurement is based on neutral and fair technical requirements and bidder qualifications.



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**PROCUREMENT REFERENCE No: ZIMRA ICB 02/2020**

**PART III CONTRACT**

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**PART 3 CONTRACT**



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
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**PROCUREMENT REFERENCE NO: INTERNATIONAL TENDER ZIMRA ICB  
02/2020**

**GENERAL CONDITIONS OF CONTRACT FOR NON-COMPLEX WORKS.**

**General Conditions of Contract**

Any resulting contract is subject to the Zimbabwe General Conditions of Contract (GCC) for the Procurement of Non-Complex Works (copy available on request) except where modified by the Special Conditions below.



**BIDDING DOCUMENT FOR THE PROCUREMENT OF WORKS FOR THE  
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02/2020**

**GENERAL CONDITIONS OF CONTRACT FOR NON-COMPLEX WORKS.**

# **Government of Zimbabwe**

## **GENERAL CONDITIONS OF CONTRACT**

**FOR THE**

**PROCUREMENT OF NON-COMPLEX WORKS**

**December 2020**

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02/2020**

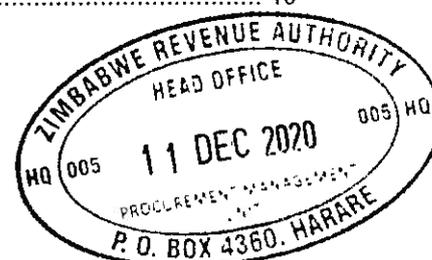
**GENERAL CONDITIONS OF CONTRACT FOR NON-COMPLEX WORKS.**

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**General Conditions of Contract  
for the Procurement of Non-Complex Works**

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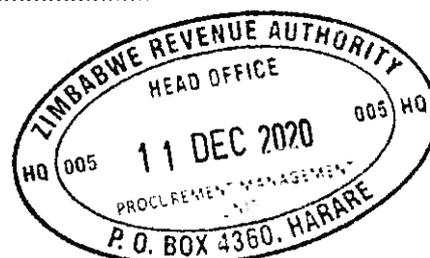
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GENERAL CONDITIONS OF CONTRACT FOR NON-COMPLEX WORKS.**

---

**General Conditions of Contract for the Procurement of Non-  
Complex Works**

**A. General**

**1. Definitions**

The definitions in the Public Procurement and Disposal of Public Assets Act [*Chapter 22:23*] (“the Act”) and the Public Procurement and Disposal of Public Assets (General) Regulations, 2018 (Statutory Instrument 5 of 2018) (“the Regulations”) shall apply to these General Conditions of Contract. In addition, the following words and expressions shall have the following meanings, unless the context otherwise indicates:

- (a) “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) “Activity Schedule” means a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract.
- (c) “Adjudicator” means the person appointed jointly by the Procuring Entity and the Contractor to resolve disputes in the first instance, as provided for in Clause 18.
- (d) “Bill of Quantities” means the itemized list of materials, parts and labour required for the construction, installation, testing and commissioning of the Works in an admeasurement contract.
- (e) “Clause” and “Sub-Clause” mean a clause or sub-clause, as the case may be, of these General Conditions of Contract.
- (f) “Compensation Event” means an event described in Clause 33.
- (g) “Contract” means the Contract between the Procuring Entity and the Contractor to execute and complete the Works and to remedy any defects, and includes the Contract Documents.
- (h) “Contract Documents” means the documents listed in the Contract or incorporated by reference in the Contract, and all attachments and appendices to those documents as well as any amendments to them.
- (i) “Contractor’s Bid” means the completed Bid submitted by the Contractor to the Procuring Entity.
- (j) “Dayworks” means 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.
- (k) “Defect” means any part of the Works not completed in accordance with the Contract.
- (l) “Defects Liability Certificate” means a certificate issued by Project Manager upon correction of defects by the Contractor at the conclusion of the Defects Liability Period.
- (m) “Defects Liability Period” means the period stated in the SCC pursuant to Clause 26.1 and calculated from the Completion Date.
- (n) “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 Procuring Entity in accordance with the Contract, and includes calculations and other information provided or approved by the Project Manager for the execution of the Contract.
- (o) “Equipment” means the Contractor’s machinery and vehicles brought temporarily to the Site to construct the Works.
- (p) “General Conditions of Contract”, hereinafter referred to as GCC, means the conditions set out in this document.
- (q) “Intended Completion Date” means the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the SCC.
- (r) “Materials” means all supplies, including consumables, used by the Contractor for incorporation in the Works.
- (s) “Plant” means any integral part of the Works that have a mechanical, electrical, chemical, or biological function.



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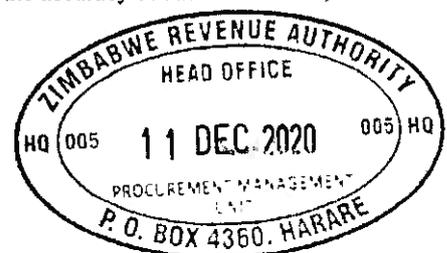
- (t) "Project Manager" means the person named in the SCC who is responsible for supervising the execution of the Works and administering the Contract, and includes any other competent person appointed by the Procuring Entity and notified to the Contractor to replace the Project Manager.
- (u) "Site" means the area defined as such in the SCC.
- (v) "Site Investigation Report" means a factual and interpretative report, included in the Bidding Documents, about the surface and subsurface conditions at the Site.
- (w) "Special Conditions of Contract", hereinafter referred to as "SCC", means the conditions attached to the Contract Agreement, which shall govern the Contract and shall prevail over these General Conditions of Contract.
- (x) "Specification" means the Specification of the Works included in the Contract, including drawings, diagrams and Bills of Quantities and any modification or addition made or approved by the Project Manager.
- (y) "Start Date" means the date specified in the SCC as the latest date on which the Contractor shall commence execution of the Works.
- (z) "Subcontractor" means a person or entity to whom/which the Contractor subcontracts any part of the Works, including work on the Site.
- (aa) "Temporary Works" means works designed, constructed, installed and removed by the Contractor, which are needed for construction or installation of the Works.
- (bb) "Works" means the Construction work, as defined in the SCC, which the Contractor is required by the Contract to construct, install and turn over to the Procuring Entity.

**2. Interpretation**

- 2.1 The Contract shall be read as a whole. The Contract and the Contract Documents (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory.
- 2.2 The headings and titles of these GCC shall not limit, alter or affect the meaning of the Contract.
- 2.3 In these GCC, unless the context otherwise requires:
  - (a) the singular includes the plural and *vice versa*;
  - (b) words indicating one gender include all genders;
- 2.4 The Project Manager may clarify the meaning of the provisions of the GCC and, subject to the provisions of these GCC relating to the resolution of disputes, the Project Manager's clarifications shall be binding on the Parties unless altered or corrected by mutual agreement of the Parties.
- 2.5 The documents listed in the SCC shall form part of the Contract:
- 2.6 The type of Contract shall be as defined in the SCC, and:
  - (a) 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 shall be used to calculate the payment due to Contractor based on the actual quantities accomplished. The Contractor shall be paid for the quantity of the works accomplished at the rate in the Bill of Quantities for each item as certified by the Project Manager; and
  - (b) in the case of a Lump Sum Contract, the Works shall be carried out for an all-inclusive fixed total amount based on the Priced Activity Schedules. Works shall not be measured for payment but be based on estimated percentage of works accomplished against the Contract Price.

**3. Language and Law**

- 3.1 The language of the Contract shall be English. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, this translation shall govern. The Contractor shall bear all costs of translation to English and all risks of the accuracy of such translation,



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3.2 The Contract shall be governed by and interpreted in accordance with the laws of Zimbabwe.

**4. Project Manager's Decisions**

Contract management responsibility rests on the Procuring Entity. Except where otherwise specifically stated in the SCC, the Project Manager shall represent the Procuring Entity in deciding contractual matters between the Procuring Entity and the Contractor.

**5. Delegation**

Unless otherwise specified in the SCC, 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. Communications**

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 and Other Contractors**

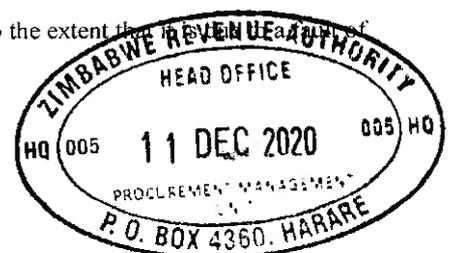
- 7.1 Unless otherwise indicated in the SCC, the Contractor shall not subcontract any part of the Works.
- 7.2 The Contractor shall co-operate and share the Site with other contractors, public authorities, utilities, and the Procuring Entity between the dates given in the Schedule of Other Contractors set out in the SCC.

**8. Personnel and Equipment**

- 8.1 The Contractor shall employ the Key Personnel and use the equipment identified in its Bid to carry out the Works but may use 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.
- 8.2 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 immediately and has no further connection with the Works.
- 8.3 All costs associated with the removal and replacement of Contractor's personnel or equipment from the Site shall be borne by the Contractor.

**9. Procuring Entity's and Contractor's Risks**

- 9.1 The Procuring Entity carries the risks which the Contract states are Procuring Entity's risks, and the Contractor carries the risks which the Contract states are Contractor's risks.
- 9.2 From the Start Date until the Defects Liability Certificate has been issued, the following are the Procuring Entity'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 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 Procuring Entity 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 the Procuring Entity is not responsible for the damage.



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the Procuring Entity or in the Procuring Entity's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

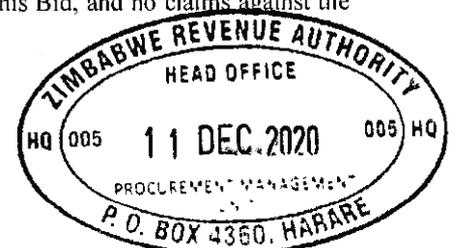
- (c) From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is the Procuring Entity's risk except loss or damage due to:
  - (i) a Defect which existed on the Completion Date,
  - (ii) an event occurring before the Completion Date, which was not itself a Procuring Entity's risk, or
  - (iii) the activities of the Contractor on the Site after the Completion Date.
- (d) From the Start 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 Procuring Entity's risks are Contractor's risks.

#### **10. Insurance**

- 10.1 The Contractor shall provide, in the joint names of the Procuring Entity and the Contractor, and shall cause any Subcontractors to take out and maintain, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and terms and conditions stated in the SCC 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.
- 10.2 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.
- 10.3 If the Contractor does not provide any of the policies and certificates required, the Procuring Entity may affect the insurance which the Contractor should have provided and recover the premiums the Procuring Entity 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 to the Procuring Entity.
- 10.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager in writing.
- 10.5 Additional insurance shall be required to cover for any necessary works to correct the defects during the Defects Liability Period.
- 10.6 Both Parties shall comply with any conditions of the insurance policies.

#### **11. Inspection of Site**

- 11.1 The Contractor shall be deemed to have inspected and examined the Site and its surroundings and to have satisfied himself before submitting his Bid and signing the Contract as to all matters relative to the nature of the land and subsoil, the form and nature of the Site, details and levels of existing pipe lines, conduits, sewers, drains, cables or other existing services, the quantities and nature of the work and materials necessary for the completion of the Works, the means of access to the Site and the accommodation he may require, and in general to have himself obtained all necessary information as to risk contingencies, climatic, hydrological and natural conditions and other circumstances which may influence or affect his Bid, and no claims against the



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Procuring Entity will be entertained in connection with these matters.

- 11.2 The Contractor shall be deemed to have examined any Site Data referred to in the SCC, supplemented by any information available to the Contractor.

**12. Contractor to Construct the Works**

The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

**13. The Works to Be Completed by the Intended Completion Date**

The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Programme submitted by the Contractor, as updated with the approval of the Project Manager, and shall complete them by the Intended Completion Date.

**14. Safety and Security**

- 14.1 The Contractor shall be responsible for the safety of all activities on the Site.
- 14.2 The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or required by the Engineer or by any duly constituted authority for the protection of the Works and the materials and equipment utilised therefor or for the safety and convenience of the public or others

**15. Discoveries**

Subject to the law of Zimbabwe, anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Procuring Entity. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

**16. Possession of the Site**

The Procuring Entity 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 SCC, the Procuring Entity shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.

**17. Access to the Site**

The Contractor shall allow the Project Manager and any person 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 for any purpose related to the oversight and management of the Contract, including audit and inspection

**18. Settlement of Disputes**

- 18.1 The Procuring Entity and the Contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 18.2 If, after twenty-eight (28) days, the parties have failed to resolve their dispute or difference by such mutual negotiation, then either the Procuring Entity or the Contractor may give notice to the other party of its intention to commence arbitration under the terms of the Arbitration Act [Chapter 7:15], as amended.
- 18.3 Notwithstanding any reference to arbitration herein,
- (a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
- (b) the Procuring Entity shall pay the Contractor any moneys due the Contractor.



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**B. Time Control**

**19. Programme**

- 19.1 Within the time stated in the SCC, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Programme 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 Programme shall be consistent with those in the Activity Schedule.
- 19.2 An update of the Programme shall be a programme 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.
- 19.3 The Contractor shall submit to the Project Manager for approval an updated Programme at intervals no longer than the period stated in the SCC. If the Contractor does not submit an updated Programme within this period, the Project Manager may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated Activity Schedule within fourteen (14) days of being instructed to do so by the Project Manager.
- 19.4 The Project Manager's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Project Manager again at any time. A revised Programme shall show the effect of Variations and Compensation Events.

**20. Extension of the Intended Completion Date**

- 20.1 The Procuring Entity, on the recommendation of 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.
- 20.2 The Project Manager may revise the Intended Completion Date by issuing an extension of time or an acceleration order in accordance with this Clause.

**21. Acceleration**

- 21.1 When the Procuring Entity wants the Contractor to complete the Works before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Procuring Entity accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Procuring Entity and the Contractor.
- 21.2 If the Contractor's priced proposals for an acceleration are accepted by the Procuring Entity, they shall be deemed to have been incorporated in the Contract Price and treated as a Variation.

**22. Delays Ordered by the Project Manager**

The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

**23. Management Meetings**

- 23.1 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 under Clause 24.
- 23.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Procuring Entity. 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



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meeting and stated in writing to all who attended the meeting.

**24. Early Warning**

- 24.1 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.
- 24.2 The Contractor shall co-operate 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**

**25. Identifying and Testing of Defects**

- 25.1 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.
- 25.2 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

**26. Correction of Defects**

- 26.1 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 SCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- 26.2 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.

**27. Uncorrected Defects**

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**

**28. Contract Price**

- 28.1 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 shall be used to calculate the Contract Price. The Contractor shall be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.
- 28.2 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 shall be used to monitor and control the performance of activities on the basis of which the Contractor is to be paid. If payment for Materials on Site is to be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.



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**29. Changes in the Contract Price**

29.1 In the case of an admeasurement contract:

- (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 twenty-five (25) per cent, provided the change exceeds one per cent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.
- (b) Except with the prior approval of the Procuring Entity, the Project Manager shall not adjust rates from changes in quantities if the adjustment would result in the Initial Contract Price being exceeded by more than 15 per cent.
- (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.

29.2 In the case of a Lump Sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes to the Programme 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.

**30. Variations**

30.1 All Variations shall be included in updated Programmes and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.

30.2 The Contractor shall provide the Procuring Entity with a quotation for carrying out a 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.

30.3 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.

30.4 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.

30.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning of the circumstances necessitating a Variation.

30.6 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, 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.

**31. Payment Certificates**

31.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

31.2 The Project Manager shall check the Contractor's monthly statements and certify the amount to be paid to the Contractor.

31.3 The value of work executed shall be determined by the Project Manager.



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31.4 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.

31.5 The value of work executed shall include the valuation of Variations and Compensation Events.

31.6 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.

### 32. Payments

32.1 Payments shall be made promptly by the Procuring Entity after issue of a Payment Certificate, but in no case later than two months after submission of an invoice or request for payment by the Contractor, and after the Procuring Entity has accepted it.

32.2 Unless otherwise provided for in the SCC, in the event that the Procuring Entity fails to pay the Contractor any payment by its due date or within the period set forth in the SCC, the Contractor may raise a complaint with the Authority, which may order the Procuring Entity to settle the outstanding invoice immediately or to pay to the Contractor interest on the amount of such delayed payment at the rate shown in the SCC, for the period of delay until payment has been made in full, whether before or after judgment or an arbitral award.

32.3 Unless otherwise stated in the Contract, all payments and deductions shall be paid or charged in the currency of the Contract.

32.4 Items of the Works for which no rate or price has been entered in the Contract shall not be paid for by the Procuring Entity and shall be deemed covered by other rates and prices in the Contract.

### 33. Compensation Events

33.1 The following shall be Compensation Events:

- (a) The Procuring Entity does not give access to a part of the Site by the Site Possession Date stated in the SCC.
- (b) The Procuring Entity 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.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed, before issue 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 Procuring Entity, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Procuring Entity do not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.



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- (i) The advance payment is delayed.
- (j) The effects to the Contractor of any of the Procuring Entity's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.

33.2 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.

33.3 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 he or she considers the Contractor's forecast cost unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

33.4 The Contractor shall not be entitled to compensation to the extent that the Procuring Entity's interests are adversely affected by the Contractor's not having given early warning or not having co-operated with the Project Manager.

#### **34. Taxes and Duties**

34.1 The Contractor is liable for all taxes and duties in accordance with the laws of Zimbabwe.

34.2 Unless otherwise stated in the SCC, the Project Manager shall not adjust the Contract Price if taxes, duties, and other levies are changed during the period from Start date to the date the Completion certificate.

#### **35. Retention**

35.1 The Procuring Entity shall retain from each payment due to the Contractor the proportion stated in the SCC until Completion of the whole of the Works.

35.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with Clause 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.

#### **36. Liquidated Damages**

36.1 The Contractor shall pay liquidated damages to the Procuring Entity at the rate per day stated in the SCC 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 SCC. The Procuring Entity may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

36.2 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.

#### **37. Bonus**

No bonus shall be paid under the Contract.

#### **38. Advance Payment**

38.1 If so provided in the Bidding Documents, the Procuring Entity shall make advance payment to the Contractor of the amounts stated in the SCC by the date stated in the SCC, against provision by the Contractor of an



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Unconditional Bank Guarantee in a form and by a bank acceptable to the Procuring Entity. 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.

- 38.2 The Contractor shall use an advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that the advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.
- 38.3 An 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.

**39. Performance Security**

- 39.1 If required as specified in the SCC, the Contractor shall, within twenty-one (21) days of the notification of contract award or, in the event of Challenge proceedings under Part X of the Act within twenty-one (21) days of the resolution of the Challenge, provide a performance security for the performance of the Contract in the amount specified in the SCC.
- 39.2 The proceeds of the Performance Security shall be payable to the Procuring Entity as compensation for any loss resulting from the Contractor's failure to complete its obligations under the Contract.
- 39.3 As specified in the SCC, the Performance Security, if required, shall be:
- (a) denominated in the currency(ies) of the Contract.
  - (a) in one of the formats stipulated by the Procuring Entity in the SCC, or in another format acceptable to the Procuring Entity;
  - (a) provided by an institution acceptable to the Procuring Entity, where the security is issued by a financial institution; and
  - (a) valid for the period prescribed in the SCC.
- 39.4 The Performance Security shall be discharged by the Procuring Entity and returned to the Contractor immediately following the date of Completion of the Contractor's performance obligations under the Contract, including any warranty obligations.

**40. Dayworks**

- 40.1 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.
- 40.2 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.
- 40.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

**41. Cost of Repairs**

Loss or damage to the Works or Materials to be incorporated in 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.



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**42. Contract Administration Fee**

The Contractor shall pay the Contract Administration Fee set out in Part V of the Fifth Schedule of the Regulations if so indicated in the SCC.

**E. Finishing the Contract**

**43. Completion**

Upon completing the Works, the Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon determining that the whole of the Works is completed.

**44. Taking Over**

The Procuring Entity shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.

**45 Final Account**

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 two months of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within two months 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.

**46 Operating and Maintenance Manuals**

- 46.1 If "as built" Drawings and/or operating and maintenance manuals are required in terms of the SCC, the Contractor shall supply them by the dates stated in the SCC.
- 46.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the SCC or if they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in the SCC from payments due to the Contractor.

**47 Termination**

- 47.1 After the occurrence of any of the events specified in this sub-clause, the Procuring Entity may terminate the Contract by giving the Contractor not less than thirty (30) days' written notice of termination (except in the event listed in paragraph (g) below, for which there shall be written notice of not less than sixty (60) days):
- (a) the Contractor fails to remedy a defect or other failure in the performance of its obligations within thirty days of receipt of a notice or within such period otherwise agreed between the Parties in writing;
  - (b) the Contractor becomes insolvent or bankrupt or enters into any agreements with its creditors for relief of debt or takes advantage of any law for the benefit of debtors or goes into liquidation or receivership whether compulsory or voluntary, other than for a reconstruction or amalgamation;
  - (c) the Contractor fails to comply with any final decision reached as a result of arbitration proceedings;
  - (d) the Contractor is unable, as the result of Force Majeure, to perform a material portion of the Works for a period of not less than sixty (60) days;
  - (e) the Contractor, in the judgement of the Procuring Entity, has engaged in a corrupt or fraudulent practice in competing for or in executing the Contract;
  - (f) the Contractor has been made the subject of a suspension or debarment sanction under section 74 (1)(c) (d) or (e) of the Regulations; or
  - (g) the Procuring Entity, in its sole discretion and for any reason whatsoever, decides to terminate the Contract.
- 47.2 The Contractor may terminate the Contract, by not less than thirty (30) days' written notice of termination.



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Entity, upon the occurrence of any of the following events:

- (a) if the Procuring Entity fails to pay any money due to the Contractor pursuant to the Contract and not subject to dispute pursuant to Clause 18, within forty-five days after receiving written notice from the Contractor that such payment is overdue;
  - (b) if the Procuring Entity is in material breach of its obligations under the Contract and has not remedied the breach within forty-five (45) days, or such longer period as the Contractor may have subsequently approved in writing, following receipt by the Procuring Entity of the Contractor's notice specifying such breach;
  - (c) if the Contractor is unable, as the result of Force Majeure, to perform a material portion of the Works for a period of not less than sixty (60) days; or
  - (d) if the Procuring Entity fails to comply with any final decision reached as a result of arbitration pursuant to Clause 18.
- 47.3 If either Party disputes whether an event specified in this Clause has occurred, such Party may, within forty-five (45) days after receipt of notice of termination from the other Party, refer the matter to arbitration pursuant to Clause 18 and the Contract shall not be terminated on account of such event except in accordance with the terms of any resulting arbitral award.

#### **48 Fraud and Corruption**

- 48.1 If the Procuring Entity considers that the Contractor or a Subcontractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for or in executing the Contract, or has otherwise acted contrary to the obligations stated in section 72 of the Act, then the Procuring Entity may do either or both the following:
- (a) recommend to the Authority that the Contractor should be debarred under section 99 of the Act, in accordance with the procedures in Part XI of the Regulations;
  - (b) terminate the Contractor's employment under the Contract and cancel the contract, in which event Clause 47.1 shall apply as if such expulsion had been made under paragraph (e) of that clause.
- 48.2 Should the Procuring Entity determine that any employee of the Contractor or of a Subcontractor has engaged in a corrupt, fraudulent, collusive, or obstructive practice during the execution of the Works, then the Contractor shall ensure the removal of the employee in accordance with Clause 8.
- 48.3 For the purposes of this Clause:
- (a) "corrupt practice" means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value in order to influence improperly the actions of another party;
  - (b) "fraudulent practice" means any knowing or reckless act or omission, including a misrepresentation, that misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
  - (c) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including improperly influencing the actions of a party;
  - (d) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of a party in order to influence improperly the actions of a party;
  - (e) "obstructive practice" means:
    - (i) deliberately destroying, falsifying, altering or concealing evidence material to an investigation or making false statements to investigators in order to materially impede an investigation by the Procuring Entity, the Authority or a Government agency into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party in order to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
    - (ii) an act intended to materially impede the exercise of the Procuring Entity's inspection and audit rights provided for under Clause 17.1.

**49 PAYMENT UPON TERMINATION**



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- 49.1 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 SCC. Additional Liquidated Damages shall not apply. If the total amount due to the Procuring Entity exceeds any payment due to the Contractor, the difference shall be a debt payable to the Procuring Entity.
- 49.2 If the Contract is terminated for the Procuring Entity's convenience or because of a fundamental breach of Contract by the Procuring Entity, 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.

**50 Property**

All property belonging to the Contractor shall be removed forthwith by and at the expense of the Contractor if the Contract is terminated because of the Contractor's default.

**51 Release from Performance**

If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Procuring Entity 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.



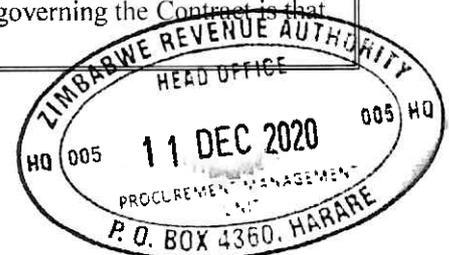
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### Special Conditions of Contract

Procurement Reference Number: INTERNATIONAL TENDER ZIMRA ICB 02/2020

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

GCC reference	Special Conditions *
1.1(g)	<b>The Contractor is:</b> _____ _____
1.1(q)	<b>The Intended Period for the Whole Works is: 24 months</b>
1.1(t)	<b>The Procuring Entity is: ZIMRA</b> Address: ZB Centre Cnr Nkwame Nkrumah Ave/ First Street P O Box 4360 Harare Region: Head Office
1.1(v)	<b>The Project Manager is:</b> <u> TBA </u>
1.1(w)	<b>The Site is located at:</b> Stand 865 Mount Pleasant Township of Lot 53A Mount Pleasant, (situated in the District of Salisbury, Corner Golden Stairs & Norfolk Road, Mt Pleasant, Harare)
1.1(z)	<b>The Start Date shall be: soon after site handover</b>
1.1(cc)	<b>The Works consist of:</b> Proposed Construction of Zimbabwe Revenue Authority Headquarters
2.2	<p><b>The documents that form part of the Contract shall be following:</b></p> <ul style="list-style-type: none"> <li>a. the Contract Agreement,</li> <li>b. the Letter of Acceptance,</li> <li>c. the Contractor's Bid Submission Sheet,</li> <li>d. the Special Conditions of Contract,</li> <li>e. the General Conditions of Contract,</li> <li>f. the Procuring Entity's Requirements,</li> <li>g. the Contractor's Bill of Quantities or Schedule of Activities (as applicable), and</li> <li>h. any other documents submitted by the Contractor forming part of the Contract.</li> </ul> <p>The priority of the documents shall be in the aforementioned order. If there is any discrepancy or inconsistency, the Project Manager shall issue any necessary clarification.</p>
2.3	<b>The Contract is a:</b> <i> lump-sum fixed contract </i>
3.1	<b>The Language of the Contract is English.</b> The Law governing the Contract is that of the Republic of Zimbabwe.



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GCC reference	Special Conditions
4.1	<p>The Project Manager's decision shall be limited to the following:</p> <ul style="list-style-type: none"> <li>(a) issuing a variation order equal to 15% of the Initial Contract Amount in accordance with GCC Sub-clause 29.1(b);</li> <li>(b) adjusting the Contract Price by up to 10% of the Contract Amount when a Compensation Event causes additional cost in accordance with GCC Sub-clause 33; and</li> <li>(c) any consequent extension of time that should be issued under (a) and (b).</li> </ul> <p>On circumstances that exceeded the aforementioned limits, prior approval of the Procuring Entity is required.</p>
7	<p><b>7.1 The limit of subcontract is:</b> <i>Only nominated subcontractors.</i></p> <p><b>7.2 The Schedule of Other Contractors is:</b></p>
10.1	<p><b>The minimum insurance amounts and deductibles shall be:</b></p> <ul style="list-style-type: none"> <li>(a) for loss or damage to the Works, Plant and Materials: <i>10% of Contract Sum</i></li> <li>(b) For loss or damage to Equipment: <i>included in (a)</i></li> <li>(c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract <i>included in (a)</i></li> <li>(d) for personal injury or death: <ul style="list-style-type: none"> <li>(i) of the Contractor's employees: <i>Contractor's all risk insurance</i></li> <li>(ii) of other people: <i>Contractor's all risk insurance</i></li> </ul> </li> </ul>
11.2	<p><b>The data on Site</b> are outlined in the following documents:</p> <p>Provided in all Drawings and also Bills of Quantities, EIA, Geotechnical Survey and Topo-survey</p>
16.1	<p><b>The Site Possession Date shall be:</b> Soon after contract signing. Exact dates to be advised.</p>
19.1	<p>The Contractor shall submit a Program for the Works within 14 days after the date of the Letter of Acceptance.</p>
19.3	<p>The Contractor shall submit for approval an updated Program for the Works within 14 days from the date of any change made to the Contract.</p>
26.1	<p><b>The Defects Liability Period is:</b> <i>12 months (including rain season)</i></p>
34.2	<p><b>Adjustment of the Contract Price:</b> The Project Manager shall not adjust the Contract Price if taxes, duties, and other levies are changed during the period from Start date to the date the Completion certificate</p>
35.1	<p>The retention shall be <i>5% (to be banked in a joint account between contractor and client)</i></p>



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GCC reference	Special Conditions
36.1	The Liquidated Damages shall be 0.005% of Contract Sum per day of delay. The total liquidated damages (LD) shall not exceed 10% of the Contract Amount
38.1	ZIMRA shall pay after delivery, inspection and acceptance. However, in the event that advance payment is required, the advance payment shall not exceed 15% of the Contract Price for domestic contractors and 10% for foreign contractors, and shall be paid to the Contractor no later than 14 days from receipt of an acceptable Bank Guarantee of the equivalent amount from a reputable registered commercial bank redeemable in Zimbabwe
39.1	The Performance Security shall be in the form of a Bank Guarantee and in the amount of 10% of the Contract Amount in the form of a bank guarantee, redeemable in Zimbabwe.
42.1	The Contract Administration Fee set out in Part V of the Fifth Schedule of the Regulations is due upon the signing of the Contract and the applicable Fee is an equivalent of USD3000.00
46	<p><b>46.1</b> The date to supply "as-built drawings and/or operating manuals shall be within 14 days following issue of Completion Certificate.</p> <p><b>46.2</b> The amount to be withheld shall be 0.01 percent of the Contract amount per day of delay.</p>
49.1	The percentage to apply to the value of the work not completed, representing the Procuring Entity's additional cost for completing the Works, is <i>limited to retention</i>



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**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, should only be completed by the successful Bidder after contract award.

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**LETTER OF ACCEPTANCE**

To:

**Subject: Letter of Acceptance**

This is to notify you that your Bid dated..... for the execution of the ..... for the Accepted Contract Amount of . . . . . , as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by the Procuring Entity.

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 3 (Contract Forms) of the Bidding Document.

<b>Signed:</b>	.....[insert signature of authorised person]
<b>Name:</b>	.....[insert complete name of person signing]
<b>In the capacity of:</b>	.....[insert legal capacity of person signing]
<b>Duly authorized to sign the letter of acceptance for and on behalf of</b>	.....[insert complete name of Procuring Entity]
<b>Date:</b>	..... day of ..... {DD/MM/YY}

Attachment: Contract Agreement



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**CONTRACT AGREEMENT**

**Procurement Reference:.....**

THIS CONTRACT AGREEMENT is made the \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

BETWEEN

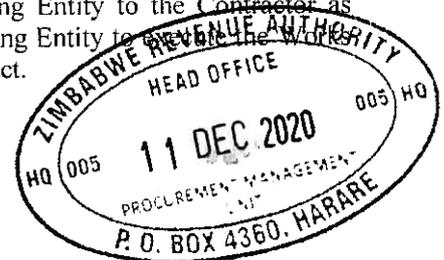
(1) \_\_\_\_\_ and having its principal place of  
business  
at \_\_\_\_\_  
\_\_\_\_\_ (hereinafter called "the Procuring Entity"), and

(2) \_\_\_\_\_, a corporation incorporated  
under the laws of \_\_\_\_\_ and having its principal  
place of business at  
\_\_\_\_\_ (hereinafter  
called "the Contractor").

WHEREAS the Procuring Entity desires that the Works known as  
\_\_\_\_\_ should be executed by the Contractor, and has  
accepted a Bid by the Contractor for the execution and completion of these Works and for the  
remedying of any defects in them,

THE PROCURING ENTITY AND THE CONTRACTOR AGREE AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are assigned to them in the General and Special Conditions of Contract referred to below.
2. The following documents shall constitute the Contract between the Procuring Entity and the Contractor, and each shall be read and construed as an integral part of the Contract:
  - (a) This Contract Agreement;
  - (b) The Letter of Acceptance;
  - (c) The Contractor's Bid;
  - (d) The Special Conditions of Contract;
  - (e) The General Conditions of Contract;
  - (f) The Procuring Entity's requirements (Specifications and Drawings);
  - (g) The completed Bill of Quantities or Schedule of Activities; and
  - (h) *Any other documents listed in the GCC as forming part of the Contract.*
3. This Contract Agreement shall prevail over all other Contract Documents. In the event of any discrepancy or inconsistency within the Contract Documents, then the documents shall prevail in the order listed above.
4. In consideration for the payments to be made by the Procuring Entity to the Contractor as mentioned below, the Contractor hereby agrees with the Procuring Entity to \_\_\_\_\_ and to remedy any defects in them in conformity with the Contract.



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5. The Procuring Entity hereby agrees to pay the Contractor, in consideration for the execution and completion of the Works and the remedying of any defects in them, the Contract Price or such other sum as may become payable under 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 Zimbabwe on the day, month and year indicated above.

**For and on behalf of the Procuring Entity**

<b>Signed:</b> .....
<b>Name:</b> .....
<b>In the capacity of:</b> ..... <i>[Title or other appropriate designation]</i>

**For and on behalf of the Contractor**

<b>Signed:</b> .....
<b>Name:</b> .....
<b>In the capacity of:</b> ..... <i>[Title or other appropriate designation]</i>

**For and on behalf of each member of the Joint Venture**

<b>Signed:</b> .....
<b>Name of member:</b> .....
<b>In the capacity of:</b> ..... <i>[Title or other appropriate designation]</i>

<b>Signed:</b> .....
<b>Name of member:</b> .....
<b>In the capacity of:</b> ..... <i>[Title or other appropriate designation]</i>



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**BANK GUARANTEE FOR PERFORMANCE SECURITY**

*[The issuing bank, as requested by the successful Bidder, must fill in this form in accordance with the instructions indicated]*

Date: *[insert date (as day, month, and year)]*

Title of the procurement: *[Insert general title of the procurement]*

Procurement Reference No: *[insert reference]*

Bank's Branch or Office: *[insert complete name of Guarantor]*

**Beneficiary:** *[insert complete name of Procuring Entity]*

Performance Guarantee No:

We have been informed that ..... *[name of the Contractor]*, (hereinafter called "the Contractor") has entered into Contract No. . . . . *[procurement reference number of the Contract]*, dated *[insert day and month]*, *[insert year]*, with you, for the execution of ..... *[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]*<sup>1</sup>.... ( . . . . . *[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 the . . . . . day of . . . . . , .....<sup>2</sup>, and any demand for payment under it must be received by us at this office on or before that date. The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed ...*[six months]**[one year]*, in response to the Procuring Entity's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758, 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.*

<sup>1</sup> *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.*

<sup>2</sup> *Insert the date twenty-eight days after the expected completion date. The Procuring Entity should note that in the event of an extension of the time for completion of the Contract, the Procuring Entity would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*



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**ADVANCE PAYMENT SECURITY**

*[The bank, as requested by the successful Tenderer, shall fill in this form in accordance with the instructions indicated.]*

Date: *[insert date (as day, month, and year)]*  
Procurement Reference No: *[insert reference]*

*[Issuing bank's letterhead]*

**Beneficiary:** *[insert legal name and address of Procuring Entity]*

**ADVANCE PAYMENT GUARANTEE No.:** *[insert Advance Payment Guarantee no.]*

We have been informed that ..... *[name of the Contractor]* (hereinafter called "the Contractor") has entered into Contract No..... *[procurement reference number of the Contract]*, dated *[insert day and month]*, *[insert year]* with you, for the execution of ..... *[name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum ..... *[name of the currency and amount in figures]*<sup>1</sup> (..... *[amount in words]*) 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.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number .....*[Contractor's account number]*, at ..... *[name and address of the Contractor's Bank]*.

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 of .....<sup>2</sup>, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date. The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months][one year]*, in response to the Procuring Entity's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.  
.....

*[Seal of Bank and Signature(s)]*.....

**Note –**

*All italicized text is for guidance in preparing 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.*

*2 Insert the expected expiration date of the Time for Completion. The Procuring Entity should note that in the event of an extension of the time for completion of the Contract, the Procuring Entity would be responsible for the extension.*



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*an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*





## PREAMBLES



## EXCAVATION

### NATURE OF GROUND

The Contractor must satisfy himself by his own personal examination of the nature of the material to be excavated. No claim for extras arising from his having failed to do this will be entertained.

Should the Contractor deem that the excavations are of such a hardness as to warrant payment on the basis of hard pickable material, rock, concrete or brickwork, he is to notify the Architect and the Quantity Surveyor, in writing, while such excavations are in progress, whereupon the Quantity Surveyor, in consultation with the Architect, will inspect the excavations. The decision of the Architect and the Quantity Surveyor as to the nature of the excavations being carried out will be final and binding. If written notice is not given the excavation will be valued as pickable material.

### PUMPING

The Contractor must keep the works entirely clear of mud, surface and sub-soil water by baling, pumping, etc. Stop off or pipe away all springs that may be opened up.

### PLANKING AND STRUTTING

Planking and strutting is to be provided where deemed necessary by the Contractor. Should any ground fall in owing to omission or insufficiency of planking and strutting, it must be cleared away, refilled and rammed as directed at the Contractor's expense.

### EXCAVATIONS GENERALLY

Excavations have been measured nett and no extra quantity will be allowed if excavations are executed too wide irrespective of class of materials encountered, or FOR INCREASE in bulk or planking and strutting.

All excavations shall be executed to the depths shown or as may be directed to ensure a solid bottom. Should the Contractor excavate below the levels shown or required to obtain a solid bottom he shall fill up the excavations to the correct level with Concrete (Grade 10) at his own expense.

The Contractor shall give notice to the Architect when the excavations are ready to receive the foundations and concrete shall not be laid until the excavations have been inspected and approved.

No work shall commence, or be continued, in excavations which have been flooded until permission has been obtained from the Architect.



NOTICE TO QUANTITY SURVEYOR

The Contractor is to give notice to the Quantity Surveyor, in writing, when the excavations are completed to the approved level and before any concreting is done in order that all provisional work may be measured and adjusted as necessary. The final depth of all foundations, bases, etc., is to be decided on site.

FILLING

Filling under floors, steps, etc., to be an approved non-expansive material obtained from the excavations or carted on to the site, and to be inert and free from all clay, vegetable or other deleterious matter. Filling to be sifted if necessary.

All consolidated filling is to be well watered, consolidated and rammed by means of a mechanical ramming machine in layers of not more than 150 mm thick. Where required the compaction is to the density stated.

NOTE: All filling has been measured NETT and no extra quantity will be allowed for consolidation and compaction.

SURPLUS MATERIAL

Surplus material from the excavations which is not to be used is to be carted off site and will become the property of the Contractor.

GRAVEL

Gravel to be nominal 40 mm maximum size graded to comply with B.S. 2006/1962 Table 4 and to be compacted to the density stated.

HARDCORE

Hardcore to be stone, brick or other hard dry material broken to pass a 50 mm ring and be retained on a 20 mm ring and well consolidated as described for filling.

COMPACTION TESTS

Only tests ordered by the Architect will be for the Client's account, however the costs of any subsequent tests due to failure of the tests previously ordered shall be to the Contractor's account.

TERMITE TREATMENT

Where the application of termite treatment is required the following materials and quantities are to be used:

Termicide 'A' insecticide mixed with water at the rate of one litre of insecticide to ninety litres of water and this solution to be applied at a rate of 5 litres per square metre of the surface treated. The treatment to be executed by an approved firm of Specialists with a written ten year guarantee.



## ADDITIONAL PREAMBLES

### EXPLOSIVES AND BLASTING

Blasting shall only be carried out on sections of the Works for which permission in writing shall have been given by the Engineer and shall be restricted to such hours and conditions as he may prescribe. Such permission shall not be withheld not such hours and conditions imposed unreasonably.

The Contractor shall use explosives for blasting in connection with the work only at such time and places and in such a manner as the Engineer may approve but such approval shall not relieve the Contractor from his responsibility for injury, loss, inconvenience and annoyance to persons, damage to the work and adjoining structures, roads, places and things and injury or damage to animals and property consequent on the use of such explosives. The Contractor shall be entirely liable for any accident which shall occur and shall save the Employer harmless and Indemnified from all claims arising from such use of explosives.

The Contractor shall keep in his office at the Site copies of Laws applying to the transport, storage and use of explosives and shall supply one copy of each Law to the Engineer. The Contractor shall also submit to the Engineer a copy of any instructions or notices which the Contractor may issue to his staff or workmen or post about the site in compliance with such Laws.

The Contractor shall submit to the Engineer details of the explosives which he proposes to use and of his proposals for the transport and storage of explosives.

Any use of explosives which the Contractor wishes to make, shall be carried out in accordance with the Laws and Regulations governing the supply, transport and use of explosives for the time being in force and the Contractor shall comply with any particular requirements of the Commissioner of Mines relative to this Contract.

#### 1. Blasting Warning

The Contractor shall be responsible for the provision, installation and maintenance of ample sirens, barriers, signs, etc., to warn against and prevent access to the area affected by blasting procedures, of any personnel not associated with Contractor. Any such measures shall be with the Engineer.

#### 2. Excavation Methods

At the start of the excavations the Contractor shall carry out trials to demonstrate that the excavation methods which he proposes to use will achieve the required dimensions. During the progress of the Works the excavation methods shall be varied as necessary to suit all conditions which may be met and to obtain the best practicable shape and surface condition. Excavation methods shall at times be subject to the agreement of the Engineer.

In the case of excavation by drilling and blasting the Contractor shall use methods which will take out the excavation as possible to the sizes required with a minimum of overbreak and a minimum of disturbance or fracturing beyond the required excavation lines. Blasting or excavation methods which cause unnecessary disturbance or fracturing beyond the excavation lines shall not be permitted.



The finished faces of excavations shall be scaled to ensure that loose and insecure fragments are removed. Any material which projects inside the required excavation line shall also be removed.

No overbreak due to excessive use of explosives shall be greater than 400 mm beyond the excavation line. Where appropriate, the Contractor may be asked to presplit to the excavation line for which no additional payment may be made.

#### CLASSIFICATION OF EXCAVATION

For the purposes of measurement of excavation the excavation will be classified as follows:

1. Excavation in 'rock' which purpose rock is defined as:
  - a) undecomposed rock occurring in bulk or banks or ledges, the practicable excavation of which requires explosives or drilling, wedging and splitting.
  - b) undecomposed boulder each exceeding 0.20 cubic metres in volume.
2. Excavation in 'hard' which will be held to be material other than 'rock' the economically practicable excavation of which necessitates the use of mechanical breakers, or ripping by bulldozer, or which reduce the rate of excavation of a backacting excavator having a power of at least 0.1 kW per millimetre width of bucket to one third or less of that achieved by the same excavator in soft excavation at a similar depth.

Latrine, ironpan and cemented gravels will fall into this category.
3. Excavation in 'normal' which will be held to be all other material not falling into the categories of 'rock' or 'hard' and will include all loose, decomposed boulders less than 0.20 cubic metre in volume.

For purposes of payment, items are included in the Bill of Quantities for excavation in the foregoing three classes. The classification of material into these shall be agreed by the Engineer and the Contractor as the work proceeds and material shall only be classified as 'rock' or 'hard' when the Engineer has given his agreement prior to its removal. In the event of the dispute over the classification of materials, the ruling of the Engineer shall be final and binding subject to the terms of the General of Contract.



CONCRETE, FORMWORK AND REINFORCEMENT

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1. DEFINITIONS

- 1.1 CHARACTERISTIC STRENGTH shall denote the cube crushing strength below which not more than 5% of the test results may be expected to fall when tested at 28 days.
- 1.2 CURRENT MARGIN shall denote the margin of strength by which the designed strength shall exceed the characteristic strength.
- 1.3 DESIGN CUBES shall imply concrete test cubes mad for the purpose of testing the performance of a design mix prior to use.
- 1.4 DIRECT OFF-SHUTTER finish shall imply an untouched finish impressed upon a concrete surface by the shuttering.
- 1.5 INDIRECT FINISH shall imply the finish obtained on a concrete surface with treatment as stipulated.
- 1.6 TESTING LABORATORY shall imply an approved independent materials testing laboratory qualified and equipped for the design and testing of concrete and its constituents.
- 1.7 WATER DEMAND shall be the volume of water in litres needed to produce one cubic metre of concrete with a slump of 35 mm using 20 mm nominal size coarse aggregate.
- 1.8 WORKS CUBES shall imply concrete test cubes on site as work proceeds.
- 1.9 STANDARDS shall denote British Standards (BS) or Standards Association of Zimbabwe Standards (SAZS).

2. RECORDS

The Contractor shall, with respect to all portions of the Works, maintain written records that contain the following:

- a) The date on which each portion was concreted, the concrete grade used, records of all sampling and testing carried out as directed under this Specification, records of all ready-mix or site batched concrete and the manufacturer's batch numbers from the cement used.
- b) Daily weather conditions including maximum and minimum temperatures.
- c) The location of all sampling in the Works and the nature of the samples or testing carried out.
- d) Results from all sampling and testing.

These records, or a copy thereof, shall be available for inspection at all times on the site.



3. MATERIALS

3.1 GENERAL

Before any concrete is supplied to the works, the Contractor shall provide the following which shall confirm compliance with specified requirements:

- a) Information listed in Clause 3.1 of BS5328 : Part 3:1990.
- b) Information on aggregates in accordance with SAZS : 233 : 1978.
- c) Evidence of suitability of concrete mix to Clause 7.5.
- d) Workability of concrete mix.
- e) All other information regarding constituent materials required by this Specification.

3.2 CEMENT

- a) Only Portland Cement (PC) to SAZS : 307 : 1993 is to be used for this project and may be supplied from more than one Manufacturer. Such cement shall only be used independently of all other cement. Concrete containing mixed cement will not be accepted.
- b) The Contractor shall seek approval for the types of cement he proposes to use.
- c) All cement shall conform to SAZS : 307 : 1993. The Manufacturers' certificates of testing including compressive strength tests carried out, shall be kept in the Site Records. Records must reflect all batches of cement supplied to the works.
- d) Uniformity of colour is required in the Architectural Concrete finishes and shall be as directed in the Engineer's Specification.

3.3 WATER

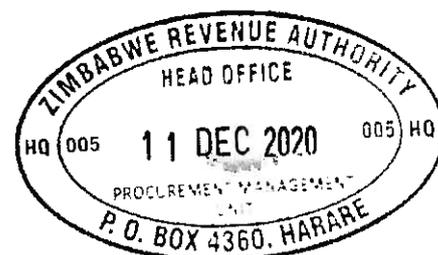
All water shall be potable, clean and free from damaging levels of oil, acids, alkalis, organic matter or other deleterious substances. If water is not supplied from the Municipal mains, the Contractor shall arrange for tests to be carried out to BS3148.

3.4 AGGREGATES

All aggregates shall conform to SAZS : 233 : 1978.

The Contractor shall ensure that sufficient supplies of coarse and fine aggregate of the quality, colour and type approved are available to complete the works.

Aggregates having a water absorption greater than 4% by weight shall not be used.



3.5 ADMIXTURES

Admixtures may only be used in the works with the written permission of the Engineer. Concrete admixtures shall comply with BS5075. Acceptance of admixtures into the Works will only be made upon provision of satisfactory information relating to source, type, dosage, justification for use and evidence of suitable performance.

Calcium chloride thycyanates or admixtures containing more than 0.1 per cent chloride ions are not permitted in concrete containing reinforcement, prestressing tendons or other embedded metal or in concrete made with cement complying with BS915 or BS4248.

3.6 CHANGES IN CONSTITUENT MATERIALS

The Contractor shall not make any changes in the source or nature of any of the constituent materials or any change greater than 20 kg/m<sup>3</sup> in the cement content without first providing evidence that the proposed changes will provide concrete of the required quality, and obtaining the written approval of the Engineer.

3.7 REINFORCEMENT

The type of reinforcement will be identified on Schedules by prefixes to the bar mark numbers.

The prefixes have the following meanings:

- a) R: Plain round not rolled mild steel bars with a characteristic strength of 250 N/mm<sup>2</sup> and complying with BS4449.
- b) Y: Type 1 deformed high yield steel bars with a characteristic strength of N/mm<sup>2</sup> and complying with BS4461 : 1978.
- c) X: High yield square twisted bars with a characteristic strength of 425 N/mm<sup>2</sup> and complying with BS4461 : 1978.

Welded wire mesh fabric shall comply with BS4483.

3.8 SPACERS LIFTING BLOCKS

Spacers and lifting blocks required to positively hold the reinforcement in position prior to concreting shall be sufficiently strong for the purpose required. They shall be provided with fixing devices suitable for maintaining the units in the correct position during concreting.

They shall be made of concrete, sand-cement mortar or shall be approved patent units manufactured of a material which will not corrode, rot or otherwise degrade.

The units will be compatible with the type of finish specified. Spacer blocks in exposed concrete will be made from the same materials used in the surrounding concrete.



3.9 EXPANSION JOINT FORMERS

Materials used to form expansion joints shall be rightly held in position during concreting, shall not deteriorate or distort when wet and shall be easily removed from the formed joint without damaging the finished concrete.

The Contractor shall submit details of the material he proposes to use.

3.10 EXPANSION JOINT FILLERS

Where directed to do so, the Contractor will fill expansion joint spaces with a filler approved by the Engineer.

3.11 EXPANSION JOINT SEALERS

Where directed to do so, the Contractor will seal expansion joints with a sealer approved by the Engineer.

3.12 WATERBARS

Waterbars shall be extruded from rubber, synthetic rubber or virgin PVC. They shall be jointed with purpose made junction pieces and in accordance with the manufacturer's written instructions.

3.13 HOLLOW CONCRETE BLOCK

Hollow blocks shall conform to the sizes and weights as given on the drawings.

3.14 RELEASE AGENTS

Release agents shall be materials marketed as such and shall be one of the following types:

- a) cream emulsion provided it is not subject to freezing;
- b) neat oil with surfactant added;
- c) chemical release agent; or
- d) non-staining mineral oil.

Release agents shall be stored and used strictly in accordance with the Manufacturer's written instructions.

3.15 SUBSTITUTION OF MATERIALS

No materials shall be substituted without the approval of the Engineer.



4. STORAGE OF MATERIALS

4.1 CEMENT

- a) Cement shall be stored on site under cover and off the ground in a manner that provides adequate protection against moisture and other factors which may promote deterioration. Storage in bulk in silos or similar containers is permitted.
- b) Cement supplied in sacks shall be so arranged that it can be used in the order in which it was delivered to the site and should not be stacked higher than 12 sacks at a time.
- c) Cement shall not be kept in storage for longer than 6 weeks without the Engineer's permission.

4.2 AGGREGATES

Aggregates shall be stored on hard paved, self-draining areas or in suitable hoppers or containers.

Aggregates of different nominal size or source shall be stored separately. Intermixing of different materials will not be permitted.

The Contractor shall ensure that contamination by foreign matter is avoided.

4.3 REINFORCEMENT

Reinforcement shall be stored clear of the ground and protected from mud, oil and other substances which may adversely affect its use in the works.

Excessive rust shall be removed by wire brushing prior to inclusion in the works unless in the opinion of the Engineer, the reinforcement falls under Clause 4.5.

Steel welded wire mesh fabric shall be delivered and stored flat.

4.4 ADMIXTURES

Admixtures shall be stored as directed in the Manufacturers' written instructions.

4.5 DETERIORATED MATERIAL

Material that has deteriorated or that has been contaminated or otherwise damaged shall not be used in concrete. Such materials shall be removed from the site without delay at the Contractor's expense.



5. REINFORCEMENT

5.1 BENDING

- a) Reinforcing bars shall be bent to the dimensions shown on the working drawings in accordance with BS4466 : 1989 'Bending dimensions and scheduling of bars for the reinforcement of concrete'.
- b) All bars shall be bent cold and bending shall be done slowly, even pressure being used without jerk or impact.
- c) Reinforcement shall not be cut and bent except as shown in the Bending Schedules unless specifically to do so by the Engineer.
- d) Each bundle of bars shall be clearly tagged with their schedule and bar mark numbers.

5.2 RE-BENDING

- a) Under no circumstances shall reinforcement be re-bent unless the Contractor is specifically directed to do so by the Engineer.
- b) All re-bending will be to the Contractor's account unless called for on the Engineer's drawings.

5.3 FIXING

Reinforcement shall be positioned as shown on the working drawings and maintained in those positions within the tolerance given in Table 5.3. It shall be secured against displacement by tying at intersections with 16swg soft iron wire, or other approved method, or by the use of suitable clips.



**Table 5.3- Tolerance On Positions Of Reinforcement**

POSITION OR TYPE OF REINFORCEMENT	TOLERANCE
1. Slabs	
Absolute position specified	+/- 75 mm
Spacing greater than 150 mm	+/- 15 mm
* Specified spacing less than 150 mm	+/- 10 mm
2. * Main bars in beams or columns	+/- 10 mm
3. All bars positioned in bends of other bars	+/- 10 mm
4. Bars not specified above-absolute position	+/- 50 mm
* Spacing	+/- 15 mm
5. Longitudinal location of bends: end of bars	+/- 50 mm
6. Cover (Notwithstanding any tolerance shown above.	+/- 5 mm

- Provided that the horizontal distance between bars shall in no case Be less than the nominal coarse aggregate size + 5 mm or diameter Of bar whichever is greater.
7. The 'Tolerance' is defined as the maximum permissible displacement Of any reinforcement from the position shown on drawings. Where One more tolerance apply, the lesser shall govern.

#### 5.4 SPACERS AND LIFTING BLOCKS

- a) The Contractor shall provide spacers or lifting blocks in order to form and maintain the cover as required in Clause 3.8.
- b) Stools for supporting top reinforcement will be shown on the Drawings.

#### 5.5 COVER

The concrete cover to the reinforcement shall be shown on the Drawings. If not so shown the cover shall be as indicated in Table 5.5. The Contractor shall obtain the exposure rating from the Engineer.



Table 5.5 – Nominal cover to Reinforcement				
Exposure rating (to be supplied by Engineers)	Nominal cover (mm) Concrete Grade (Mpa)			
	20	25	30	40
Mild: e.g. completely protected against weather or Aggressive conditions during construction. Plastered and unplastered interior work.	25	25	20	20
Moderate: e.g. sheltered from severe rain and not subject to freezing whilst saturated. Buried in non-aggressive soil and concrete continuously under water.	-	-	30	25
Severe: e.g. exposed to driving rain, alternately wet and dry and subject to freezing when wet. Corrosive fumes. Buried in aggressive soils.	-	-	40	30
Very severe.	-	-	-	50

**NOTE:** The above covers are a minimum to any reinforcement including links, except where specifically detailed otherwise.

#### 5.6 SPLICING

Splicing or jointing of reinforcing bars shall be made only as and where shown on the drawings. Welding will not be permitted.

#### 5.7 PROTECTION OF EXPOSED BARS AND RUST STAINING

Reinforcement exposed for future bonding of extensions to the works shall be protected from corrosion by coating the bars with cement grout once all rust has been removed. Rust must be removed by wire brushing or a similar approved method.

Concrete surfaces which will be exposed to view in the finished works shall be protected from staining due to rusting of projecting reinforcement if that reinforcement is to be left exposed for a protracted period.

#### 6 FORMWORK AND FALSEWORK

Prior to any construction in the Works, the Contractor shall provide details of the systems of formwork and falsework he proposes to use to form all main structural members and concrete requiring formed finishes.



6.1 DESIGN

- a) Formwork shall be so designed and constructed that the concrete can be properly placed and compacted and that the required shapes, positions, levels and dimensions of the concrete works as shown on the working drawings are maintained, subject to the tolerances specified, due attention being paid to the accumulation of error when modular formwork is used.
- b) The formwork and its supports (together referred to as falsework) shall be capable of resisting with an adequate factor of safety all construction loads, wind forces and all other superimposed loads and forces.

Supports shall be adequately braced and suitable precautions shall be taken to protect the falsework against possible impact. The construction shall allow for stripping without jarring or damaging the concrete.

- c) Joints in forms shall be tight enough to prevent leakage of cement paste. All sharp corners shall have a 25 x 25 mm fillet unless otherwise shown on the drawings.
- d) Wedges and clamps shall be used in preference to nails. Wedges shall be used in pairs. Tie rods are preferable to wire ties. This specification calls for vibrated concrete and adequate cognisance shall be taken of this in the design of the formwork.
- e) No metal part of any device for maintaining formwork in the correct location shall remain permanently within the specified concrete cover to the reinforcement.

6.2 CAMBERS

Unless specifically directed to do so on the drawings, or in the Structural Preliminaries, no cambers are to be provided. Where cambers are specified, the formwork shall be constructed such that the following upward cambers exist immediately before striking off formwork.

- a) Spanning between supports - 0.2% of span at centre.
- b) Cantilevers - 0.4% of span at free end.
- c) Cambers where specified shall be 'doomed' and not 'rigged'.



### 6.3 FORMWORK

#### 6.3.1 Materials

- a) Timber used for formwork shall be sound, well seasoned and free from loose knots, large cracks, warping and other defects.
- b) Steel forms shall be capable of remaining true to shape. Forms which do not provide a smooth surface or cannot be properly aligned shall not be used.
- c) Plywood, blockboard or similar sheeting shall be in good condition. Sheeting which has become excessively porous shall not be used.
- d) All bolt and rivet heads which will be in contact with the concrete surface shall be countersunk flush with the surrounding surface.

#### 6.3.2 Ties

- a) The type of ties used and their position shall be such that the finish required is achieved and is not marred by subsequent corrosion.
- b) Ties shall not cause holes to be formed in excess of 1000 square millimetre per square metre in cross-sectional area.
- c) Unless otherwise required in terms of specific finishes, holes exceeding 300 square millimetre in cross-sectional area shall be plugged with an approved concrete mix. Small holes are to be filled with approved dry pack mortar.
- d) Approved temporary bolts through the concrete shall be allowed but all such bolts shall be removed and the holes shall be thoroughly grouted with a cement/sand grout of the same colour as the surrounding concrete. The ratio of cement to sand in the grout shall be the same as the ratio of cement to sand in the concrete. The concrete surface at the holes shall be made flush neat to the satisfaction of the Engineer.

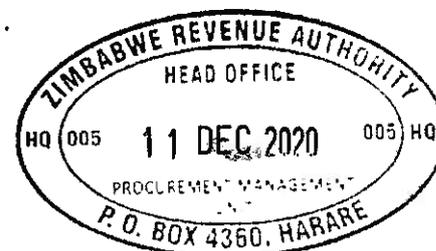
Wire connectors through 'off shutter' concrete shall. All ferrule or other fastening devices shall present a neat, uniform, tidy pattern to the Engineer's approval.

#### 6.3.3 Repair of Formwork

Damaged formwork shall not be reused if, in the opinion of the Engineer the making good would impair the surface of the concrete.

#### 6.3.4 Re-use of Formwork

Before re-use, all form surfaces that are to be in contact with the concrete shall be thoroughly cleaned without unduly damaging the surfaces of the formwork, and where applicable, reconditioned. The cleaning and reconditioning shall be consistent with the quality of the required finish.



6.3.5 Openings

Where necessary for cleaning, inspection, or placing purposes, temporary openings may be provide in the formwork and care to be taken to ensure that 'off shutter' finishes are not impaired.

6.3.6 Preparation of Formwork

- a) Surfaces that are to be in contact with fresh (wet) concrete shall be so treated as below to ensure non-adhesion and easy of formwork during stripping. Every precaution shall be taken to avoid contamination of the reinforcement during this application.

Timber forms shall be thoroughly wetted or coated with an approved release agent. Steel forms shall be coated with an approved release agent.

- b) Formwork which is to receive concrete shall be thoroughly cleaned of all foreign matter before casting.

6.3.7 Formed Surfaces

- a) There will be three classes of formed surface according to the standard of surface finish required and the type of form permitted.
- b) Appropriate forms must be used to achieve the required finish. The quality of the concrete on the forms shall be as shown below.
- c) Special care shall be taken to protect 'off shutter concrete finish' surfaces from damage due to construction operations or other causes. All such protective measures shall be to the satisfaction of the Engineer.
- d) Finishes shall be as shown in table 6.3.7.



Table 6.3.7 – Formed Surfaces

CLASS	DESCRIPTION	TYPE OF FINISH
F1	General	As would be obtained from the use of sawn or used steel plates. Forms may consist of any suitable material.
F2	Fairface	As would be obtained from the use of plywood face shutting boards or steel forms providing a comparable finish, including sawn timber fillets to all corners. The joints shall be arranged in a grid pattern to the satisfaction of the Engineer.
F3	Rubbed Fairface	As for F2 surface except that immediately on removal of the forms the surface of the concrete shall be well washed with water after which a Portland Cement wash shall be applied and rubbed in with Carborundum blocks until the resulting surface meets with the Engineer's approval. Any fins or blemishes shall be removed. This operation shall be completed within 48 hours of the form.
F4	High Quality Off-Shutter	As would be obtained by the use of new steel forms or smooth pressed hardboard. The Contractor will be required to construct a prototype panel for acceptance by the Engineer prior to construction of any F4 surfaces. Once approved, this will form the standard for acceptance of future.

6.3.8 Unformed surfaces

- a) There will be three classes of unformed surface according to the standard of Surface finish required.
- b) Finishes shall be as shown in Table 6.3.8



**Table 6.3.8 – Unformed Surfaces**

CLASS	
U2 General	The concrete shall be uniformly levelled and screeded to produce a Uniform plain or ridged surface. Surplus concrete shall be struck off by a straight edge immediately after compaction.
U2 Trowelled	After the concrete has stiffened sufficiently, the type U1 finish shall be floated by hand, or machine, sufficiently to produce a uniform surface free from screed marks.
U3 High Quality Trowelled	When the surface moisture has disappeared and the concrete has stiffened to prevent laitence from being worked to the surface a type U1 finish shall be steel trowelled under firm pressure to produce a dense, smooth surface free from trowel marks.

#### 6.4 FALSEWORK

##### 6.4.1 Propping Details

- a) Not less than two weeks before the start of any pour requiring props, the Contractor shall provide details of the system he intends to use.
- b) An appropriate foundation for the falsework shall be prepared so as to afford reasonable protection against accidental settlement.
- c) Falsework shall be adequately braced to prevent movement due to all possible loadings including accidental loading.
- d) Falsework shall be constructed such that it can be easily removed without causing damage to the concrete.
- e) Falsework shall be constructed such that it can be removed in the sequence shown on the drawings or as directed by good practice.
- f) Falsework shall be constructed such that it does not permit undue deflection during placing and compaction of the concrete.



6.4.2 Prop Spacing

Spacing of props will depend on which, if any, proprietary system the Contractor wishes to use. Regardless of any other constraint, all members shall be supported between permanent supports at no more than 2.0 metre centres in each direction.

6.5 REMOVAL OF FORMWORK AND FALSEWORK

- a) Formwork and falsework shall not be removed until the concrete has attained sufficient strength to support its own mass and loads that may be imposed upon it.
- b) The structure shall not be distorted, damaged or overloaded in any way by the removal of formwork or falsework.
- c) The responsibility for the safe removal of any part of the formwork or falsework shall rest with the Contractor.

6.5.1 Minimum Striking Period

- a) Forms may not be struck until the concrete has attained the age or strength specified in Table 6.5.1. To prove that the concrete has reached the strength specified in the table, cubes that have been cured under the same conditions as the concrete in the member under consideration, shall be crushed.
- b) Formwork shall be removed carefully so that shock and damage to the concrete are avoided. It should be increased in the case of special finishes which may be sensitive to damage.
- c) Weather may be regarded as 'normal' when the mean atmospheric temperature adjacent to the concrete, as measured by a maximum and minimum thermometer, does not fall below 15 degrees C and 'cold' when the temperature measured similarly falls below 5 degrees C. When mean temperatures are between those values, stripping times shall not be less than the intermediate values determined by the linear interpolation between the specified periods.
- d) The striking of forms but not props may be approved if the Contractor can show that this can be done without damage to the concrete.



**Table 6.5.1 – Removal of Formwork : Minimum Time in Days**

Type of structural member of formwork	Alternative Strength as % of 8 day strength	OPC PC25 Weather	
		N	C
1. Beam sides, walls and unloaded columns Less than 300 mm thick	20%	2	3
2. Ditto but not less than 300 mm thick	20%	1	2
3. Slabs with props left under	40%	4	7
4. Beam soffits with props left under	60%	7	12
5. Beam props except cantilever beams.	70%	14	28
6. Cantilever beams	100%	-	-
7. Slab props.	70%	10	17

N = Normal

C = Cold

When use of other cement is permitted, the revised striking times will be to the Engineer's instructions.

#### 6.5.2 Subsequent Construction

The contractor shall not impose construction loads on slabs and beams in excess of the design loads shown on the drawings and shall retain the propping in position unless such loads are adequately accommodated. Where floor slab construction is required to support subsequent floor construction over, the new construction shall be supported by means of propping the number of floors shown in Table 6.5.2. Such props shall be placed vertically above each other through the required floors.

NN



**Table 6.5.2 – Number of Supporting Floors**

CONSTRUCTION CYCLE IN DAYS	HOT WEATHER	COLD WEATHER
4	4	6
5-6	3	5
7-9	3	4
10-13	2	3
14 and over	1	2

At the discretion of the Engineer the above number of days given in Table 6.5.2 may be reduced or increased. In such cases the Engineer will confirm to the Contractor in writing the revised duration.

## 7 CONCRETE

### 7.1 GENERAL

- a) The Contractor will be responsible for the design of the concrete mix and for the proportions and suitability of its constituent materials necessary to produce concrete that complies with the requirements set out in Tables 7.2 and 7.3.b)
- b) Due consideration shall be given to the production of concrete with minimal bleeding, segregation and shrinkage characteristics. The Contractor shall carry the entire responsibility for any defects that may arise from bleeding of the concrete unless such defects flow from construction procedures stipulated by the Engineer.
- c) The concrete shall have maximum density and minimum free content consistent with the required strength and workability.
- d) Mix proportions must in addition to the other requirements be compatible with the specified surface finish and exposure conditions.
- e) Concrete grades will be as shown on the drawings. Trial mixes and tests and tests shall be out on concrete grades 25, 30, and 40 MPA.



7.2 CONCRETE MIXES

- a) Not less than two weeks before the start of any concrete work on the site, the Contractor shall submit to the Engineer, for his information and approval a statement of mix design. The statement shall provide the following information for each class of concrete.

Mix proportions:

Water/cement ratio  
 Type and quality of additives  
 Target slump  
 Target mean strength

For all concrete the Contractor shall submit a method to be adopted for adjusting the amount of water added to compensate for variation in the moisture content of aggregate.

- b) The type of aggregate and cement, their sources of supply shall not be altered during the currency of the contract without the prior written agreement of or instruction from, the Engineer.
- c) The schedule of specified requirements for concrete mixes is given in Table 7.2 shown below. Proportion and design mixes shall have concrete slump limits at point of placement of not less than 25 mm and not more than 100 mm.

**Table 7.2 – Schedule of Specified Requirements of Concrete Mixes**

	MIX DESCRIPTION			
	C10P	C25	C30	C40
Type of mix (P, D) Type of Cement, SAZS 307	P PC15 PC45	D PC15	D PC15	D PC15
Nominal aggregate max size (mm)	20	20	20	20
Grade	10	25	30	40
Minimum cement content (kg/m <sup>3</sup> )	NR	250	275	325
Sampling Rate (m <sup>3</sup> )	Refer to specification Clause			
Maximum free-water/cement ratio	0.49	0.49	0.40	0.40
Admixtures permitted	No	No	Yes	Yes
Temp of fresh conc. (Degree/ C) max/min	30/7	30/7	30/7	30/7
Density of conc. (kg/m <sup>3</sup> ) max/min	2500/ 2100	2500/ 2100	2500/ 2100	2500/ 2100



P = Prescribed

D = Designed

NR = No special requirements

### 7.3 CONSISTENCY AND WORKABILITY

- a) Unless the Contractor proposes to use other approved methods of controlling the amount of water added, slump tests shall be carried out sufficiently frequently to ensure that measurable variations in the moisture content are allowed for.
- b) Slump measurement shall be taken in accordance with Clause 12.4 and shall conform with the approved values of the slump given in the 'Mix Proportion Statement' of Clause 7.2 (b).
- c) The concrete shall be of such a workability that it can readily be compacted into the corners of the formwork and around reinforcement and produce the required standard of finish.

## 8. MEASURING OF MATERIALS

### 8.1 CEMENT

Cement supplied in standard sacks shall be assumed to contain 50 kg equivalent to 0.033 cubic metres. All cement taken from bulk storage containers and from open or partially used sacks shall be batched by mass, the weighing device having an accuracy within 2 per cent of the mass of cement required for the batch.

### 8.2 WATER

Mixing water for each batch shall be measured, either by mass or volume, to an accuracy of within 2 per cent.

### 8.3 AGGREGATES

Aggregates shall be gauged by mass as set out below. Gauging by volume will not be permitted for concrete of characteristic 28 days strength greater than 20Mpa.

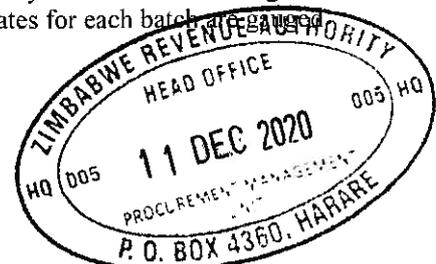
#### 8.3.1 Batching by Mass

All aggregates shall be weighed. Weighing devices shall be maintained in good order and shall have an accuracy of within 5 per cent.

#### 8.3.2 Batching by Volume

Permitted only for concrete of characteristic 28 day strength of 20 Mpa.

The fine and coarse aggregates shall be measured separately in suitable measuring boxes or barrows of such capacity that the quantities of aggregates for each batch are placed into the mixer.



Batching boxes shall be filled without tamping, ramming or consolidation of any kind other than that occurring naturally during the filling process, and shall be screened off level with their topmost edges. Any adjustment of the volume shall be made by supplementary containers of a suitable size. Adjustment by the incomplete filling of batching boxes to marks on their inside faces is not permitted.

Fine aggregate shall be tested for bulking at the following times:

- a) commencement of concrete shift,
- b) halfway through shift,
- c) after rain occurring during shift,
- d) at any other time when it may reasonably be thought that the moisture content of the sand may have changed.

Adjustments shall be made to the batch volume to give the true volume required.

## 9. MIXING

### 9.1 GENERAL

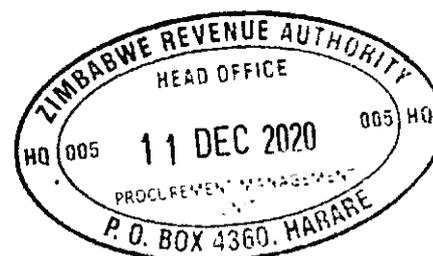
Mixing of materials for concrete shall be conducted by an experienced operator. Unless otherwise approved mixing shall be carried out in a mechanical batch-mixer of approved type and capable of producing a uniform distribution of ingredients throughout the batch.

### 9.2 CHARGING THE MIXER

- a) A fixed sequence of charging shall be maintained and shall be subject to the approval of the Engineer.
- b) The volume of the mixed materials per batch shall not exceed the manufacturer's rated capacity of the mixer.
- c) Immediately before commencing mixing, the mixer shall be primed with a mixture of sand, cement and water in the proportions of the proposed mix, sufficient being added to coat all inner surfaces of the drum, any excess being tipped to waste.
- d) When admixtures are used, they shall be added to the mix in accordance with the manufacturer's instructions.

### 9.3 MIXING AND DISCHARGE

Mixing shall be continued for a period sufficient to ensure a uniform blending of all ingredients. The mixer shall be operated at the speed recommended by the manufacturer. Each batch shall be completely discharged before recharging the mixer.



9.4 MAINTENANCE AND CLEANING OF THE MIXER

If the mixer has stopped running for any period in excess of 30 minutes, it shall be thoroughly cleaned out, particular attention being paid to the removal of any build-up of materials in the drum, in the loader, and around the blades or paddles. Worn or bent blades and paddles shall be replaced.

9.5 READY MIXED CONCRETE

Clause 4.5 of BS5328 : PT3 : 1990 shall apply in preference to those given in this section if concrete is delivered to the site 'Ready Mixed'.

10. TRANSPORTING AND PLACING

10.1 SIZE OF POUR

In establishing the size of any one pour the Contractor shall give due consideration to and will be solely responsible for defects which may arise from shrinkage or bleeding of the concrete unless such defects arise from construction procedures stipulated by the Engineer.

10.2 TRANSPORTING

Mixed concrete shall be discharged from the mixer and transported to its final position in such a manner that segregation, loss of ingredients, and adulteration are prevented. The mix shall be of the required workability at the point and time of placing.

10.3 PLACING

- a) The Contractor shall give the Engineer reasonable notice of his intention to place concrete. The concrete shall be placed in its final position in the forms before loss of workability occurs but in no case in excess of fifteen minutes from the time of discharge from the mixer. Re-tempering by the addition of water or other material is not permitted. The forms to be filled shall be clean internally. Excavations and contact surfaces of an absorbent nature shall be dampened but no free water shall be permitted to remain.
- b) The Contractor is required to give the Engineer reasonable notice of his intention to cast concrete in any specific area and to advise the Engineer when all the shuttering, formwork and centering is completed, reinforcement placed, all pipe and conduits set in position and all holes, chases and built-in items set in order that he can in the company of the Contractor check all these items against the Engineer's drawings.
- c) Wherever possible the concrete shall be deposited vertically into its final position and care shall be taken to avoid segregation and displacement of reinforcement and other embedded items.



- d) The working of deposited concrete (whether by means of vibrators or otherwise) to cause it to flow laterally is prohibited. The concrete shall be brought up in horizontal layers of compacted thickness not exceeding 0.5 metre and heaping shall be avoided. At the discretion of the Engineer and where practical this may be varied for instance in the case of long walls or similar structural elements.
- e) Where chutes are used to convey the concrete, their slopes shall be such as not to cause segregation and suitable spouts or baffles shall be provided for the discharge of the concrete. Chutes shall be suitable 'primed' in a manner similar to that specified for the mixer in Clause 9.2.
- f) Concrete shall not be allowed to fall freely through a height of more than 3 metres, and it shall not be placed in water (standing or running) unless so approved, or as directed. Where it is required to deposit concrete through a height exceeding 3 metres, suitable chutes shall be provided for the full drop. Casings or driving tubes for lightly reinforced piles will be considered as suitable chutes.
- g) The pumping of concrete will be permitted providing the mix design complies fully with the requirements of this specification.

#### 10.4 COMPACTION

The concrete shall be thoroughly compacted during and immediately after placing. Compaction shall be carried out by mechanical vibration or, if approved, by spading, rodding, or forking. Over-vibration resulting in segregation, surface laitence, or leakage (or any combination of these) shall be avoided. Similarly under vibration resulting in honeycombing or low densities shall be avoided.

#### 10.5 CONSTRUCTION JOINTS

- a) Unless construction joints are shown on the drawings, the Contractor shall submit his proposals for construction joint positions. The Contractor shall obtain approval for his proposed positions.

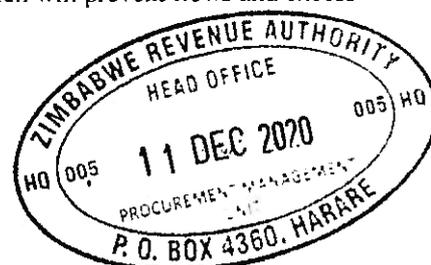
- b) Position of Construction Joints

The position of construction joints proposed the Contractor shall be such as to avoid distress or damage to the Works particularly from thermal movement or shrinkage effects.

The position and spacing of joints which will be acceptable will vary from place to place and will be determined to the Engineer's approval.

Where the Contractor's result in alterations to the reinforcement the Contractor shall be responsible for providing full revised details for approval prior to the commencing on site.

- c) Concreting shall proceed uninterrupted up to stopping points shown on the drawings or as approved. All construction joints inclined at an angle during compaction shall be formed against a face which will prevent flows and excess loss of mortar.



- d) If, in an emergency concreting has to be interrupted, a construction joint shall be formed which will least impair the durability, appearance, and functioning of the concrete. If in the opinion of the Engineer the construction joint so formed is not suitable, the Contractor shall at his own expense modify the joint and cut back where required to the satisfaction of the Engineer.
- e) The Contractor shall obtain approval of size, position and methods of making good of any temporary openings required.
- f) When bonding fresh concrete to old concrete (and where applicable), hack away any projecting stones or fins of concrete and cut back to solid concrete. Remove any mortar leakage which may have occurred. Where the old concrete surface is smooth, lightly roughen to Engineer's approval. Clean away all loose material. Thoroughly damp down old surface (24 hours soaking where concrete is more than 3 days). The joint may at the Contractor's discretion be covered with a layer of mortar not exceeding 10 mm thick and composed of cement and sand mixed in the same ratio as the cement and sand in the concrete mixture. This mortar shall be freshly mixed and placed immediately before the placing of new concrete.
- g) Construction joints in 'off-shutter concrete finish' shall be so arranged as to limit rain water streaking and weather boards shall be erected where directed by the Engineer. The Contractor shall be solely responsible for all discolouration caused by rain water streaking, grout spillage or other causes and all such discoloured work shall, where required by the Engineer, be replaced or repaired at the Contractor's expense. The Contractor shall take note of the fact that grout spillage cannot be successfully removed by subsequent washing and wire brushing.

#### 10.6 CASTING AGAINST EXISTING STRUCTURES

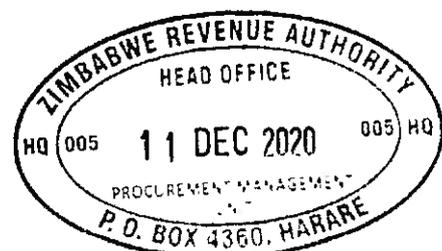
All new concrete work shall be separated from adjoining work by means of 12 mm (minimum) thick soft fibreboard or other suitable bond breaking material.

When casting against masonry or similar walls, one layer of bitumastic paint shall be applied.

Concrete shall not be cast in such lifts as will exert excessive pressure on existing adjoining structures or part of structures.

#### 10.7 CURING AND PROTECTION

- a) Formwork shall be retained in position for the appropriate period given to Clause 6.5, and, as soon as it is removed, all concrete shall be protected from contamination and loss of moisture by one or more of the following methods:
  - i) Ponding the exposed surfaces by means of water, except where atmospheric temperatures are low, i.e. less than 5 degrees C.
  - ii) Covering with sand, or mats made of a moisture retaining material, and keeping the covering continuously wet.
  - iii) Continuous mist spraying of the exposed surfaces with water.



- iv) Covering with a waterproof or plastic sheeting firmly anchored at the edges.
- v) Using liquid curing membrane in accordance with Manufacturer's written instructions and approved by the Engineer.
- b) Intermittent hosing by will not be permitted.
- c) Whatever method of curing is adopted, its application shall not cause staining contamination, or marring of the surface of the concrete.
- d) The curing period shall be at least 5 days for concrete made with Portland cement, and at least 7 days if PC45 cement is used. When atmospheric temperatures are at below 5 degrees these minimum curing periods shall be extended by 3 and 4 days respectively.
- e) Freshly placed concrete shall be protected against heavy rainfall and flowing water for at least 12 hours after placing.

10.8 ADVERSE WEATHER CONDITIONS

a) Cold Weather

When the surrounding atmospheric temperature is over 32 degrees C, effective measures shall be taken to ensure that the temperature of the concrete from the time of placing is maintained above 5 degrees C for 5 days. All surfaces shall be protected from ice or frost damage.

b) Hot Weather

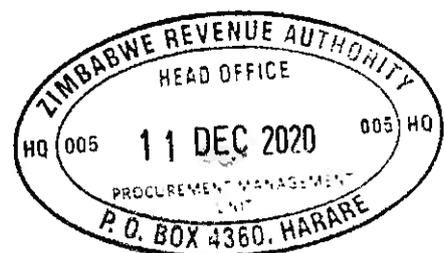
When the surrounding atmospheric temperature is over 32 degrees C the temperature of the concrete when deposited shall not be allowed to exceed this figure. All metal contact surfaces shall be cooled by spraying with water.

- c) It should be noted that a combination of Low Humidity, High Concrete Temperature High Atmospheric Temperature and High Wind or various combinations of these phenomena, will cause very rapid evaporation from the concrete surface. Appropriate measures should be taken to prevent excessive evaporation.

11. CONSTRUCTION DETAILS

11.1 HOLES, CHASES AND BUILT-IN ITEMS

- a) No holes or chases other than those shown on the Drawings or approved by the Engineer shall be cut or otherwise formed in the concrete.
- b) Holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place shall be filled in to the Engineer' approval.



- c) No items for the attachment of fixtures shall be embedded in the concrete unless approved by the Engineer.
- d) Built-in items shall be positioned in accordance with the relevant tolerances and shall be securely held in position during concreting. Unless otherwise shown on the drawings items which are to be incorporated into cambered members shall be suitably curved to match the required camber.

#### 11.2 PIPES AND CONDUITS

The location of pipes or conduits embedded in the concrete are subject to the Engineer's approval. The clear space between any such pipes and the clear distance between such a pipe and any reinforcement shall be at least 40 mm or the maximum size of the coarse aggregate plus 5 mm whichever is greater. The amount of concrete cover over pipes and fittings shall be at least 25 mm.

#### 11.3 EXPANSION JOINTS

Expansion joints shall be formed as shown on the drawings. Adequate care shall be taken to ensure that any joint filler will be securely retained or easily removed, as may be required.

#### 11.4 WATER BARS

Water bars shall be securely maintained in the desired position during concreting.

#### 11.5 HOLLOW BLOCKS

Hollow block incorporated in the concrete work shall be thoroughly wetted immediately prior to receiving concrete but no free-standing water shall be permitted. Open ends of hollow blocks which are butt against concrete shall be blocked off with a mortar filler 10 mm to 5 mm thick prior to the blocks being placed in position.

#### 11.6 PATCHING

After removal of the forms, if the concrete shows any defect or if subsequently any defect attributable to the quality of the concrete or its constituents should develop, the Contractor shall be at his own cost, on and in accordance with instructions from the Engineer, remove all defective concrete and replace it or make good such defects. The making good shall be approved by the Engineer. No patching or making good shall be carried out by the Contractor without the prior approval of the Engineer.

The Engineer's approval of the proposed patching technique shall be obtained at the start of the contract and all patching shall be done under the strict supervision of the foreman. Only work which is unsatisfactorily in limited respects and not classed as defective shall be allowed to be patched.



12. SAMPLING AND TESTING

12.1 SAMPLING, TESTING AND GENERAL CERTIFICATES

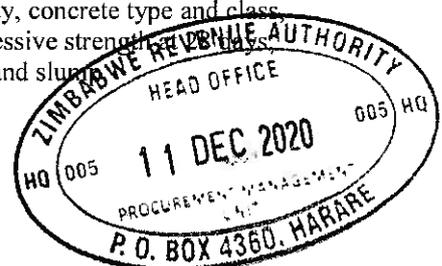
- a) The Engineer shall have free access to the work for the selection of samples and for carrying out tests. The Contractor shall render any assistance necessary for the taking of the samples and for carrying out the tests. If so required, the Contractor shall provide storage and protection for such samples on the site.
- b) The Contractor shall provide manufacturer's test certificates if called upon to do so by the Engineer. Such certificates shall be submitted within 14 days of request. The need for such certificates shall be borne in mind at the time of placing orders.
- c) Not less than two weeks before the start of any concrete work on site, the Contractor shall supply to the Engineer for his information and approval, samples of the constituent materials of the concrete and items ancillary thereto, together with the necessary evidence supporting compliance with the specification. Samples of aggregate shall be supported by a grading analysis, relative density, geological report and shrinkage tests.
- d) Rates of sampling and testing will be as specified in the Bill of Quantities.

Each test will comprise 4 cubes, tested 1 at 3 days, 1 at 7 days and 2 at 28 days.

During the time in which each class of concrete is being placed, samples of the concrete shall be taken at the mixer at the rate specified by the Engineer. The minimum number of cubes to be taken on any one pour will be four, irrespective of the volume of concrete poured. The samples taken will be in accordance with BS5328. One set of cubes is to be four cubes.

- e) Testing will be carried out at the rate specified by the Engineer until a satisfactory relationship is found between the 3, 7 and 28 day strengths. The Engineer may change the sampling rate as and when he deems fit to do so.
- f) The procedure for sampling, making the test cubes, curing, storing and testing and the mould used shall be in accordance with BS1881.
- g) The Contractor shall provide sufficient moulds required for the making of test cubes.
- h) Cores if required which may be drilled in terms of Clause 14,4 shall be tested as specified in BS1881.
- i) Compressive tests shall be carried out by an independent authority approved by the Engineer.

The reports shall contain the project identification name and number, date of concrete placement, name of concrete testing authority, concrete type and class, location of concrete batch in structure, design compressive strength, type of cement used, compressive breaking strength and slump.



12.2 GRADING ANALYSIS

The Engineer, may at any time call for a grading analysis to be made for each of the aggregates used. The analysis shall be made by the method given in SAZS : 190 or as approved by the Engineer. The Engineer may call for any grading analysis to be carried out by an independent authority.

12.3 DETERMINATION OF CONSISTENCY

The slump test used to measure the consistency of the concrete mix shall be carried out by the method given in BS 1881.

12.4 BULKING OF AGGREGATES

The test for determining the bulking of fine aggregates shall be carried out as described in SAZS : 190.

12.4 COST OF TEST

The cost of all tests required by the Engineer shall be borne by the Owner, either as may be specifically measured in the Bills of Quantities or as allowed for as an extra to the contract, except that the costs of the following tests plus incidental expenses related to such tests shall be borne by the Contractor and shall be deemed to have been allowed for in the rates.

- a) Slump tests.
- b) Preliminary tests required in terms of Clause 7.2.
- c) Bulking tests.
- d) Such tests (including load tests) as may, in the opinion of the Engineer, be made necessary by failure on the part of the Contractor to meet the requirements of this specification and any tests which fail to meet the requirements of this specification.

13. FAILURE

13.1 APPEARANCE

If in the opinion of the Engineer any concrete finishes which do not match up to the requirements of this specification shall be deemed to have failed.

13.2 CONCRETE STRENGTHS

- a) Concrete from which test cubes have been prepared shall be considered as having failed if the requirements of BS 5328 are not met.
- b) Concrete which exhibits defects as a result of poor workmanship, overloading during construction, fire, premature removal of formwork, bleeding and drying shrinkage shall be considered as having failed.



14. REMEDIAL ACTION

14.1 CONDONEMENT

The Engineer, in his sole discretion and without prejudice towards any other failures, and without giving any reasons therefore may condone failure.

14.2 APPEARANCE DEFECT

Concrete which has failed in terms of Clause 13.1 and 14.1 shall be repaired or removed and replaced, to Engineer's approval.

14.3 DIMENSION DEFECT

Concrete which has failed in terms of Clause 13.1 and 14.1 where applicable shall be treated as follows:

- a) In the case of members of excessive size excess material shall be removed and subject to this procedure not resulting in the weakening of the member for other reasons or adversely affecting the appearance. If the member would be weakened or its appearance affected, it shall be required or removed and replaced.
- b) In the case of undersized members, they shall be treated as for strength defect (Clause 14.4), if applicable, or they shall be built up to the required size subject to this procedure not affecting the appearance. If the appearance would be affected they shall be repaired or removed and replaced.
- c) Notwithstanding the requirements of this clause, if modification of the members can be avoided by the alteration of other components this will be permitted provided it does not affect strength considerations.
- d) All remedial measures shall only be carried out with prior approval of the Engineer for method and procedure.

14.4 STRENGTH AND DEFECTS

Where concrete has failed in terms of Clause 13.2 the Engineer may call for any or all of the following remedial measures to be implemented:

- a) Change the materials or proportions of the concrete mixture to result in 28 day strengths of at least 5 MPa higher than the target strength of the mix under consideration, to avoid a future recurrence of the defect.
- b) Forthwith extend the periods of time given in Clause 6.5 up to a maximum of 14 days extension and/or Clause 10.7 up to a maximum of 28 days extension.
- c) Drill and test concrete cores and/or perform non-destructive tests.
- d) Strengthen the defective portion.



- e) Remove and replace the defective portion.
- f) Remove and replace such non-defective portions as may be required for the purposes of strengthening or removal and replacement of defective portions.
- g) Carry out a load test in terms of Clause 9.5 of BS 8110 Part 2.

#### 14.5 COSTS

Where the Contractor is found to be responsible for any failure, the following costs shall be borne by him:

- a) The cost of all tests required to establish the nature of the failure and the ultimate adequate repair of the portion in question (see Clause 12.6).
- b) Professional fees incurred by the Employer as a result of the failure.
- c) All costs incurred in strengthening, opening up, removal and replacement as applicable.
- d) The cost of modifications to other components where necessary.

#### 15. CONCRETE TOLERANCES

##### 15.1 GENERAL

This section details all forms of construction tolerances. This will include all permitted deviations of the setting-out grid, levels, formed and unformed concrete finishes. All permitted deviations are deemed to be from the absolute position, dimension or level specified.

##### 15.2 SETTING OUT GRID

- a) The Contractor will establish a primary setting-out grid as indicated on the drawings. The absolute position of the grid relative to site datums will be as defined by the Engineer.
- b) The primary setting out grid is to be monitored throughout the building at all levels. The permitted deviations of the grid are: For any grid line relative to its absolute position +/-2 mm.

Permitted deviations for position given below are relative to the defined grid system.



15.3 PERMITTED DEVIATIONS15.3.1 Position of Element

The permitted deviations relative to the grid system specified are:

Foundations	+/-20 mm
Walls, columns	+/-5 mm
Beams/slab edge	+/-5 mm
Level general	+/-5 mm subject to finish specified
Blinding level	+/-10 - 20 mm

15.3.2 Size of Element

The permitted deviations relative to the absolute size specified are:

Foundations	+/-20 mm – 5 mm
Walls, thickness	+/-10 mm
Columns	+/-5 mm
Beams thickness	+/-5 mm
Slab thickness	+/-10 mm – 5 mm

15.3.3 Formed and Un-formed Finishes

The permitted deviations for finished concrete faces are:

a) Formed Surfaces:	
General	+/-10 mm unless specified below
Columns/ beams/walls/ openings etc.	+/-3 mm
Deviation from 2 mm template	+/-3 mm
Abrupt irregularities	+/-1 mm



## b) Unformed surfaces:

The permitted deviation for finished concrete faces are:

	U1	U2	U3
At any point on the surface	15	10	5
Deviation from 2 m template	10	5	2
Abrupt irregularity	5	3	1

15.3.4 Vertical Elements

The permitted deviation from plumb shall be 2 mm per metre height maximum 10 mm.

Deviation from plumb is relative to each storey height and is not cumulative.

15.4 Construction Details

The permitted deviation from specified level and position:

Cast in items	+/-3 mm
Drain inverts	+/-0-5 mm

16.0 PRECAST CONCRETE16.1 GENERAL

The requirements of the Reinforcement Concrete Specification shall apply to the all precast concrete work except where specifically by the Clauses set out below.

16.2 DESIGN16.2.1 Precast Concrete

All precast concrete works have been designed generally in accordance with the recommendations of British Standard Code of Practice Cp 100 and SAZS 166:1975 except where modified by this specification. Working tolerances are as set in the final Clause of this specification.



16.3 CONCRETE

16.3.1 Grout

The grout used for filling cavities and ducts shall be made with ordinary Portland Cement and water. Subject to the approval of the Engineer additives may be used provided they do not contain chlorides or nitrates. The grout shall be sufficiently fluid to ensure that all cavities are filled completely.

16.3.2 Mortar

The mortar used for dry-packing in joints shall be made of ordinary Portland Cement, sand and water in the proportions of one part cement to three parts sand by volume. Mortar used for dry-packing shall be of such consistency that it can be properly compacted by ramming.

16.4 REINFORCEMENT

16.4.1 Projecting Reinforcement

Reinforcement shall not be bent up within the formwork unless approved by the Engineer. All projecting reinforcement shall be suitably treated to prevent rust staining of the finished concrete surfaces without affecting the resistance of the bar.

16.5 CONCRETING

16.5.1 Steam Curing

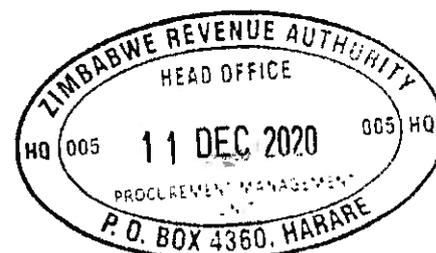
Precast units made with Ordinary Portland Cement may be steam cured at atmospheric pressure. The temperature of the units shall be raised at a steady rate which shall not exceed 22 degrees C per hour and in addition the curing shall comply with the following:

<u>Temperature of Unit</u>	<u>Time Taken to Reach Temperature From Commencement of Steam Curing</u>
32 degrees C	Not less than 2 hours
100 degrees	Not less than 6 hours

16.6 PRECAST CONCRETE

16.6.1 Programme

The Contractor shall ensure that units are stored and delivered to the site to suit construction requirements. This programme shall be agreed with the precast concrete manufacturers in writing.



16.6.2 Handling

Before removal from the casting beds the concrete shall have obtained sufficient strength to prevent any damage or distortion or overstressing of the precast units. The Contractor shall provide all necessary lifting devices which shall be subject to the approval of the Engineer prior to manufacture of the units.

16.6.3 Protection

During all subsequent handling, storage and transporting the precast units shall be protected against any damage or surface staining. The Engineer may reject any units which are damaged or stained.

16.6.4 Identification

Immediately after removal from the casting beds all units shall be marked in a manner and in a position approved by the Engineer.

16.6.5 Approval

All precast units shall be made available for checking of dimensions and surface and shall be approved by the Engineer before erection.

16.6.6 Erection

Prior to the commencement of erection the Contractor shall submit for approval of the Engineer, details of the his proposed arrangement for lifting and erecting units on site. Units which require temporary fixing in position shall be rigidly propped at a suitable point to be indicated by the Engineer.

16.6.7 Jointing

All joint surfaces shall be thoroughly cleaned. Dry-packed mortar joints shall be formed by compacting the mortar in 25 mm layers with a steel tool. Bedded mortar joints shall be formed by bedding the precast units on a firm layer of mortar. The units shall be levelled on steel shims located with the top surface just below the surface level of the mortar. The shims shall have a minimum cover of 25 mm of mortar or concrete. Thin bedded mortar joints shall be formed with a neat cement spread evenly to form a thin bed just sufficient to take up any high points on the bedding surface.

16.7 STANDARD OF WORKMANSHIP

16.7.1 Tolerances

a) Manufacture

Precast units shall be of the various sizes and in accordance with the details separately scheduled and shall be manufactured with the following tolerances:



**Length**

Up to 3 mm	+/- 6 mm
3 to 4.5 mm	+/- 9 mm
4.5 to 6 mm	+/- 12 mm
Additional for every subsequent 6 mm	+/- 6 mm

**Cross Section (each direction)**

Up to 500 mm	+/- 6 mm
500 to 700 mm	+/- 9 mm
Additional for every subsequent 250 mm	+/- 3 mm

**Straightness for Bow (deviation from intended line)**

Up to 3 m	+/- 6 mm
3 to 6 m	+/- 9 mm
6 to 12 m	+/- 12 mm
Additional for every subsequent 6 m	6 mm

b) **Squareness**

When considering the squareness of a corner, the longer of the two adjacent sides being checked should be taken as the base line. The shorter side should not vary in its distance from a perpendicular so that the difference between the greatest and shortest dimensions exceeds.

**Length of shorter sides**

Up to including 1.2 m	6 mm
Over 1.2 m but less than 1.8 m	9 mm
1.8 m and over	12 mm

For the purpose of this requirement any error due to lack of straightness should be ignored; squareness should be measured with respect to the straight lines which are most nearly parallel with the feature being checked.

When the angle is other than 90 degrees the included angle between check lines should be varied accordingly.

c) **Twist**

Any corner should not be more than the deviation stated from the plane containing the other three corners.

Up to 600 mm wide and up to 6 m in length	6 mm
Over 600 mm wide and for any length	12 mm

d) **Flatness**

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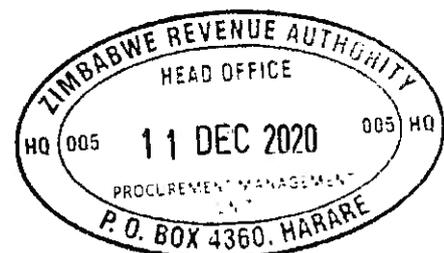


Preambles

The maximum deviation from a 1.5 m straight edge placed in any position on a nominally plane surface should not exceed 6 mm.

- e) Precast Concrete Paving Slabs to be in accordance with SAZS 104:1974.

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BRICKWORK

CEMENT

Cement is to be normal Portland cement as previously described. Blast furnace cement or proprietary mortar cement may be used with prior consent and in strict accordance with the manufacturer's printed instructions.

SAND

Sand is to be clean pit or other approved sand, washed where necessary through a 2.5 mm mesh or directed and shall conform to SAZ 233.

LIME

Lime to be best quality hydrated building lime of approved manufacture and shall conform to SAZ A15 is to be run at least four weeks required for use.

WATER

Water is to be from an approved source and free from acids and alkalis and shall be fit to drink.

CEMENT MORTAR

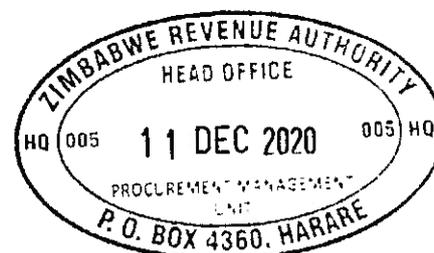
Generally to be composed of composed of six parts of sand to one part of cement. For foundations, facings and sundry grouting and pointing, the mix is to be strengthened to four parts of sand to one part of cement. No cement mortar which has taken its initial set will be allowed to be used.

MIXING MORTARS

The mortar is to be hand mixed on a non-absorbent close jointed platform with kerb. Gauge boxes are to be used for measuring all materials which are to be strike measured and not tamped down. The ingredients are to be mixed dry until thoroughly incorporated and then clean water is to be added through a rose. The mortar is to be mixed in small quantities and used within one hour of mixing. Machine mixing as described for concrete may be used. Mortar boards and mixing platforms are to be cleaned off daily and any mortar left over must be thrown away.

COMMON BRICKS

Unless otherwise described bricks shall be good, hard, sound, well burnt clay common bricks, uniform in size and shape from an approved kiln equal to samples submitted for approval and shall conform to SAZ 221. Maximum absorption shall not exceed 15%. All soft or inferior bricks shall be rejected. Bricks for foundation shall be selected extra hard burnt bricks.



### FACE BRICKS

Face bricks are to be best quality selected bricks as later described similar to samples to be submitted for approval and standard. Face brickwork is to be protected from injury with plastic or other water proof sheeting and salient angles to be cased up to prevent damage. Rates for brickwork shall include for pointing as described, protecting from injury and cleaning all surfaces with a weak solution of spirits of salts and water on completion and for building a sample panel of not less than 50 bricks for approval and demolishing same on completion. Distribute facing bricks of varying colours evenly throughout the work so that no patches appear. Mix different deliveries which vary in colour to avoid horizontal stripes.

### QUARRY TILES

Quarry tiles are to be approved pressed kiln burnt clay quarry tiles of colour as later specified, free from all defects and perfectly true and even, bedded, jointed and pointed in cement mortar (1:4), cased up to prevent injury and cleaned down as specified for face brickwork. Sample to be submitted for approval.

### BRICKWORK

Half brick or similar walls to be built in stretcher bond, unless otherwise stated, all remaining brickwork where practicable to be built in colonial bond. (Five courses of stretchers to one course of headers).

No false headers or other broken bricks are to be used except where required for bond. All bricks to be soaked in water laying. Each course of bricks to be well wetted before bedding the next.

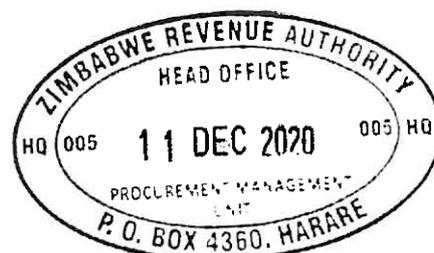
Bricks are to be laid on a solid bed of mortar, all joints flushed up and each course grouted in solid through the whole width. Angles and perpends are to be plumb and courses level. No mortar joint is to exceed 12.5 mm thickness. All brick walls shall be built to the gauge of four courses equals 345 mm (subject to confirmation on site after delivery of the bricks and necessary adjustment to suit the structural sizes). No part of the work shall exceed any other by more than fourteen courses in height. Brickwork for plastering to have joints raked.

Cavities of hollow walls are to be kept free from mortar droppings or other matter by movable battens or other means and temporary openings must be left at plinth level through which any droppings, etc., can be removed and the openings made good on completion.

Execute all cuttings, plumb angles, form reveals, cut and fit brickwork between columns, beams, slabs and staircases, etc.

### TIES

Where brickwork, etc., is described with wire ties, these are to be 3.25 mm thick galvanised crimped wire BUTTERFLY ties built into brickwork and/or cast into concrete at the rate of FOUR ties per square metre unless otherwise described and when used in cavity walls in no case are they to fall inwards towards the inner skin.



DAMP PROOF COURSES

Damp proof courses are to be formed of one layer of three-ply bituminous felt sheeting which shall conform to SAZ 276 : 1993, laid on level bed of cement mortar trowelled smooth and lapped not less than 150 mm at all joints, angles, intersections, etc., and protect from damage.

BRICK REINFORCEMENT

Brick metal fabric reinforcement is to be 'Steelforce' or other approved double row of 3.5 mm diameter high tensile wire with 2.8 mm diameter cross wires welded on at 303 mm centres and is to be bedded solidly into horizontal mortar joints of brick walls, lapped full width and wired together at angles and passings.

BUILDING IN, ETC.

Pressed steel door frames are to be set up accurately in position and lugs built into brickwork in cement mortar and the brickwork is to be built into backs of frames and run in and packed around and pointing both sides with cement mortar. Rates are to include for any temporary bracing required in order to prevent distortion of frames, easing hinges and cleaning down on completion.

Steel windows are to be set up accurately in position and lugs are to be cut and pinned to brickwork or plugged and screwed to concrete on all four sides and run in side of frame, including completely filing the channel formed by the flanges, in cement mortar and pointing. Rates are to include for easing hinges, locks, catches and stays and cleaning down on completion.

Pressed steel window surrounds are to be built in as described for steel door frames.

Pressed steel window cills are to be bolted to the bottom flange of the window, bedded solid and pointed in cement mortar.

Timber frames are to have galvanised hoop iron cramps with one end turned up and screwed to back of frame and the other end built into joints of brickwork and turned up. The frame to be bedded solid and pointed both sides in cement mortar.

REINFORCED BRICK LINTOLS IN CEMENT MORTAR

Reinforced brick lintols are to be built in cement mortar (1:4) with bricks specially selected for soundness and hardness, special care being exercised to grout all joints solid.

Lintols in cavity walls are to have the bottom two courses built solid. Single lintols are to have a bearing of 345 mm at ends and continuous lintols a bearing of 345 mm at extreme ends.

Brick lintols must be reinforced with straight continuous mild steel rods of the number and size specified or with metal fabric reinforcement, as specified. The rods or fabric reinforcement must extend the full length of the lintol and must be evenly spaced across its thickness from the first horizontal joint above the soffit.

Lintols in cavity walls must have all rods or the fabric reinforcement placed below the solid sections of the wall excepting those rods specifically scheduled to occur below the cavity over.



## ASPHALT WORK

### MASTIC ASPHALT

Mastic asphalt used for roofing shall conform to SAZ A1 and all blocks delivered to site shall be appropriately marked.

### MIXING AND LAYING

The mastic is to be mixed at a temperature not exceeding 230 degrees Celsius and is to be laid on and including an underlay of black sheathing felt, or other approved membrane of a type recommended by the manufacturer, in two layers giving a total thickness of 20 mm for ordinary horizontal work. Skirtings are not to be less than 150 mm high with angle fillets at junction with horizontal.

Mastic asphalt used for tanking shall conform to SAZ A3 and is to be laid in three layers with a total thickness of 30 mm.

### SPECIALIST

The work must be carried out by an approved specialist firm with experienced tradesman, and under a written unconditional guarantee for a period of 10 years from the end of the Defect and Liability Period.

### APPROVAL OF SURFACES

The specialist firm will be responsible for approving the screed surfaces (or other surfaces) to receive his work and the fact that his roofing material is laid will be taken as evidence of his approval of the surfaces and of his acceptance of responsibility for any faults that may appear in his work.

### RATES

Rates must include for compliance with the foregoing Preambles and subsequent descriptions and for hoisting and/or lowering to all levels.



ROOF COVERINGSROOF COVERINGS

All coverings are to be laid or fixed in accordance with the manufacturer's instructions and details, whether these instructions are supplied with the coverings or not.

METAL ROOF SHEETING

All metal roof sheeting where described shall be 24 gauge (0.63 mm) Monarch 5R/27 galvanised roof sheets. Where coloured roof sheeting is specified it shall be fluted from approved pre-coated galvanised sheeting that has had the coloured coating applied by the sheeting manufacturer prior to forming iron into coils for delivery. The colours of the sheeting shall be to approval with a silicone polyester coating to the top side and a Standard Backing Coat to be reverse side.

Details and fabrication drawings, calculations and fixing instructions shall be obtained from the Manufacturer's and the Engineer's approval obtained before fabrication commences.

Fluted roof sheeting shall have five box rib flutes 36.50 mm deep spaced at 171.10 mm centres providing a cover width of 686 mm.

Corrugated roof sheeting shall have ten and a half corrugations, 17.5 mm providing a cover width of 762 mm.

The sheeting be supplied in maximum lengths practicable in each respective application and shall be cut to size bent or otherwise worked, at Works before delivery to Site. No sheets edges, whether cut or uncut shall display unprotected metal, and shall be entirely rust free when fixed.

All flashings, trimmings and cappings, etc., shall be formed 0.6 mm thickness galvanised sheet steel, finished to match the profile of the sheeting, all cut bent formed and jointed to the required shape, and in such form and details as to provide a completely sound and watertight roof.

The design of all sheeting and flashing profiles, spans, fixings and weather-proofing detail shall be such as to provide completely sound watertight roofing areas, in the climatic conditions to be found in Zimbabwe, with particular reference to rainfall, incidence of rain and hail conditions. Calculations shall take as minimum design criteria wind loadings resulting from a wind velocity of 45 m/sec, as defined in N.S.C.P.3 Chapter 5 : Part 2.

Side Laps:	Single overlap embedded in approved Mastic Sealant.
End Laps:	Minimum of 300 mm. All bedded in approved Mastic Sealant.
Main Fixings:	Galvanised hook bolts and nuts with galvanised steel and felt washer or similar approved, suitable for fixing to steel purlins and or galvanised drive screws with galvanised steel and felt washer or similar approved, suitable for fixing to timber purlins. All fixing holes to be cleanly drilled.
Fixing Centres:	Two fixings per sheet per purlin at eaves, apexes and laps, one fixing per sheet per purlin elsewhere.



Side Lap Fixings: Two galvanised beam bolts and nuts with galvanised and felt washer per purlin space.

All flashings, ridges and trims running across the line of ribs shall be complete with polycloser componests all in accordance with Manufacturer's recommendations, and bedded in mastic as specified herein under.

All sheeting end and side laps shall be bedded in strips of minimum 25 mm of approval 1 part Polysulphide Mastic, or Mastic Tape of similar composition, application of succeeding sheets shall ensure that full contact is obtained between faces over the whole width of lapped sheeting.

All Polycloser components specified above shall be similarly bedded, on upper and lower surfaces, in mastic of the same approved specification.

All sheetings at lowest ends of roof pitches, where rainwater will be discharged, shall be bent on Site to form a drip downstand across the flat portions of sheets between ribs. This work shall be carried out with standard tools designed for the job; galvanising shall remain perfect, undamaged and unscratched. Drips shall be bent to standard identical 30 degree angles.

All materials shall be packed, transported, unloaded, stored, moved on Site and fixed in such a way as to eliminate damage by distortion, uneven loading denting, scratching, puncture, etc. Any sheets fixed in a damaged condition shall be removed and replaced. Once fixed, duckboards shall be used by personnel, to protect sheeting surface, and all other necessary protection measures taken. On completion all surfaces shall be washed and cleaned of dust, rubbish and all other blemishes.

#### METAL SIDE WALL CLADDING

The Specification for metal sidewall cladding is as for Metal Roof Sheeting above with the recommendation that the broad flutes are fixed externally with the main and side lap fasteners in the valley of the flutes.

#### ASBESTOS CEMENT ROOF SHEETING

Asbestos cement roof sheets shall be prepared and fixed strictly in accordance with the Manufacturer's recommendations.



CARPENTRY JOINERY AND IRONMONGERY

TIMBER

To be best quality procurable, free from sap, white wood, shakes, large, loose or dead knots, waney edges and other defects. Timber to be sawn to hold the full specified sizes and die square.

Timber and timber products to be guaranteed free from borer and beetle infestation of any kind, any defects traceable to such infestation shall be rectify by the Contractor at his own expense, including any timber adjacent to the affected parts. This guarantee shall be valid for a period of two years from the date of handing over the Works.

Timber to be seasoned and kiln dried to a moisture content not less than 10 % or more than 12 %.

SOFTWOOD

Softwood for carpentry to be straight grained timber graded in accordance with SAZ 334:1991.

HARDWOOD

Hardwood to be best quality selected wrot straight grained kiln dried of the type specified. Submit Sample 600 x 150 x 38 mm approval.

BLOCKBOARD

All blockboard to be commercial quality faced both sides with core of kiln dried strips (not exceeding 12 mm thick) of selected softwood jointed and glued together under pressure and planed flat and true for 1.5 mm cross veneers glued on both sides with water proof glue. Veneers to be suitable for painting, unless otherwise described.

HARDBOARD

Hardboard to comply with BS 1142.

PLYWOOD PANELS AND FACE VENEERS

Plywood panels and face veneers are to be best quality and of approved manufacture with written guarantee. Face veneers to be 1.5 mm thick before sanding and are to be specially selected for grain and colour and the figure carefully matched for pattern. Patterns and colours are to be selected and approved.

PLASTIC SHEETING

Plastic sheeting shall be 'Perstorp' or equal approved, cigarette proof quality, and shall be fixed or laminated in accordance with the manufacturer's instructions with approved adhesive and shall have edges finely chamfered at all external angles.



### FRAMED DOORS

To conform to SAZ 184 of approved manufacture and constructed of well seasoned timber of the type specified. Unless otherwise described, stiles, top rails and braces to be not less than 114 mm wide, lock rails not less than 152 mm wide and bottom rails to be not less than 228 mm wide. Stiles and top rails to be grooved and chamfered for and filled in flush on one side with 22 mm narrow tongued, grooved and V-jointed boarding twice screwed at intersections with rails and braces.

### FLUSH DOORS

To conform to SAZ 184 of approved manufacture and constructed with well seasoned framing covered on both sides with plywood cross banding and veneers selected for evenness of grain and suitable for painting, unless otherwise described, and with vertical edges concealed by solid hardwood edges. Rails to be drilled for ventilation.

The top and bottom edges of doors must be primed with an approved wood primer before the door is hung.

### SKIRTINGS

All skirtings are to be ploughed at back to prevent warping.

### STRUCTURAL TIMBER

Timber for non-structural framing, battens and bracing to be merchantable grade and shall conform to SAZ 257 : 1991.

Structural timber to merchantable grade marked 'M' and shall conform to SAZ 334.

Glued laminated timber shall conform to SAZ 169 and shall bear the mark of the Standards Association.

All timber for carpentry work to be in as long lengths as possible and all laps and joints to be placed over points of support. All wrot timber to be finished clean, smooth and free from tool marks.

### WORKMANSHIP

All joinery except that described as 'stock' is to be purpose made.

All work to be put in hand immediately upon signing the Contract, fitted together, but not wedged up and glued, stacked in a dry place and framed up and glued just before fixing in position in the building.

All joinery to be constructed in accordance with approved best standard practice, all tenoned joints to be pinned, all joinery over 76 mm to be double tenoned, all moulds to be mitred at external angles and scribed at internal angles. All mouldings will be solid except where shown to the contrary.

No screws are to be hammered. All works wherever possible to be secret fixed.



All exposed woodwork to be wrot and finished clean, smooth and free from tool marks. All angles to be arris rounded (up to 3 mm radius). All work for oiling or polishing to be finished smooth without application of sandpaper.

#### SCREWING

All screws for hardwood are to be best quality brass screws unless otherwise stated.

#### SIZES

Thickness of doors, blockboard, etc., are actual dimensions of the finished work after dressing, etc. All other sizes specified are nominal dimensions before dressing or shaping operations, 2.5 mm will be allowed off nominal sizes for each wrot face.

#### DEFECTS

All joinery which shrinks, warps, or otherwise becomes defective, or any joints which open or give, etc., within the maintenance period shall be replaced or refitted as directed at the Contractor's expense.

#### PRICES

Timbers described as 'sawn' are to include all workmanship and labour in preparing and connecting together by lapping, notching, splay or birdsmouth cutting, halving, scarfing and for all nails and spikes. All nails are to be of the best quality and of gauge, length and strength suitable for the work. They will be long enough to enter the second timber at least one half their entire length before punching. Skew nailing will only be permitted in the framing. All timbers described as 'framed' are to include for all workmanship and labour in connecting by mortice and tenon or dowelling and for all nails and spikes.

Timbers, unless otherwise stated, shall include for fixing with nails of the appropriate size and type.

The prices for all joinery fittings are to include for framing and fitting together, transporting to the site and fixing in position.

Hardwood described as 'wrot' shall include for lightly sinking the head of all nails, stopping and finishing the surface to receive decoration.

Where described as 'screwed' it shall also include for countersinking the heads and pelleting, unless otherwise stated. Where described as 'plugged' it shall include for fixing to concrete, brickwork or similar material with suitable plugs.

Protect all joinery before, during and after fixing from damage and leave in good condition.

#### IRONMONGERY

To be selected and to be fixed with screws of corresponding metal and colour. The prices are to include for collecting, storing, oiling and easing all locks, fastenings, etc., on completion.

Articles described as brass shall be solid brass and not brass finish.



Preambles

Stamp all locks with consecutive numbers and the keys with numbers corresponding to the locks they control. Each lock to be supplied with two keys. No key is to pass another lock, unless otherwise specified.

The prices for fixing to wood are to include for fixing to hardwood lippings and face veneers of flush doors.

The Contractor shall, at an early stage, arrange for approval of all ironmongery to be fitted to steel door frames, etc., so that provision may be made by the manufacturers for the correct fitting of lock striking plates; hinges, bolts, keeps, cleat hooks, etc.

All ironmongery is to be removed for decoration, cleaned down and refitted.

All joinery shall be in single lengths except where this is impracticable, in which case splayed heading joints, neatly executed are to be used.

All mouldings are to be neatly mitred at external angles and neatly scribed and fitted at internal angles.

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## METALWORK

### GENERALLY

All cast iron, wrought iron and mild steel shall be of approved manufacture complying with the latest relevant British Standard Specification.

All loose scale, rust, dust or coatings shall be removed before fixing.

### WELDING

Welding shall conform to BS 693; BS 938; BS 1775; BS 2630; BS 2937 and shall include for having the welds ground off smooth and even without blemishes and for welding on steel. If described as primed, rates are to include for thoroughly cleaning free from rust, scale, etc., and primed with one coat of approved metal priming suitable for enamel paint.

### PRESSED STEEL DOOR FRAMES

Pressed steel door frames, surrounds, etc., to be annealed steel sheets of approved thickness pressed to shape, mitred and welded at angles and provided with approved steel lugs welded on with ends split and fanged for building in. Frames described as with fanlights are to have transoms with welded seams and ends tenoned into frame. Frames are to be fitted with bracing across the bottom. Unless otherwise stated each frame is to be fitted with one pair of 100 mm heavy steel butts welded on with back plate for each door.

Each frame, unless otherwise described, is to be slotted for mortice lock bolt with cup welded on at back. All necessary drilling for ironmongery, fanlight openers, bolt sockets, etc., should be executed by the manufacturers at works and the Contractor is to supply the correct information for this to be done. Fixings for set screws are to have solid plate welded on at back in all cases. Frames are to be thoroughly cleaned from rust, scale, etc., and primed with one coat of approved metal priming suitable for enamel paint before delivery.

### METAL WINDOWS

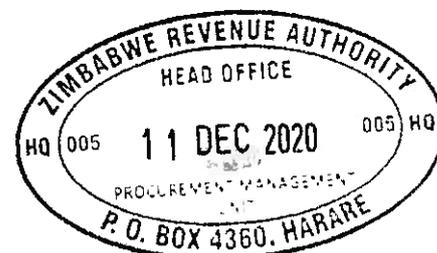
Metal windows to be mild steel as described and obtained from an approved manufacturer, thoroughly cleaned free from rust, scale, etc., and primed with one of an approved metal priming suitable for enamel paint before delivery. A sample window is to be delivered before any order is placed. Transoms are to be continuous and riveted to frame, glazing bars are to be scribed to frames with shouldered and riveted ends. All windows to be standard residential section unless otherwise described.

Frames to have standard lugs for building in, and are to be complete with all screws, nuts, curtain rod brackets, if specified, coupling screws, cleats, cords pulleys, etc. Fit easy clean steel hinges to all windows.

The sizes specified are overall to the end of the section and the width is given first in all cases to the nearest millimetre.

Top hung fanlight and casements to have bronze peg stay with pegs arranged to lock windows when closed. Side hung casements to have bronze handle with ventilation notches and adjustable bronze sliding stay unless otherwise described.

Each window must be tested after building in and adjusted where necessary to leave in perfect working order.



PLASTERING AND WALL LININGS

CEMENT

Cement is to be Superset cement as previous described.

LIME

Lime is to be quality Plasterers lime and shall conform to SAZ A15 and is to be run at least four weeks before required for use.

Sand

Sand is to be washed as directed and shall conform to SAZ 233.

MIXING

As previously described for mortars.

CEMENT PLASTER

Cement plaster for external use to be composed of one part of four parts of sand and for internal use to be one part of cement to four parts of sand.

PROPRIETARY

Proprietary plaster to be used in strict accordance with the manufacturer's printed instructions and steel trowelled to a hard to a hard true and glasslike surface unless otherwise described.

WATERPROOFING

Where work is specified as waterproofed, an approved proprietary additive is to be used in strict accordance with the manufacturer's printed instructions.

COMPO PLASTER

Lime composition plaster to be composed of three parts of sand to one part of lime with 10 % by volume of cement added immediately before use.

MOULDINGS, ETC.

Mouldings, cornices, etc., shall be run clear and accurately to full size details. Where required, brick or concrete cores have been measured separately to receive the plaster finish.



WALL TILING

All glazed wall tiles are to be first (unless otherwise described) cushion edged tiles of approved manufacture and shall conform to SAZ 103, gauged and dipped in water before bedding and jointing in cement mortar (1:3) pointing with approved neat white (or tinted) cement with continuous horizontal and vertical joints. Tiling to be cleaned down immediately after completing. Rates for tiling are to include for a cement and sand (1:4) screed backing and for protecting from injury. Tiles may be fixed with an approved adhesive instead of cement mortar in which case the screed backing to be steel trowelled and the tiles fixed dry. No increase in rates will be considered if adhesive is used.

WORKMANSHIP

All mixing must be in small quantities and must be within one hour, no mix that has commenced to set will be allowed to be used.

All plastered surfaces shall be kept wet for at least seven days after execution.

DEFECTIVE PLASTER

Plaster that is scratched or crazes, or blows, blisters, or flakes off the wall prior to the expiry of the retention period, must be completely removed at the Contractor's expense and be replaced with new plaster before decoration, otherwise re-decorate and replace all damaged woodwork and finishings at the Contractor's expense. Take out and re-fix any loose, damaged or discoloured wall tiles.

Unightly patching will not be allowed and if necessary and the Architect so desires, the whole of the work where the defect occurs must be stripped and re-plastered.



PAVINGS AND FLOOR COVERINGS

CEMENT

Cement is to be normal Portland cement as previously described.

LIME

Lime is to be best quality Plasterers lime and shall conform to SAZ A15 and is to be run at least four weeks before required for use.

SAND

Sand is to be washed as directed and shall conform to SAZ 233.

MIXING

As previously described for mortars.

SCREEDS

To be of mix specified, rates are to include for thoroughly cleaning off all dust and dirt and a neat cement grout to be applied immediately prior to laying.

LOW MASS SCREEDS

Low mass screeds of approved manufacture of suitable density and laid in strict accordance with the manufacturer's printed instructions and finished on top in one operation to receive the specified finish.

GRANOLITHIC

Screed up to within 9.5 mm of the finished surface with a dry mix of three parts sand to one part of cement, finish with granolithic composed of two and a half parts of granite chips graded up to particles which will pass a 6 mm mesh and may be retained on a 3 mm mesh and one part cement by volume.

Where granolithic is specified as tinted, 'Cementone' of selected colours is to be mixed dry in the proportions of one part of colouring agent to six parts of cement. No dusting on will be permitted.

Pavings are to be divided into squares as specified with a V-float and margins formed at junction with walls. Finished surfaces must be scrubbed and washed until all discolouration is removed and polished if specified. The concrete sub-floors to be thoroughly cleaned of all dust and dirt and a neat cement grout applied immediately prior to laying.

Skirtings are to be minimum 19 mm thick, run direct on walls with coved internal angle at floor and rounded at top to break joint with plaster or splayed at top in faced walls and V-jointed at bottom to line margin of floors. Skirtings are to be set 6 mm forward of wall plaster above.



#### VINYL ASBESTOS TILE FLOORING

The vinyl asbestos tile flooring shall comply with SAZS 272: 1987.

All colours shall be selected by the Architect and the Contractor shall allow for executing the work in the these colours to pattern.

Before tiles are laid the screed shall be brushed perfectly clean of all dust, grit, etc.

Tiles shall be laid with an approved adhesive supplied by the manufacturer of the tiles, applied to the screed and underside of the tiles in accordance with the manufacturer's instructions.

Laying of tiles shall be commenced from the centre of the room and all joints to be close and in true straight lines. No damaged tiles shall be used.

Prices for tiling shall include for all straight cutting and waste to edge and cutting to pattern.

#### HARDWOOD MOSAIC FLOORING

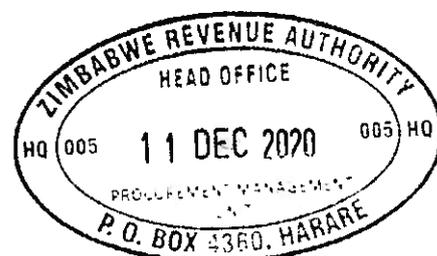
The wood mosaic shall conform with SAZS 015: 1972 and shall be 8 mm thick formed of strips size 24 mm x 12 mm in squares size 483 mm x 483 mm and of approved manufacture out of the best quality of timber specified, well seasoned, entirely free from borers, etc., and from untreated sapwood, and the moisture content shall be not less than 10% or over 15%.

Before flooring is laid the cement screed shall be swept perfectly clean, and the flooring shall be bedded with approved adhesive, the laying commencing from the centre of the room, and all joints shall be close in true straight lines.

Flooring shall be kept 12 mm clear of walls all round and the gap filled with soft setting bitumen.

Floors shall be covered up and protected from injury during the progress of the work and on completion shall be traversed and finished with a sanding machine to the approval of the Architect.

No beads to skirtings shall be fixed until the floors have been sanded.



SHEET METALWORK, PLUMBING AND DRAINLAYING

REGULATIONS

All plumbing and drainage work shall be executed strictly in accordance with the Local Authority's By-Laws and Regulations.

LICENCED PLUMBERS AND DRAINLAYERS

Only licensed plumbers and drainlayers shall be employed to carry out any plumbing and drainage works.

SHEET IRON

All sheet iron to be of approved brand, galvanised and of the thickness specified and shall conform to BS 2989. Galvanised iron nails shall be used for galvanised sheet iron where required.

FLASHINGS, ETC.

Flashings etc., shall be properly lapped at angles and passings. Dress flashing 38 mm into grooves and 6 mm up at back and wedge with rolled wedges. No screws or nails are to penetrate gutters or flashings. Provision to be made for expansion and contraction under changes of temperature.

EAVES GUTTERS AND RAINWATER PIPES IN SHEET IRON

Eaves gutters and rainwater pipes shall be formed to sizes and shapes specified. The rainwater pipes shall have close welded and soldered seams, and the joints between lengths are to be riveted and soldered. All joints in the straight length and at angles, stop ends, etc., are to be riveted and soldered. Sizes of gutters are to be effective sizes.

The eaves gutters shall be fixed to falls to outlets on 6 x 25 mm mild steel gutter brackets bent to suit the profile of gutter and twice holed for and screwed to woodwork or bolted to steel at not exceeding 1.00 metre centres. Alternatively, approved fascia brackets may be used.

Rainwater pipes shall be fixed to walls with 4 x 38 mm mild steel straps in two sections, bent around pipe with the ends bent to form flanges 25 mm long, holed for and bolted together with and including two 19 x 6 mm gutter bolts with locknuts and one section of the strap riveted to and including 4 mm thick mild steel anchor 33 mm wide and 230 mm girth with end split and fanged for and built in or cut and pinned to brickwork or concrete in cement mortar at not exceeding 1.50 metre centres.

ASBESTOS CEMENT RAINWATER GOODS

Asbestos cement rainwater goods shall be of approved manufacture, and shall include for jointing with special mastic as supplied by the Manufacturer and fixed including brackets strictly in accordance with their instructions.

CONCRETE PIPES

Concrete pipes and fittings shall conform to SAZ 315 and SAZ A29.



### STONEWARE PIPES

Stoneware pipes and fittings to comply with SAZ 342 : 1977 to be first quality, tested, spigot and socketed piping, jointed with gaskin and neat cement finished externally with a smooth fillet all round.

The joints to be wiped smooth internally by passing a badger of 6 mm less than the diameter of the pipe completely through the whole length of the drain.

### ASBESTOS CEMENT PIPES

Asbestos cement pipes and fittings shall conform to SAZ 113; SAZ 141 and SAZ 195 and are to be laid in strict accordance with the manufacturer's printed instructions.

### PLASTIC PIPES

Plastic pipes and fittings shall conform to SAZ 156; SAZ 177; SAZ 219; SAZ 220; SAZ 327 and SABS 533 and fixed including brackets in strict accordance with the manufacturer's printed instructions.

### CAST IRON PIPES

Cast iron pipes and fittings shall conform to SAZ 243. Heavy duty cast iron pipes and fittings shall conform to SAZ 243. Heavy duty cast iron pipes and fittings shall conform to BS 1130, all pipes and fittings are to be coated with an approved preservative. Pipe are to be jointed with gaskin and caulked with molten lead.

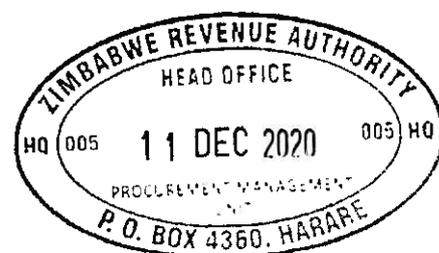
### STEEL PIPES

Steel pipes and fittings shall conform to SAZ 102 and BS 143 and be galvanised. Pipes are to be jointed with hemp and red lead. Medium quality pipes are to be used, unless otherwise specified. Fix to roof timbers with stout galvanised clips and to walls with galvanised hinged holderbats with brass pins at not exceeding 1 metre centres, built into walls with cement mortar. Sling pipes to soffits on 6 x 32 mm mild steel strip fixed around pipes with 6 mm galvanised bolt with ends split and fanged and cut and pinned to concrete soffit.

### COPPER PIPES AND FITTINGS

Copper pipes shall conform to BS 659; BS 1306 and BS 1386, shall be solid drawn seamless, supplied in straight random lengths, round, clean, smooth, free from internal and external grooving, other defects and deleterious film.

All copper pipes carrying hot water are to be supported so as to allow free movement for expansion and contraction, particularly at the end of long runs where a change of direction takes place. Fix tubing to walls with brass hinged holderbats with pins at not exceeding 1 metre centres built into wall with cement mortar. Fix to soffits as described for steel pipes.



Fittings and couplings, etc., for use with copper pipes shall be of the manipulative compression joint type, or other approved type. All fittings, etc., are to be made from suitable corrosion-resistant copper ally, sound and clean, without flaws or laminations and full bore throughout. All fittings and their component parts shall be capable of withstanding an internal hydraulic pressure of 2.20 MPa without showing signs of leakage or other defects.

SIZES OF PIPES

The sizes of pipes, traps, etc., are the nominal bore except for PVC which shall be the external diameter.

TRAPS

Traps shall be brass, copper, polythene or cast iron as specified. Generally traps to shower trays, baths, lavatory basins, drinking water fountains and domestic sinks shall be tubular copper to BS 1184 of the same size as the waste outlet of the fitment, and shall have tails to suit the waste pipe to which they connect.

STAINLESS STEEL

Stainless steel to be the austenitic type and shall comply with BS 970 EN58 series and unless otherwise described, to 0.9 mm thick in 18/8 quality and shall be entirely non-magnetic.

BRASSWARE

Brassware is to be of the best quality and equal to samples approved.

All stop valves, bib tapes, hose union, bib taps and pillar taps shall comply with BS 1010 or SABS 226 and shall have washer plates so secured as to lift with the spindle.

Cold water taps shall in every case be fixed at the right hand side of sanitary fittings.

All ball valves shall comply with BS 1212 and shall be of the sizes and for the pressure indicated or specified. The loose orifice seats shall be of nylon for sizes 15 and 20 mm and bronze for sizes 25, 40 and 50 mm. Ball valves shall be supplied and fixed complete with copper floats to BS 1968 or with plastic floats not less robust and having a lifting effect not less than a BS 1968 copper float for the same duty.

FIRE EQUIPMENT

Portable fire extinguishers are to comply with SAZ 225 : 1991. All fire equipment to be of a type and manufacture approved by the Fire Officers Committee and the Local Authority concerned.

EXCAVATIONS, ETC.

Excavate bottom of drain trenches to an even fall and lay 75 mm cement concrete (Grade 10- 20 mm stone) bed under pipe and support each length of drain pipe with stoolings of cement concrete (Grade 10-20 mm stone) behind each collar and haunch up halfway around external diameter of the pipe.



HARD PICKABLE MATERIAL AND ROCK

Extra over trench excavation for pipes for excavation in hard pickable material or rock has been measured as follows: trench not exceeding 1 metre deep average width 500 mm and trench in excess of 1 metre deep average width 800 mm. Subsequent re-measurement will be based on these widths and the Contractor must allow in his rates for any increased width he may require.

GENERALLY

No holes are to be cut through reinforced concrete work unless approved. Where possible sleeves are to be cast into concrete. Where drain pipes pass through wall, etc., they must be arched over to prevent any loads being transmitted from the structure.

TESTING AND CLEANING

All sheet metalwork shall be carefully and efficiently inspected and tested on the completion and left perfectly watertight.

All defective work shall be taken out and replaced with new work at the Contractor's expense.

At completion of plumbing and drainage installations, clean down and flush pipes, traps, etc., wash sanitary fittings and test the whole to the satisfaction of the Local Authorities and Architect including making good and re-testing until found perfect. The Contractor must provide all necessary equipment to carry out any tests required.



## GLAZING

### GLASS

All glass is to be of approved manufacture, free from bubbles, scratches or other imperfections and is to be well bedded, puttied and back puttied and secured with glazing pins or clips in steel sashes or with springs in wood sashes.

All glass shall be carefully cut to required sizes so that all panes of figured or textured glass are uniform in appearance with the pattern parallel to the edges and wired glass shall be so cut that the wires are parallel to the edges.

### PUTTY

Putty for glazing to steel sashes is to be of proprietary brand specially made for use with steel sashes and shall conform to SAZ A24. Best quality linseed oil putty shall conform to SAZ A24 to be used for wood sashes tinted as necessary when used for glazing to hardwood. Rebates are to be thoroughly back puttied before glazing and all putty is to be carefully trimmed and cleaned off so that back putty finishes level with the top of sections internally, external putty covers sight lines exactly and finished straight and true. Rough surfaces to putty will not be allowed and any defective putty will be cut out and replaced at the Contractor's expense.

Rebates of wood sashes are to be given one coat of immediately before glazing.

### LOUVRES

Glass louvres are to have ground ends and polished edges and are to be fitted both ends to metal clips unless otherwise described.

### MIRRORS

Glass mirrors are to be of the thickness specified, of selected quality glass, silvered on back, with protective sealing coat and arrised edges, unless otherwise described.

### GENERALLY

Allow for removing and replacing all cracked, broken or defective glass and leave thoroughly clean and perfect at completion.



## PAINTING

### COLOURS

Different compartments may be different colours and different walls in any one compartment may be painted different colours. Doors and door frames will be different colours.

### MATERIALS FOR DECORATION

All paints, primers, varnishes, emulsions, stopping, etc., to be of approved manufacture.

The Contractor is to use proprietary 'ready mixed' paints obtained from an approved Supplier.

Where a coat of proprietary paint is applied, the manufacturer's priming and previous coats suitable for the particular type are to be used.

All materials must be brought on to the site in unopened tins, and no dilution or adulteration will be permitted, unless approved by the Architect.

### LIMEWASH

To be composed of 45.4 kg of fresh unslaked lime, 6.35 kg of salt, 4.54 kg of tallow or boiled linseed oil, all thoroughly mixed while boiling and applied hot.

### COLOURWASH

To be limewash as previously described and tinted to an approved shade with approved colouring pigment.

### EMULSION PAINT

Emulsion paint shall be PVA (Polyvinyl Acetate) alkali-resisting formulated with high washability and capable of resisting a 8 000 scrub test. The first coat to be specially formulated base coat for direct application to the specified surface.

### KNOTTING

Knottting shall conform to BS 1336.

### OIL STAINS

Oil stains conform to BS 1215.

### FILLERS

High grade cellulose fillers to be internally and pre-mixed filler to be externally.

### VARNISHES

Varnishes shall be one pack polyurethane type.



LINSEED OIL

Linseed oil is to be refined, pale in colour, transparent, free from smell and not less than twelve months old.

HIGH GLOSS PAINTS

Primers for application to bare metal to be red oxide primer for iron and steel. For galvanised metal to be an approved zinc chromate or galvanised iron primer. For application on wood and plaster etc., to be an approved alkali primer.

Finish Enamels to be Synthetic Enamel high opacity paint with high coverage and high gloss finish unless otherwise described.

WORKMANSHIP

All surfaces are to be free of moisture, dust, grease and dirt rubbed down smooth according to approved practice.

All plaster to be free of efflorescence and treated with one coat of petrifying liquid, approved sealer or alkali primer if required. Hardwall plaster to be glass papered before decorating.

Rectifying defects to decorated surfaces due to dampness, efflorescence, chemical reaction, etc., will be to the Contractor's account, as these surfaces must be checked and the appropriate precautions taken before applying decoration.

Metalwork must be scraped free of rust, primed as described and finished as later specified.

Galvanised sheet iron, pipes, etc., are to be cleaned down to remove manufacturer's ammoniated dichromate protective covering, primed as described and finished as later specified.

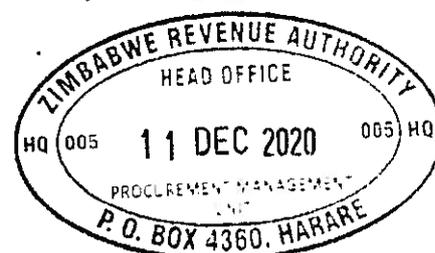
Coated pipes are to be cleaned down, stopped and primed with one coat of aluminium primer and finished as later specified.

All knots in woodwork to be prevent bleeding. Large or loose knots to be cut out and replaced with sound wood, or cut back and filled. Small knots to be treated with two thin coats of knotting free from resin and consisting entirely of a solution of Shellac in methylated spirits. Woodwork to be prepared to a smooth surface with all sharp arrises removed, all cracks, crevices, holes, etc., to be scraped out, primed as described and stopped with hard stopping, faced up and rubbed down to an even surface and finished as later specified.

All metal and woodwork to have the specified number of coats in to the priming coats.

Every coat of paint must be a good covering and must dry hard and be well rubbed down to a smooth surface before the next coat is applied, otherwise the Contractor will be required to apply extra coats at his own expense.

Each coat of paint to be colour; sample colours are to be prepared for the final coat which is to be an approved colour scheme and must not be without the permission of the Architect. After undercoats are on, the Painter shall check all work and grainfill as necessary with filler as described.

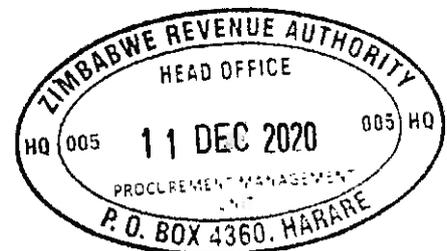


NOTE:

- a) ALL PAINTS SPECIFIED ARE TO BE OBTAINED FROM AN APPROVED MANUFACTURER AND USED IN STRICT ACCORDANCE WITH THEIR INSTRUCTIONS. THEIR REPRESENTATIVE WILL CHECK THE PAINTS BEING USED AND THE METHOD OF APPLICATION AND WILL ADVISE ACCORDINGLY.
- b) THIS SECTION OF THE WORK TO BE CARRIED OUT BY AN APPROVED FIRM OF DECORATORS WHO MUST ALLOW FOR THE VERY BEST FINISH POSSIBLE AND OF THE HIGHEST QUALITY OBTAINABLE.
- c) THE PRICES MUST ALLOW FOR THE REMOVAL AND REFITTING OF ALL BEADS, FITTINGS, FASTENINGS, IRONMONGERY, ETC., REMOVED FOR DECORATION PURPOSES TO BE CARRIED OUT BY SKILLED TRADESMEN OF THE APPROPRIATE TRADE.

GENERALLY

Cutting to line of various colours of paints measured only when the two colours are adjacent on the same plane.



## EXTERNAL WORKS

### ROAD PAVEMENT

#### ENGINEER'S APPROVAL OF METHOD

The Contractor shall not commence work on the sub-grade, sub-base, base underfloor fill, facing or shoulders until he has obtained the Engineer's approval in writing of the plant and methods that he proposes for each and every operation.

The foregoing provisions shall not prevent the Engineer from requiring the Contractor to vary his plant or methods at any time during the excavation of the Works, should the Engineer consider this essential for carrying out the Contract. The Contractor shall not vary plant or methods which have been approved by the Engineer, without previously obtaining the Engineer's approval of such variation in writing.

#### PREVENTION OF DAMAGE TO PARTIALLY COMPLETED PAVEMENTS

The Contractor shall ensure that the passage of vehicle or plant over partially completed sub-grades, sub-base, pavement, underfloor fill or shoulders shall not occasion any rutting or other damage or disturbance to the partially completed Works, and should any such rutting or other damage or disturbance occur the Contractor shall make good the same as directed by the Engineer's Representative.

Vehicles and plant passing over the partially complete sub-grade, sub-base, pavement or shoulders shall not be allowed to travel in a single track but such traffic shall be spread out over as great a width as practicable. There shall be no storage or stock-piling of material on top of partially completed pavements or shoulders.

#### WATER FOR PAVEMENT CONSTRUCTION

The Contractor shall provide all water necessary for construction of pavements, underfloor fill and shoulders. Such water shall be clean and free from organic matter, waste matter and all plant necessary for conveying and distributing water and the water shall be evenly sprinkled on the surface of material by machine of a type to be approved by the Engineer, such machines being capable of uniformly distributing the water at a known, predetermined rate.

#### ROLLERS AND MIXING EQUIPMENT

Smooth-wheeled, vibratory and pneumatic tyred rollers where employed for compaction on the roadworks as detailed in subsequent clauses shall be of a type approved by the Engineer. In addition, the Contractor shall supply at least one pneumatic-tyred roller having a loaded weight of 15 tonnes with tyres having pressures which can be safely raised to 1 N/sq mm. The distribution of wheels on any roller shall be such that the whole of the ground surface within the width of the roller is loaded during each pass of the roller.

Equipment necessary for the thorough mixing of the gravel in order to achieve a uniform moisture content throughout the material shall be tractor-drawn disc harrow type machines (or similar to the Engineer's approval) and the Contractor shall supply sufficient of such units to ensure adequate mixing of the material, taking into account any time limitations and weather conditions.



PAVEMENT AND UNDERFLOOR FILL LEVELS AND TOLERANCES

The pavement underfloor fill and shoulder levels as shown on the Drawings or as directed shall be the finished surface levels or the levels before the application of any bituminous surface dressing or concrete slab.

The levels at any point on the surface of each course shall conform to that shown in Column 2 of the Table 6.1. In addition, the surfaces of the finished sub-grade, sub-base, base shoulders and underfloor fill shall, when tested with a 3 metre straight edge placed in any position on the finished surface parallel to the centre line, have no depressions greater than that shown in Column 3 of Table 6.1.

**Table 6.1**

1	2	3
SURFACE OF COURSE	TOLERANCE FROM TRUE SURFACE LEVEL	MAXIMUM DEPRESSION TESTED WITH 3 METRE STRAIGHT EDGE
Sub-grade	+ 0 mm - 25 mm	10 mm
Sub-base	+ 0 mm - 25 mm	10 mm
Base	+20 mm - 0 mm	5 mm
Shoulder	+20 mm - 0 mm	10 mm
Underfloor fill	+6 mm -6 mm	5 mm

The tolerances in the thickness of the materials for the construction of pavements shall be as follows:

Sub-base thickness	+ 20 mm to - 20 mm
Base thickness	+ 20 mm to - 15 mm
Shoulder thickness	+ 20 mm to - 15 mm

The surface of the shoulder where it joins the base, shall in no case be at a higher level than, nor more than 5 mm lower than, the level of the adjacent surface of the base.



### TRIAL LENGTHS OF PAVEMENTS

THE Contractor shall submit in writing to the Engineer's Representative his proposal for the grading, mixing, transporting, placing, spreading and compacting the materials comprising the stabilised gravel pavements before the construction of the trial lengths. The Contractor shall construct a trial length of at least 400 square metres of each type of pavement as required by, and in the presence of, the Engineer's Representative. If in the opinion of the engineer, the results of the trial length of pavement indicate that the Contractor's proposed plant or method will complete the pavement adequately and in accordance with the specification, the Contractor may proceed with the work.

Otherwise the Contractor shall submit in writing proposals for modifying his plant or methods and shall, if the Engineer so requires, construct further trial lengths of pavement until the specified results are obtained. The location of this trial length shall be as directed by the Engineer's Representative. During the construction of the trial length or trial lengths of pavement, the Contractor shall employ such types and weights of rollers or other compacting equipment in such a manner as the Engineer's Representative may require.

### PREPARATION OF SUB-GRADE

The sub-grade shall be compacted to a depth of 150 mm in the same manner as described for the laying and compaction of gravel sub-base except that the required density shall be as shown on the Drawings, specified by the Engineer or stated in the Bills of Quantities.

Any sub-grade material which in the opinion of the Engineer's Representative fails to comply with this specification due to being inadequately compacted or being unsuitable material shall be reshaped and recompactd or replaced as directed or directed or approved by the Engineer's representative, at the Contractor's expense.

Any irregularities or depressions which develop in the surface of sub-grades during compaction shall be corrected by loosening the surface of the places affected and added, removing, or replacing smooth and uniform. At all times the surfaces of the sub-grades shall be kept in such condition that they will drain quickly and effectively, and to this end small drainage grips shall be dug through the sub-grade of the verges wherever required. Any erosion that may develop on the surfaces of sub-grades shall be made good by the Contractor at his own expense.

No sub-grade shall be covered up until it has been inspected, tested for density and approved by the Engineer's Representative.

### PROCUREMENT OF MATERIALS

The Contractor shall be responsible for procuring materials for use in sub-base, base, underfloor fill and wearing course and for ensuring that all material comply with this specification. Samples of materials that are proposed to be used shall be submitted to the Engineer for approval at least six weeks prior to them being brought onto the site. Materials that are not approved shall not be used in the permanent works.



GRAVEL SUB-BASE

The sub-base material shall comply with the following requirements. Any oversize material in the excess of 50 mm shall be removed from the works prior to processing if so directed by the Engineer's Representative.

Notwithstanding the fact that the Engineer may have approved stockpiles of materials for use in sub-base, the Contractor shall ensure that material used in the sub-base complies with the following requirements:

Class of sub-base		3.3	3.6	3.9
Texas Triaxial Strength (max)	3.3	3.6	3.9	
Max Ip (%) (Plasticity Index)	10.0	12.0	15.0	
Max Ip (Plasticity Index)	150.0	200.0	450.0	

GRADING SPECIFICATION

<u>B.S. Sieve (mm)</u>	<u>Percentage Passing</u>
37.50	100
19.00	75 – 100
9.50	53 – 100
4.750	37 – 95
2.360	26 – 75
0.425	11 – 42
0.75	5 – 27

GRAVEL BASE

The base material shall comply with the following requirements. Any excess oversize material in excess of 50 mm shall be removed from the works prior to processing if so directed by the Engineer's Representative.

Notwithstanding the fact that the Engineer may have approved sources of material for use in the base and underfloor fill, Contractor shall ensure that material used in the base and underfloor fill complies with the following requirements:



Class	2.4	2.6	2.8	3.0	3.3
Texas Triaxial (Strength Max)	2.4	2.6	2.8	3.0	3.3
Max Ip (%) (Plasticity Index)	2.0	4.0	6.0	10.0	10.0
Max PP (Plasticity Product)	30.0	50.0	80.0	150.0	150.0

#### GRADING SPECIFICATION

B S Sieve Size (mm)					% Passing 3.3
	2.4	2.6	2.8	3.0	
37.5	100		100		100
19.0	65 - 90		75 - 100		75 - 100
9.5	45 - 75		53 - 90		53 - 100
4.75	30 - 50		37 - 75		37 - 95
2.36	21 - 40		26 - 60		26 - 75
0.425	8 - 20		11 - 33		11 - 42
0.075	5 - 12		5 - 22		5 - 27

#### GRAVEL WEARING COURSE

The wearing course gravel to be stockpiled and used in the works shall conform with the following requirements:

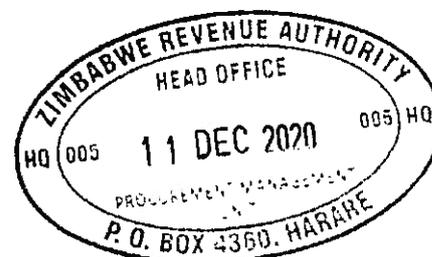
All material shall have a grading modulus (GM) of not less than 1.5 and not greater than 2.5 where the grading modulus is defined as the sum of the percentages retained on the 75 micron, the 425 micron and the 2.00 mm sieve divided by 100.

The percentage passing the 75 micron sieve shall not exceed 70 % of the percentage passing the 425 micron sieve.

#### LAYING AND COMPACTION OF GRAVEL SUB-BASE

The sub-base shall be deposited and spread in a uniform layer across the road, so that the final sub-base as shown on the Drawings, correct to line, slope widths and level is obtained. The sub-base shall be compacted in one layer in a methodical and orderly manner. It shall be compacted throughout to a minimum dry density of 95 % Higher Compactive Effort (HCE), and at a moisture content in the range - 3 % to + 1 % of Optimum moisture content for the compaction plant being employed.

Compaction shall be carried out by approved compactors or rollers which follow a regular route such that each track slightly overlaps the adjacent previous track and the entire area of each layer is covered. Compaction shall progress from the sides to the centre of the section under construction, or from one side towards previously compacted work.



The surface of the finished sub-base shall be smooth and free from irregularities to the approval of the Engineer. Any parts of the surface of the sub-base which do not comply with the above requirements shall be corrected by being scarified, reshaped, re-mixed and re-compacted as may be necessary, or shall be otherwise treated as the Engineer may require, at the Contractor's expense.

LAYING AND COMPACTION OF GRAVEL BASE AND UNDERFLOOR FILL

The gravel base and underfloor fill shall be constructed in the same manner and to the same standard as the gravel sub-base, except that it shall be compacted to 97 % Higher Compactive Effort.

LAYING AND COMPACTION OF GRAVEL WEARING COURSE

Gravel wearing course shall be constructed to the same standard as gravel sub-base, except that it shall be compacted to 93 % Higher Compactive Effort.

STABILISED GRAVEL

Where shown on the Drawing or instructed by the Engineer the base or sub-base shall be stabilised with cement or lime.

The gravel for stabilisation shall comply with the requirements for gravel base or sub-base, whichever the case may be, in all respects except those for Texas Triaxial Strength, Plasticity Product, all of which shall have values which in the Engineer's opinion render the gravel suitable for use as base (or sub-base) with stabilisation using cement or lime.

The rate of addition of the stabilisation agent (expressed as the percentage by weight of the dry material to which it is to be added) shall be as instructed by the Engineer, following the results of tests on samples from the stockpiles which the Contractor proposes to use for stabilised gravel base or sub-base and when planning his operations the Contractor must make due allowance for the delay between stockpiling and the material becoming available for use.

Before the stabilising agent is applied, the material to be stabilised shall be spread, mixed, shaped true to line, grade and cross section and lightly compacted. The loose thickness shall be such as to give the specified thickness after the full compaction has been carried out. The instructed percentage of stabilising agent shall be uniformly spread over the full widths to be stabilised as shown in the Drawings. Only sufficient stabiliser for immediate use shall be spread ahead of the mixing operation and any stabiliser which, in the opinion of the Engineer, becomes defective shall be replaced at the Contractor's expense. No traffic of plant not actually used in the spreading or mixing operations shall be allowed to pass over the stabilising agent, when so spread, until it has been mixed into the material to be stabilised.

Immediately after the stabilising agent has been spread, the agent and the material to be stabilised shall be thoroughly mixed to form a fine tilt for the full depth of the layer, and mixing shall continue for as long as is necessary to ensure that the resulting mixture is homogenous.

Care shall be taken both during this and during subsequent watering operations that the layer underlying that being stabilised is not disturbed and that no material from the underlying layer of shoulders is mixed with that being processed.



Water shall be added where necessary, and thoroughly mixed in successive increments, to obtain the required moisture content uniformly throughout the depth of the layer. Care shall be taken to avoid a concentration of water at any point, or any flow of water over the surface.

Any portion of the work which becomes saturated after the stabilising agent has been added shall be rejected; this shall apply equally to saturation by rainfall.

The base shall be compacted in one layer and shaped on completion of the mixing operations. Compaction shall be to a minimum dry density of 97% Higher Compactive Effort and at a moisture content in the range - 3% to + 1% of Optimum Moisture Content. The gravel layer shall be shaped in accordance with the correct lines, slopes, widths and levels shown on the Drawings.

The surface finish after compaction shall be free from ridge compaction planes, laminations or other surface irregularities.

All work required to produce the finished pavement layer shall be completed within five hours of spreading the stabilising agent with the exception of rolling to induce cracking.

The Contractor shall roll the finished layer once, not less than six and a half hours, nor more than seven hours, after spreading the stabilising agent, with a 12 tonne or 18 tonne smooth wheeled roller to induce cracking of the layer.

All construction joint with previous work shall be made to a face cleanly cut, vertically at right angles to the road centre line, for compacted portion of the previous work. Previous work must be fully compacted at all times. Test holes shall be backfilled by the Contractor at his own expense, with fully stabilised and compacted material, to the same standard as the base course.

The stabilised base shall be continuously kept damp for a period of seven days after constructing. All traffic other than that required for watering shall be kept off the completed base course for this period. The prime coat shall then be applied as soon as practicable thereafter.

The stabiliser content shall not be less than 60% nor more than 140% of the specified amount and the average stabiliser content over 20 samples shall not be less than 90% nor more than 120% of the specified amount.

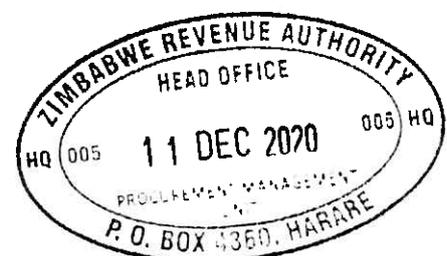
#### HYDRATED LIME FOR SOIL STABILISATION

Hydrated lime for soil stabilisation shall comply with SAZ A19 : 1964 in all respects except that under Clause 4 of the Chemical properties the 2.40 mm and 420 micron sieve sizes shall read 2.26 mm and 425 microns respectively.

#### SURFACE DRESSING : PRIME COAT

#### MATERIALS

Priming materials shall be cut back bitumen grade MC30 in accordance with SAZ 145 : 1975, or alternatively tar prime of grade TP.7 in accordance with SAZ 105 : 1974.



CONSTRUCTION

1. PLANT AND EQUIPMENT

All plant and equipment used on the works shall be in good condition and operation by experienced, competent personnel. No plant or equipment used during the construction of the surfacing shall be serviced or re-fuelled whilst standing on the road and furthermore any of the plant and equipment developing leaks (of either fuel, oil or of the tar or bitumen) shall be removed from the Works immediately and not allowed back on the road until properly repaired.

Before commencing any spray work the bitumen distributor shall be checked and approved by the Engineer as being in satisfactory condition for use. Distributors should have a valid certificate of approval issued by the Standards Association of Zimbabwe.

2. WEATHER LIMITATIONS

No spraying of prime, tack or seal binders shall be carried out under the following adverse conditions:

- (a) during misty conditions;
- (b) when rain is threatening;
- (c) when wind is blowing sufficiently hard to disturb spray jets which will result in unsightly edges to the spray line;
- (d) when the minimum road surface temperature is less than 10 degrees celsius, or when the air (shade) temperature is:
  - (i) rising and less than 18 degrees celsius;
  - (ii) falling and less than 21 degrees celsius;
- (e) when the surface to be sprayed is wet or damp (except that a slightly damp base is acceptable for prime);
- (f) when the aggregate is damp.

3. PREPARATION OF THE BASE COURSES

Before spraying, the surface of the base shall be broomed and cleaned of all loose or foreign material by means of a rotary broom and/or hand brooms to the satisfaction of the Engineer. With a base constructed of fine cohesionless material it may be necessary to use soft hand brooms or in some cases omit the brooming altogether. The Engineer will indicate his requirements in all cases. The edges of the work shall be carefully set out.



Adequate precautions shall be taken to ensure an absolutely clean edge to the surfacing. This shall be achieved by laying strips of tobacco paper or by providing a windrow (at least 200 mm wide and 10 mm thick) of the base sweepings (or other suitable material) along the edges. On curves with excessive super-elevation a windrow of the base sweepings shall be left along the lower edge of the surface to be primed to prevent prime from running in unsightly streaks across the shoulder.

Immediately before the application of the prime a light spray of water shall be applied to the base surface. If the water is over applied the surface shall be allowed to dry out to a uniform damp condition before priming. On no account shall priming be carried out on a saturated or over wetted base as penetration will not occur.

#### 4. PRIME COAT APPLICATIONS

- (a) The prime coat shall be applied by distributor at the application rate of between 0.80 and 0.90 l/square metre.

Trial applications over short sections shall be undertaken to obtain the correct application. The practice shall be to apply a coat of 0.90 l/square metre and then to made adjustments downwards as necessary.

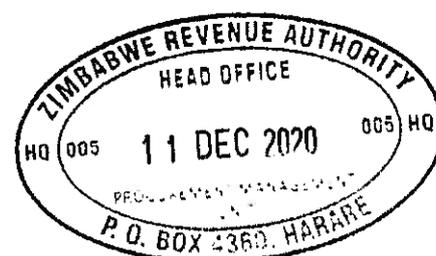
- (b) The temperature of the application shall be as given in SAZ 145 or SAZ 105.
- (c) Tobacco paper or a suitable substitute shall be used at all transverse joints at the beginning and end of all sprays.
- (d) The prime is generally applied in more than one lane and hence allowance shall be made for overlapping of adjoining sprays. End jets shall not be used for these overlapping longitudinal joints. The overlap shall be equal to one half of the width of the coverage obtained from a single jet.
- (e) Care shall be taken to protect any kerbing, channelling, etc., from the prime by covering with a suitable protective material prior to spraying.
- (f) All traffic shall be kept off the primed surface until the prime has penetrated and cured sufficiently to prevent the wheels picking it up when passing over the surface.
- (g) The priming operation shall stop some 15 – 20 metres short of the end of the compacted base. This will ensure no interference with the surface when compaction restarts.

#### SURFACE DRESSING : ASPHALTIC CONCRETE (PREMIX)

##### MATERIAL

##### 1. BINDERS

Bituminous binders shall comply with SAZ 144 (Penetration grades) (normally Bitumen 80/100).



2. AGGREGATES

- (a) The aggregates shall comply with SAZ 232 (1978). Filler may consist of either Portland Cement or approved mineral dust and shall be thoroughly dry and free from lumps. Material in the filler retained on the 0.075 mm sieve shall be regarded as fine aggregate. Where acid aggregates are used, the filler shall be alkaline.
- (b) The combined grading of the aggregates, including the filler, shall conform as closely as possible to the grading envelopes as follows.

SIEVE SIZE	NOMINAL AGGREGATE SIZE	
	7 mm	13 mm
	% PASSING	% PASSING
13.2 mm		100 - 85
9.5 mm	100	75 - 94
4.75 mm	75 - 90	55 - 75
2.36 mm	45 - 65	40 - 56
1.18 mm	28 - 42	28 - 42
0.600 mm	17 - 30	17 - 30
0.150 mm	6 - 15	6 - 15
0.075 mm	4 - 10	4 - 10

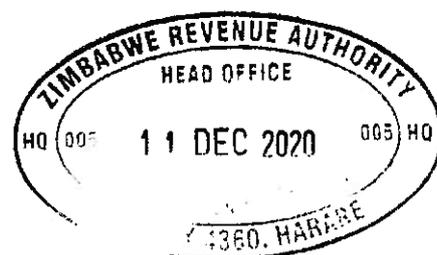
COMPOSITION AND STABILITY

The premix when tested by the standard method shall comply with the following:

Marshall Stability (min) (Kn) (at 60 degrees – 75 blows each end of specimen)	3.34
Flow	2 - 4.5
Air voids mix (%)	3 - 6

As a guide the following is a broad specification for binder contents:

Bitumen (80/100) : 6.5 % +/- 0.5 % by mass of aggregate.



### PLANT AND EQUIPMENT

All equipment used shall be of adequate rated capacity and in good mechanical condition.

Spreading machines shall be mechanical self-propelled pavers of approved type capable of spreading the premix true to line and level, to a minimum width of 3 metres and without segregation, dragging, tearing, burning or other surface defects.

Tandem-steel wheel roller and pneumatic tyred rollers shall be supplied and shall conform to the following requirements:

- (a) Steel-wheel rollers shall be in the 8 - 10 tonne range and shall be self-propelled.
- (b) Pneumatic tyred rollers shall be in the 12 - 20 tonne range, with a working type pressure of up to 600 kPa, and shall be self-propelled. They shall have two rows of smooth tyred wheels so mounted that any gaps between in the front row are covered by wheels in the rear row.
- (c) Both types of rollers shall be fitted with adjustable scrapers to keep the wheels clean and an efficient means of keeping the wheels wet.

### MIXING

The aggregate shall be screened into different sizes and supplied into separate storage bins. They shall then be mixed in the correct proportions to give the desired grading for each batch, and shall be thoroughly dried and fed at a temperature not exceeding 175 degrees celcius for bituminous premix and 100 degrees celcius for tar premix into a mechanical mixer of approved type. The filler and bitumen (or tar) shall then be added, and mixing shall continue until the aggregate has been uniformly mixed and coated with binder.

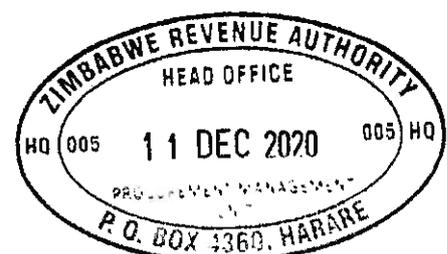
The temperature of the binder shall not exceed 175 degrees celcius, in the case of bitumen, and 100 degrees celcius in the case of tar, and shall not be held at it's maximum for an excessive period. The temperature of the mix on completion of the mixing operation shall be between 135 degrees celcius and 165 degrees celcius (70 degrees celcius - 90 degrees celcius for tar premix).

### PREPARATION OF PRIMED BASE

The surface of primed base shall be completely clean and free from loose material before the premix is applied. Holes and depressions shall be patched out with a fine premix consisting of a densely graded crusher dust or similar material mixed with a stable bitumen emulsion, well compacted and true to profile to the satisfaction of the Engineer.

Where a separate item is included in the Bills of Quantities the Contractor shall obtain written instructions from the Engineer as to where a light spray of bituminous emulsion shall be applied to the primed base immediately before laying the premix. This shall be approved bituminous emulsion diluted with water and sprayed on by an approved pressure distributor to give approximately 0.2 litres/square metre residual bitumen. The day by the premix. Any pools of surplus emulsion shall be removed before the premix is laid.

### WEATHER LIMITATIONS



Premix shall be laid only when conditions are such that the specified density can be attained by rolling and a good bond obtained with the primed base.

Laying shall not take place :

- (a) when air temperature is below 15 celsius;
- (b) during wet or foggy weather;
- (c) if the surface is wet.

#### TRANSPORTATION

The premix shall be transferred from the mixing plant to the site in suitable vehicles and a sufficient number of vehicles shall be available from the plant at the same rate at which it is being produced.

The temperature of the premix on arrival on site shall be not less than 120 degrees celsius for a premix using bitumen and not less than 70 degrees celsius for a premix using tar. If the transportation distance is great, or if rain is likely, the trucks shall be covered with tarpaulin sheets.

#### LAYING

The premix shall be laid by means of an approved paver to provide the compacted thickness required.

Segregated, dragging, tearing, burning or other surface defects shall be avoided, and backcasting shall not normally be permitted.

A skilled mechanic shall be available to carry out any necessary adjustments to avoid defects in the surface finish.

In special circumstances permission may be given to spread fine material behind the paver or drag-broom the surface. This shall be done before the initial rolling. Any excess material, especially segregated coarse aggregate, resulting from this operation, shall be removed from the surface and rejected.

Every effort shall be made to maintain continuous operation of the paver.

#### TRIAL AREA

The Contractor shall be called upon to lay and compact a trial area of at least 200 square metres at the designed thickness, for approval by the Engineer, before the commencement of the work. This area shall be inspected and tested for density. If accepted, and if density achieved is to specification, the surface finish and density of all succeeding work shall not be inferior to that of the trial area.



### JOINTS

Care must be taken to ensure that construction techniques are such that joints are well compacted and impermeable to weather.

Cold joints between sections shall be cut back to a vertical face, loose materials removed and the face painted with a thin coat of bituminous emulsion, to form a bond between the sections. Joints shall be accurately levelled so that the surface is uniform and true.

Joints shall be either at right angles or parallel to the centre line of the road.

The outside edge of the completed layer shall be trimmed to the exact line to give the specified width.

### ROLLING

The rolling technique shall be in accordance with current accepted good practice for the rolling of bituminous concrete surfacing with particular attention paid to the sequence of rolling edges, and the rolling of joints.

The sequence of rollers used shall be at the discretion of the Contractor but the Engineer shall have the right to order any alternative sequence to that used by the Contractor.

The compacted layer shall have a density of at least 97% of the Marshall design density.

Longitudinal and transverse joints shall be carefully rolled so that a good bond is obtained and no ridges or depressions are formed.

The length of successive passes of the roller shall be staggered so that a ridge does not develop in the surface at the point where the roller stops and reverses. After completion of rolling, rollers shall not be allowed to stand on the warm recently compacted premix.

### QUALITY CONTROL

Samples for analysis to determine mix proportions shall be taken from each day's work.

### FINISHED SURFACE

The premix shall conform closely with the required lines, grades, cross-section and dimensions.

The finished surface shall be free from rutting or irregularities which may hold water.

The level of any point on the finished surface of the premix shall be within 5 mm of the level specified.

When a 3 metre long straight edge is placed on any part of the surface so as to be on or parallel to the centre line, any gap between the contact edge and the finished surface shall not be more than 5 mm.



### KERBING AND CHANNELING

Precast concrete work shall be of an approved manufacture. All in-situ work shall be in accordance with 'Concrete, Formwork and Reinforcement'.

All kerbing and channelling shall be true to line and grade, and precast sections shall be jointed with 1:4 cement and mortar. All kerbing shall be haunched with grade 10 concrete to the Engineer's approval.

- (a) Where the depth of cover over a pipe and surround is less than one metre, culverts shall be constructed using Class 5 concrete pipes with a Grade 20 concrete surround in accordance with the Drawings;
- (b) Where the depth of cover over a pipe exceeds one metre, culverts shall be constructed using Class X concrete pipes with a Grade 20 concrete haunch in accordance with the Drawings.

If the Contractor wishes to construct pipe culverts removable formers he shall submit details to the Engineer for approval at the time of submitting his tender.

### ROAD MARKINGS

All road marking shall be carried out using an approved PVA paint. The paint shall be applied in two coats to the exact dimensions as shown on the Drawings.

Before any paint is applied the road surface shall be dry and swept clean. The template used shall be in good condition and shall be sufficiently flexible to make continuous contact with the road surface throughout its length.

### ROAD SIGNS

Road signs shall be of standard pattern, reflective on metal base, bolted or otherwise securely fixed to 50 mm mild steel tubular supports.

From the lowest point of the sign and commencing with black, Give Way signs shall be painted in alternate black and white bands 300 mm in width. Paint shall be enamel.

The tubular supports shall be set 600 mm into the ground in concrete Grade 15 bases approximately 230 mm square in plan. The bottom ends of the supports shall be crimped to prevent the post being rotated in the concrete.



SPECIALIST SERVICES

NO DISCOUNT ALLOWED

All Provisional and P.C. Sums stated are NETT delivered to site, unless otherwise described. The Contractor must add for profit, if required, to the item following each sum.

ATTENDANCE, ETC.

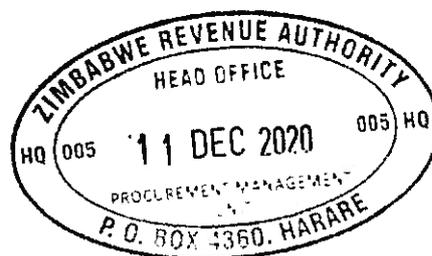
The Contractor must allow for attendance upon all Nominated Sub-Contractors. 'Attendance' unless otherwise described, shall mean taking delivery at site, checking, unloading, storing as necessary in Contractor's sheds, hoisting, the provision of all facilities to and attendance on the particular supplier and fixer, giving all reasonable assistance, the provision of water, power, etc., and of necessary builders' scaffolding or building plant, including erecting scaffolding, adjusting as required, maintaining and moving for the execution of the work, making good in all trades after completion of the work, protecting from injury and the availability of toilets, etc. In the case of Nominated Suppliers 'taking delivery', unless otherwise described, shall mean taking delivery at site, checking, unloading and storing as necessary in Contractor's sheds until required for fixing.

ADJUSTMENT OF PROFIT AND ATTENDANCE

The 'Profit' allowed in the Contractor's original Bills of Quantities will be deemed to have been worked as a percentage profit mark-up on the Provisional or PC Sums and will be adjusted to align with the final cost of the item, excluding allowances for increased costs. Attendance will not be adjusted unless the scope of the work varies or the Contractor states it as a percentage in which case it will be adjusted to align with the final cost of the item, excluding allowances for increased costs.

CONTRACTOR TENDERING

If the Contractor is permitted to tender (and if his tender is accepted) for any work covered by a Provisional Sum in the Bills of Quantities, such Provisional Sums in the original Bills of Quantities will be omitted. Any additional Preliminaries and General allowances and conditions required by the Contractor shall be included in his tender for the work covered by such Provisional Sum, and no additional allowances, etc., will be allowed. Any allowance for 'Profit' and 'Attendance' in the original Bills of Quantities will be adjusted as above.





## PRELIMINARIES AND GENERAL



BILL NO. 1  
PRELIMINARIES

NOTES TO TENDERES

- A The following Preliminaries shall apply to all tenders whether based on bills of Quantities or on a Specification, issued by the Ministry of Works.
- B In the case of a tender based on Bills of Quantities the Tenderer should allow for all costs incurred in complying with the Preliminaries in the money column of this Bill and carry the total (if any) to the appropriate summary in the Main bills of Quantities , or as otherwise instructed in the Tender Documents.
- C In the case of a Tender based on a specification, the Tenderer should include for all costs and expenses in complying with these Preliminaries in his lump sum Tender figure for the work.
- D In the case of a contract based on cation, those Preliminaries which refer to "Bills of Quantities", shall apply only where such term is synonymous with the term "Specification"

- E The Specification or Bills of quantities are to be read in conjunction with, and all work-man ship and materials, unless otherwise described, shall comply with the current edition of the Ministry of Works "General Specification of Materials and Workships" and with my amendments thereto. It is hereby made a condition that the submission of a tender based on Bills of Quantities of a Specification issued by the Ministry of Work shall be accepted as proof that the Tenderer was I possession of a copy of this "General Specification" tendering and that his tender was based upon the requirements of such "General Specification" and amendments there to.

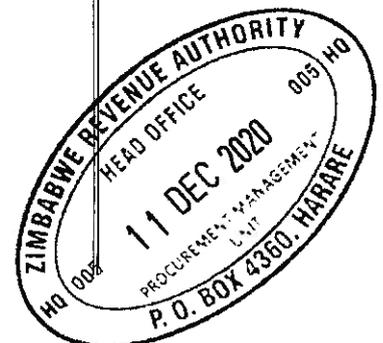
Carried to collection

- A No representation , explanation or statement which any way alter the tender or contract documents , made prior to the acceptance of a tender or during the progress of the contract shall bind the Secretary for works unless such explanation , statement or alteration be made and cornfirmed under the signature of the Secretary for Works.

- B Should there be any doubt or obscurity as to the meaning of any particulars in the Specification , Bills of Quantities or Tender Documents, the Tenderer must obtain an explanation as to the true intent and meaning in writing from the secretary for Works before submitting his tender. No claims for extras arising for any doubt or obscurity will be admitted after the delivery of his tender.

- C There Tenderer is required to check the number of pages in the Specification (and in the case of Bills of Quantities all pages and reference4s thereto in the "Collection" and Summary, and should any pages or references thereto be missing or duplicated or the figures or typing be indistinct , he is to apply the same rectified . any errors arising through the Tenders failing to ..... not be admitted after the submission of his tender.

- D The Contractor shall, when requested by the Secretary for Works, deposit his Bills of Quantities fully priced out in ink with the Secretary for Works, and on the basis of this Bill of Quantities all extras and omissions will be valued. The Secretary for Works shall be at liberty to call for such adjustments of individual rates and rectify discrepancies as he considers necessary provided that the Tendered Amount is not altered



CONDITIONS OF CONTRACT

E. The Tendered is referred to the "Conditions of Contract" and if he considered any of the clauses ( or any amplification thereof given below) in such Conditions involves expense not included elsewhere, he should be include for same

Carried to collection

A Should the Tendered not be in possession of the Ministry of Works Standard Conditions of Contract to copies will be issued to him on application being made.

B. A Tenderer's failure to obtain a copy of the Conditions of Contract will not absolve in from complying with such conditions

C Clause No. 1 : Scope of Contract

D Clause No. 2 : Drawings, Specifications and Bills of Quantities, etc

E Clause No.3 : Local and other Authorities' Notices and fees

F Clause No.4 : Setting out works.

G Clause No.5 : Materials an Workmanship to Conform to Description

H Clause No. 6 : Foreman

J Clause No. 7 : Access for Architect to Works.

K Clause No 8 : Clerk of Works

L Clause No. 9 : Ascertainment of Pricess for Variation

M Clause No. 10 : Bills of Quantities

Should the Contractor not affix any figures in the money column against any particular items, he shall write hyphens thus:- - against such items.

Throughout the Bills of Quantities ..... net should be held to mean the finished measurement and sixes , unless otherwise stated. The Quantities represented the actual net quantities left in the in the building. The Contractor must allow in his prices for all cutting and waste , etc

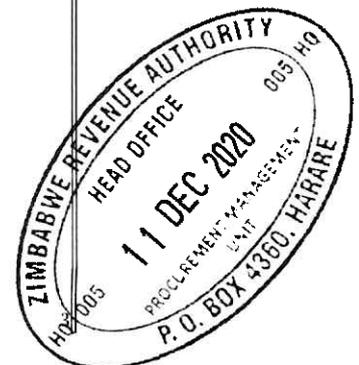
The Bills of Quantities are not to be such for the ordering of materials except at the Contractor's own risk. The have been prepared in order to enable the Contractor to finish an estimate for the work and to provide unit rates for the adjustments of variations.

No alterations erasures of addition are to be made by the Tender's in the text of the Bills of Quantities , and should any such alterations or additions be made, the same will not be recognized and the text of the Bills of Quantities will be adhere to.

To assist the Tenders in casting the various traders in these Bills of Quantities , sufficient , space has been left at the end of each trade enable him to cast each page separately , and carry the same to a column of the page in question under the heading of "Finalisation"

Carried to collection

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AMOUNT

- A Clause No. 11 : Unfixed when taken into account to be property of the Government
- B Clause No. 12 : Defects After Completion.
- C Clause No. 13 : Assignment or Sub-letting
- D Clause No.14 : Injury to Persons or Property

(a) Injury to persons : The Contractor allow for all costs and charges in taking out an Insurance Policy Covering THIRD PARTY RISKS, in the joint names of the Government and the Contractor.

(b) Women's Organization.

(c) Injury to Property

(d) Damage resulting from riot or civil commotion

Carried to collection

- A Clause No. 15 : Insurance . The Contractor is to allow for all cost and charges in insuring the building against fir, for the full amount of the Contractor plus 12 ½ % to cover professional fees. From the commencement of work until the building is handed over. The policy is to deposited with the Secretary for Works and payments to the contractor may be withheld until the clause been compiled with.

B Clause No.16 : Occupation

C. Clause No. 17 : date of Possession and Completion.

D Clause No 18: Damages for Non-Completion

E Clause.No.19 : Delay and extension of Time.

F Clause No. 20: Determination by Government.

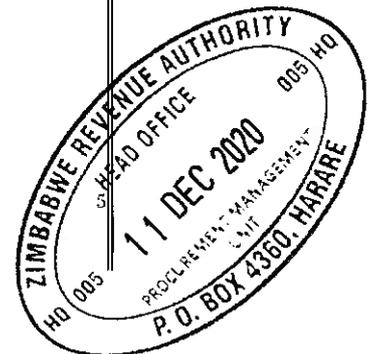
G Clause No.21 : Determination by Contractor.

H Clause No. 22 and 23: Nominated Sub-contractors and suppliers

Where the Government becomes the nominated sub-contractor or the nominated supplier no cash discount will be allowed.

When during the course of the contract the Government omits Provisional Some included in the Bills of Quantities , Specification or Tender Documents for nominated sub0contractorsor nominated suppliers and negotiate a separate contract for such work to be paid direct by the Government , the main Contractor shall allow such separate contractor or supplier access and facilitate and he shall be entitled to pay of profit and attendance at the rates included by him in the Bills of Quantities against the respective items, adjusted pro rata on the amount paid direct by the Government, but shall not be entitled to claim cash discount or compensation for loss thereof.

Carried to collection



In the Event of Provisional Sums for nominated sub-contractors' or suppliers' work being omitted the whole or in part, and such work not being otherwise carried out during the period of this contract all cash discount, profit and attendance shall be similarly omitted in whole or in part pro rate.

A Clause No. 24: Artists, Tradesmen and works Outside the Contract

The Government reserves the right at all times during the progress of the contract to let separate contactors for Specialists' work, or any other similar work not included in the Bills of Quantities, Specification or Tender Documents, and the main Contractor must grant access, and all facilities to such artists tradesmen and others so engaged by the Government and such person shall not be regarded as sub-contractors under this contract and n builders' Discount or profit in respect thereof shall be payable to the Main and Making good being required payment will be made on a fair valuation of the services performed.

To assist the Contractor in preparing any attendance required, the Government may, when there is prior knowledge of specialist work, state in the Specification of Bills of Quantities the approximate value of such intended or existing separate contract, but the inclusion of this information is for the Contractor guidance only and shall not be deemed to be an amount included in the value of the Contract.

B Clause No 25: Certificates and Payment

The Contractor when requiring a progress payment, shall furnish the Secretary for works with an approximate statement of the work executed, detailed and priced under trade and based on his original tender

In all cases where the Contractor required payment for unfixed materials on the site, the application for progress payment must be accompanied by a complete list of all such materials signed by the Contractor and Countersigned by Clerk of Works. All such materials shall become the property of the Government and shall not be taken away (except for use in the building) without the written permission of the Secretary of Works.

Carried to collection

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Not more than 80% of the value of any materials on site will be included in progress payments and such will only be made for materials which are properly protected from weather and theft, and which have not, in the opinion of the quantity Surveyor, been brought permanently upon the site.

All monies due to the nominated sub-contractors or suppliers and which are included in the Contractors' certificates shall be paid to the sub-contractors or suppliers by the Contractor within 21 days after the date of the Certificate in which the sum due is included. In the event of such payment not being made within the above stipulated time, the Contractor shall lose all right to claim any cash discount on the monies involved and the Secretary for Works reserves the right to deduct ALL sums of money that are due to the said sub-contractors or supplies from the Contractors' next certificate and pay the direct to the sub contractor's or suppliers.

It is a condition of this contract that the Government shall not be bound to pay (Except under an Order of Court) any monies due or to become hereunder to any persons save the Contractor who shall not have the right to assign his rights to payment to any third party without first obtaining the written consent of the Government to such assignment.

A Clause No. 26: Wages



B. Clause No. 27: Non-payment of Certificates

Notwithstanding the provisions of Clause 25 of the "Conditions of the Contract", the Government reserves the right to withhold retention period until the Contractor has submitted to the Secretary for Works all receipts in respect of monies due to nominated sub-contractors and nominated suppliers which have been included in payments made to the Contractor, and in the event of the Contractor failing to produce within 14 days of being asked in writing, conclusive evidence that such amount have been fully paid, the Government shall have the right to make final payment direct to such sub-contractors or suppliers and to deduct the value from the retention money, or other monies due under the Contract

Carried to collection

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A Clause No. 28 : Surety Bond

The Contractor is to allow all cost and charges in taking the surety bond.

B Clause No. 29 : Corrupt Gift and Payments of Commission.

C Clause No.31: Articles of Value or Antiquity.

D Clause No. 32 : Feten Rights and Royalties.

F. Clause No 33 : Arbitration.

PRELIMINARIES AND GENERAL

The Tenderer is referred to section B, Preliminaries and General, Pages B.1 to B.9 considers that any of the clauses of any amplification thereof given below involved expense not elsewhere included, he should include for some hereunder.

Clause B.1 Public Liability

G 1.1 Noise control

1.2 Nuisance

The Contractor shall make adequate provisions by spraying erecting screens or other suitable methods, against nuisance or damage by dust to all works under this Contract, to persons or property in the vicinity, and he will be held solely responsible or claims in this connection.

1.3 Adjoining

The Contractor shall not in the execution of the Works enter upon or otherwise make use of and lands adjoining the site of the Works as demarcated on the site plan, without the consent in writing of the Secretary for works or without the consent of the owners of such adjoining lands, having been previously obtained, but shall (except with such consent) confine his operations within the site of the Works.

No trespassing beyond the limits as above described will be allowed.

Carried to collection

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- A 1.4 Adjoining property.
- B 1.5 Police regulations.
- C 1.6 Statutory obligations
- D 1.7 Notices, fees and charges



Clause B.2 Prevention of Damage of Loss

- E. 2.1 Locate existing services
- F 2.2 Protect exist services
- G 2.3 Damage to services
- H 2.4 Fire Precautions
- K 2.5 Damage to roads
- K 2.6 Repairs to roads
- L 2.7 Clear roads

Nothing shall be done by the Contractor or anyone employed by him that shall in anyway interfere with the free us by the public of any of the roads , grave drives, paths , etc., within the approaching the site.

- M 2.8 Protect trees and shrubs .
- N 2.9 Replace trees and shrubs
- O 2.1 Existing features

Make good or reinstate a the Contractor's expense all damage which may occur to gates, fences , buildings or other Government property existing upon the site.

- P 2.11 Existing Damage

Clause B.3 Management/ Administration Procedures

- Q 3.1 Program

- R 3.2 Submit

- S 3.3 Submission

Carried to collection

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- B 3.5 Monitoring

The contractor shall provide book which shall provide on site a carbon copy record book which shall provide one original and two copies in which shall b recorded all site visit and daily record of work done.

- C 3.6 Safety , Health and welfare.

- D. 3.7 Use of site

- E 3.8 Site meetings

- F 3.9 Minutes

- G 3.1 Measurements

- H 3.11 Labor return

- J 3.12 Daywork vouchers

- K 3.13 Ode materials

Clauses B.4 Resources/ Temporary and Service

- L 4.1 Locations
- M 4.2 Temporary works
- N 4.3 Reads
- O 4.4 Buildings
- P 4.5 SO's site office
- Q 4.6 Storage for cement and lime
- R 4.7 Sanitary accommodation for supervisory
- S 4.8 Sanitary accomodation for Artigas
- T 4.9 Hoardings, gantries and scaffolding



U 4.1 Name boards

V 4.11 Telephone

W 4.12 Water

Allow for providing all water for the works and for sub-contractors, pay all fees and charges legally demandable and provide all necessary piping, taps and other fittings, storage tanks etc.

If this Contract embodies work at a Government building or institution where water is already laid on, The contractor may by agreement in writing with the Secretary of Works.

Carried to collection

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If permission be thus obtained and the Contractor uses water from this source , he shall pay to the government ( by deduction from the amount due under the contract) a sum equal to one quarter percent (1/4%) of the final completed cost of the work executed under this contract as disclosed in the final statement , and shall allow in his price for water such as he considers necessary to cover his cost .

The use of water from a government supply is granted subject to the condition that the water is used by the contractor shall be for the building purposes only and should the government be satisfied that the contractor is unduly wasting water and/or using water for any subsidiary purpose such as providing for living accommodation of his workmen on the site, the government reserves the right to deduct from monies due under the contract their assessment of all such additional water used.

A 4.13 Lighting and Power

It is enterly the contractor's responsibility to ascertain before tendering the availability of electricity and all costs and charges thereof, and no claim arising out of this cause will be considered after the submission of a tender.

B 4.14 Plant

C 4.15 Sole use of plant

D 4.16 Removal of plant

E 4.17 Plant to comply

F 4.18 Protective clothing

Clause B.5 Nominated Firms / Public Bodies

5.1 Prime cost or provisional sums. Where provisional and prime cost sums are included for works to be performed, or materials supplied by nominated sub-contractors or suppliers , the secretary for works will invite tenders (or may request the contractor to obtain not less than three tenders) and will direct the contractor to accept a tender from a sub-contractor who contract.

Carried to collection

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Contractor will be entirely responsible for the proper and timely execution of the sub-contract and no contract will exist between the nominated sub-contractor or supplier and the government , and it is the responsibility of the main contractor to ensure that the sub-contractor against the same obligations in respect of the sub-contract , as those for which the contractor is liable in respect of the main contract.



The Contractor shall not order any materials for which Provisional or Prime cost Sums are included without first receiving instructions in writing from the secretary for works so to do .

The contractor will be required to produce all receipted invoices , if demanded by the secretary for works for the adjustment of accounts.

If items are reserved for work of a nature usually carried out by the contractor in the course of his business , the Government may give the contractor an opportunity of tendering for the same without prejudice to the Government 's right to reject the work of any tender.

#### 5.2 Sub-Contractors.

The names of all sub-contractors (other than nominated) whom the contractor proposes to employ shall be submitted to the secretary for works for approval before the signing of the contract . Such approval shall not be unreasonably withheld.

#### 5.3 General Attendance

Whenever the words for attendance " occur, it shall be deemed to cover all the contractor's costs involved in the following :

a) For giving the sub-contractor every facility to enable him to execute his work in a workmanlike manner and improper order and sequence. Use of all scaffolding and plant as may be reasonably required by him, and for erecting ,shifting and removing as necessary such scaffolding and plant free of charge to the sub- contractor.

Carried to collection

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For a providing water or electricity required by the sub-contractor.

b) For receiving, unloading, checking and removing to store all the sub-contractor's materials, articles and fittings on arrival at the site , and where necessary for providing proper storage accommodation for the prevention of pilferage, damage, e.t.c., returning all empties and packing of same carriage paid , and for hoisting or lowering materials, articles or fittings to the requisite levels and positions in the building

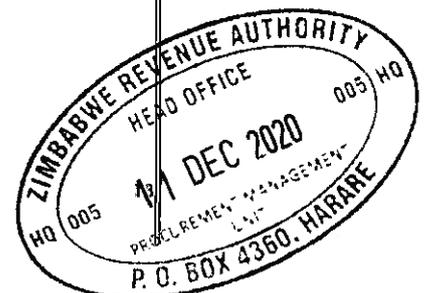
c) For agreeing with the sub-contractor proper and accurate working dimensions and other particulars and for obtaining from the sub-contractor's requirements, with particular regards to chases, recesses ,mortises ,notching's holes, perforations e.t.c, and for obtaining full information from the sub-contractor to enable the contractor to make proper arrangements and provisions during the general execution of the work for the reception of the sub-contractor's work . The cost of any alterations consequent upon the non-fulfilment of the foregoing stipulations will be at the contractor's sole expense.

d) For all items, conditions or requirements with regards to the sub-contractor's work mentioned or described in the general conditions of contract, specification and preliminaries not specifically stated in the foregoing .

#### 5.4 Supervision.

#### 5.5 Programme

Carried to collection



- A 6.1 Commodities
- B 6.2 Manufacture's recommendations
- C 6.3 Standards
- D 6.4 Single sources
- E 6.5 Samples of commodities
- F 6.6 Samples of work

Clause B.7 Accuracy/Setting Out

- G 7.1 Set out the works
- H 7.2 Profiles
- J 7.3 Permanency
- K 7.4 Instruments
- L 7.5 Check all dimensions
- M 7.6 Dimensions

Clause B.8 Protection

- N 8.1 Safeguard the site.  
Provide all necessary barriers, hoardings, footways , etc , and provide all necessary watching and lighting as required for the protection of the works and materials and plant on the site ,and for the protection of the public. The contractor will be held responsible for all injury or accident that may happen through failure to provide adequate protection and lighting.

- O 8.2 Inclement weather

- P 8.3 Stormwater and surface water.  
The contractor must satisfy himself as to the quantities of subsoil and surface water to be dealt with and is to keep the building foundations and work generally clear of surface , subsoil and stormwater by baling ,pumping or otherwise. Provide for dealing with springs , underground streams , etc , which may be opened up and provide all necessary pipes and machinery sufficient for the above operations to be promptly and efficiently performed, including night and day attendance and work as necessary.

Carried to collection

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Provide and lay down as necessary any temporary surface drains, cut temporary sluits ,and remove and fill in at completion

- A 8.4 Overloading
  - B 8.5 Cleanliness
  - C 8.6 Damage by sunlight
  - D. 8.7 Datum
- Clause B.9 Prefabricated Elements
- E 9.1 Delivery
  - F 9.2 Check fixings
  - G 9.3 Authorise erection
  - H 9.4 Notice

Clause B.10. Work at Completion

- J 10.1 Clean the works
- K 10.2 Cleaning
- L 10.3 Remove
- M. 10.4 Painted Surfaces
- N 10.5 Moving parts
- O 10.6 Security at completion
- P 10.7 Making good defects
- Q 10.8 Maintenance instructions

Clause B.11. Miscellaneous

- R • 11.1 Photographs



S 11.2 Articles of value or antiquity

Carried to collection

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A. VISIT SITE

The Contractor must visit the site of the Works before submitting his tender and carefully examine the conditions of that exist, and he is to satisfy himself as to the nature of the materials to be excavated as well as all natural conditions ,water and light services, transport facilities, etc.

No allowance will be made in the event of conditions being different from what he expected.

B. FLUCTUATIONS IN COSTS

1) Where applying to nominated sub-contractors or suppliers

Where the following provisions for fluctuations in wages ,cost of living allowances or prices of materials are applicable to a nominated sub contractor, or nominated supplier, the additional payments to them are to be regarded as a requirement of expense only ,upon which the contractor shall not be entitled to claim any additional pro rata profit in terms of Clause 25 (e) of the conditions of contract

2) Fluctuations in Wages and cost of living allowances

The Contractor is to pay not less than the recognised Standard Rate of Wages and Allowances to all employees

/If at any time between the date of the delivery of the Contractor's tender and the date of the completion of the Works any statutory fluctuation (i.e any specific increase or decrease stipulated by the Government Gazette) takes place in the Standard Rate of Wages, Cost of Living Allowances, or other statutory compulsory contribution in respect of the men employed on the Works covered by this Contract, whether on the site or in the workshops or yards of the Contractor or sub-contractors (but not in respect of merchants or suppliers), the Contractor is to submit WEEKLY to the Secretary for Works receipted time sheets, together with a weekly return of the number of hours worked, signed by the Foreman and countersigned by the Clerks of Works , and the contract price shall be adjusted in accordance with the statutory fluctuation. Variations, if any, made under this clause shall be made for any profit whatsoever. No claims will be admitted in respect of labour employed after the expiration of the contract completion date or any amendments thereto under Clause 19 of the Conditions of Contract.

Carried to collection

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3) Fluctuations in prices of materials

Should any statutory fluctuations (i.e any specified increase or decrease in control prices of materials stipulated by notices published in the Government Gazette ) take place after the date of delivery of the Contractor's tender, the Contractor is to submit invoices for such materials certified by the Clerk of Works and the contract price shall be adjusted in accordance with the statutory fluctuations . Such variations, if any, made under this clause shall be a nett increase or decrease, and no allowance will be made for any profit whatsoever.



The term "statutory fluctuation" is accepted to cover variation in custom duty or other Government tax duty or surcharge only when detailed in the relevant Act of Parliament or statutory notices as payable direct on specified building materials and items incorporated in a building structure but will not be accepted to cover any indirect variation of costs or overheads, etc of the Contractor, sub-contractors, merchants or suppliers, arising from fluctuations in such items as bailage, shipping rates, insurance, postage, dock, due, clearance charges, transport, power and fuel costs, Government action.

No claims will be admitted under the Clause for statutory fluctuations coming into effect after the expiration of the contract completion date any amendment thereto under Clause 19 of the Conditions of Contract

If the Contractor wishes to be protected against fluctuation in cost of any basic materials he is to attach to the Form of Tender a list of such materials and prices in respect of which he wishes to be protected. Such prices to be those upon which bases his tender.

In support of these prices, the Contractor is to furnish with his tender bona fide current merchants quotations (for quantities as required for the job)

The prices actually paid must be sustained by receipted invoices, and all adjustment will be net with no allowances for profit, provided that if the variations are positive then the contractor may add not more than 5% to the net amount.

At the completion of the works the Contractor will be required to substantiate the quantities used and the prices actually paid for all items listed in order that Government may benefit for any decrease in price that may have occurred

Carried to collection

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Orders for materials as listed shall have been placed within a reasonable time after the date of acceptance of the tender, otherwise will be made. Such time to adjustments will be made. Such time to be mutually agreed when the tender is provisionally accepted

All delivery note for materials as listed must be certified by the Clerks of Work as having been delivered to the site, and shall be submitted to the Secretary for works failing which no adjustment will be made.

All documents in support of claims for fluctuations in the price of materials must be submitted within three weeks of the date appearing on those document failing which no adjustments will be made.

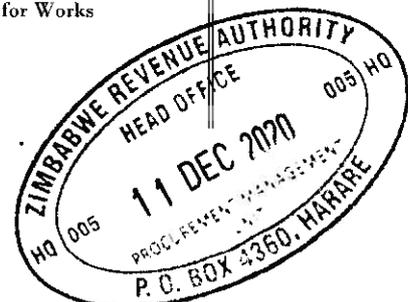
Where no materials have been listed the tender shall be treated as a firm tender.

Dumping duties are acceptable as fluctuations, and it is a condition of the tender that a dumping duty levied at any time on items and goods incorporated in this contract shall be payable by successful tendered, and not recoverable from the Government.

**A AGREED WORKING HOURS**

No work of any kind or description shall be done outside the agreed working hours of the building industry such as shall be unavoidable or absolutely necessary for the saving of life or property, or the safety and protection of the work. Should the Contractor desire the building industry, he shall first obtain the permission of the Secretary for Works and any work executed outside such hours without the written permission having been first obtained will not be paid for, or if Secretary for Works so desires the same taken out or pulled down and removed.

**B DISMISSAL OF INCOMPETENT WORKMAN**



The Contractor shall on the request of the Secretary for Works Immediately dismiss from the works any person employed thereon who may, in the opinion of the secretary for Works be incompetent or misconduct himself, or is likely to cause or who has caused strikes, disturbance or delays, and such persons shall not again be employed on the Works without permissions from the secretary of work

AMOUNT

Carried to collection

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Collection

- 1
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CARRIED TO FINAL SUMMARY PAGE

SHUSD

.....  
SIGNATURE OF CONTRACTOR

.....  
DATE





**MAIN BUILDING**





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 2</u></b>				
<b><u>FOUNDATIONS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>SITE CLEARANCE</u></b>				
<b><u>Note: Site clearance measured in Civil works Bill.</u></b>				
<b><u>EXCAVATION</u></b>				
<b><u>Pumping</u></b>				
<b><u>Note: Should pumping be necessary, the Contractor must forward to the Quantity Surveyor, on a monthly basis, a statement showing the number of hours worked by each pump, signed by the Engineer and Foreman, failing which, no payment for pumping will be made. Only actual pumping hours will be paid for.</u></b>				
1	Item			
Allow for keeping the excavations free from storm, surface water and mud by pumping and baling.				
2	No	50		
Allow for keeping the excavations free from underground water by pumping with a pump not exceeding 2.5 kw and allow for all necessary hosing, piping, fuel, attendance, temporary drainage and anything else necessary and clear away and reinstate all surfaces disturbed. (In hours).				
<b><u>Excavation</u></b>				
<b><u>Excavate in pickable material for</u></b>				
3	m <sup>3</sup>	46		
Lift shaft exceeding not exceeding 2 metres deep.				
4	m <sup>3</sup>	1		
Extra over excavation in pickable material for excavation in hard pickable material.				
5	m <sup>3</sup>	1		
Ditto for excavation in rock.				
<b><u>Planking and strutting</u></b>				
6	m <sup>2</sup>	67		
Allow for maintaining and supporting sides of all excavations and making good all slips.				
<b><u>Disposal</u></b>				
7	m <sup>3</sup>	48		
Redig from spoil heap and cart off site.				
<b><u>TERMITES</u></b>				
8	m <sup>2</sup>	5 613		
Termite treatment as described				
Carried to Collection			\$	



BQ FITZWILLIAM PARTNERSHIP  
 8747 Princess Margaret Road,  
 Malborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>Unreinforced concrete (Grade 10-20 mm stone) in</u></b>				
9				
50 mm Ditto under Lift Shafts.	m <sup>2</sup>	23		
<b><u>Vibrated reinforced concrete (Grade 25-20 mm stone) in</u></b>				
10				
Lift shafts	m <sup>3</sup>	16		
11				
Walls	m <sup>3</sup>	26		
<b><u>formwork</u></b>				
<b><u>Sawn formwork as described to</u></b>				
12				
Sides of walls.	m <sup>2</sup>	76		
<b><u>Reinforcement</u></b>				
<b><u>High yield deformed rods</u></b>				
13				
Not exceeding 8 mm diameter.	Kg	1 507		
14				
Exceeding 8 mm and not exceeding 12 mm diameter.	Kg	1 507		
15				
Exceeding 12 mm and not exceeding 30 mm diameter.	Kg	1 507		
Carried to Collection				\$





Amount

**BILL NO. 2**  
**FOUNDATIONS**  
**COLLECTION**

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Carried to Summary

\$



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 3</u></b>				
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>CONCRETE</u></b>				
<b><u>Vibrated reinforced concrete (Grade 30-20mm stone) in</u></b>				
1	m <sup>3</sup>	2 678		
2	m <sup>3</sup>	86		
3	m <sup>3</sup>	7		
4	m <sup>3</sup>	4 602		
5	m <sup>3</sup>	509		
6	m <sup>3</sup>	47		
<b><u>35MPa/19mm concrete</u></b>				
7	m <sup>3</sup>	1 172		
8	m <sup>3</sup>	567		
<b><u>EXPANSION JOINTS</u></b>				
9	m <sup>2</sup>	16		
10	m	52		
<b><u>SUNDRIES</u></b>				
11	m <sup>2</sup>	210		
12	m <sup>2</sup>	25 567		
<b><u>FORMWORK</u></b>				
<b><u>Sawn formwork as described to</u></b>				
13	m <sup>2</sup>	3 627		
14	m <sup>2</sup>	37		
15	m <sup>2</sup>	5		
16	m <sup>2</sup>			RATE ONLY
17	m <sup>2</sup>	17 850		
Carried to Collection				\$



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	Unit	Quantity	Rate	Amount
18 Sides of walls.	m <sup>2</sup>	3 686		
19 Sides of square or rectangular columns.	m <sup>2</sup>	4 538		
20 Sides of square or rectangular columns in narrow widths.	m <sup>2</sup>			RATE ONLY
21 To Circular columns	m <sup>2</sup>	3 256		
22 Risers in narrow widths.	m <sup>2</sup>	144		
23 To soffits of landings.	m <sup>2</sup>	136		
24 To soffits of suspended slabs.	m <sup>2</sup>	25 566		
25 To edges of landing in narrow widths.	m <sup>2</sup>	50		
26 Raking sides of stairs in narrow widths	m <sup>2</sup>	118		
27 Raking soffits of stairs.	m <sup>2</sup>	219		
<b><u>REINFORCEMENT</u></b>				
<b><u>High yield deformed rods</u></b>				
28 Not exceeding 8 mm diameter.	Kg	437 210		
29 Exceeding 8 mm and not exceeding 12 mm diameter.	Kg	437 210		
30 Exceeding 12 mm and not exceeding 30 mm diameter.	Kg	437 210		
<b><u>PRECAST CONCRETE</u></b>				
<b><u>Precast concrete (Grade 20-20 mm stone) finished fair on all exposed surfaces:</u></b>				
31 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 800 mm long.	No	268		
32 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 900 mm long.	No	14		
33 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 1 700 mm long.	No	11		
34 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 1 200 mm long.	No	80		
35 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 3 200 mm long.	No	30		
36 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 1 900 mm long.	No	32		
37 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 3 400 mm long.	No	2		
38 110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 4 200 mm long.	No	548		
Carried to Collection				\$



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	Unit	Quantity	Rate	Amount
39 300 mm (extreme) twice weathered and twice throated coping cast in suitable lengths, hoisted, bedded and pointed in cement mortar on top of one brick wall.	m	126		
Carried to Collection				\$



**BQ FITZWILLIAM PARTNERSHIP**  
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Amount

**BILL NO. 3**  
**CONCRETE, FORMWORK AND REINFORCEMENT**  
**COLLECTION**

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Carried to Summary

\$



**BQ FITZWILLIAM PARTNERSHIP**  
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	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 4</u></b>				
<b><u>MASONRY</u></b>				
<b><u>REINFORCEMENT</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>BRICKWORK</u></b>				
<b><u>Brickwork in common bricks in cement mortar as described</u></b>				
1	m <sup>2</sup>	8 164		
2	m <sup>2</sup>	48		
3	m <sup>2</sup>	1 077		
4	m <sup>2</sup>			RATE ONLY
5	m <sup>2</sup>	20 822		
<b><u>Sundries</u></b>				
6	m <sup>2</sup>			RATE ONLY
<b><u>Ventilation (Provisional)</u></b>				
7	No			RATE ONLY
8	No			RATE ONLY
<b><u>Brickforce lapped at joints and junctions and building in as the work proceeds (measured nett)</u></b>				
9	m	24 002		
10	m	92 895		
<b><u>DAMP PROOF COURSE</u></b>				
<b><u>One layer of three ply bituminous felt sheeting as damp proof course as described well lapped at joints and junctions</u></b>				
11	m <sup>2</sup>			RATE ONLY
12	m <sup>2</sup>	396		
<b><u>BUILDING IN</u></b>				
13	No	205		
Carried to Collection				\$



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	Unit	Quantity	Rate	Amount
14 Set up in position, cross brace and build in aluminium window and door frame exceeding 40 square metres but not exceeding 45 square metres.	No	1		
15 Set up in position, cross brace and build in aluminium window and door frame exceeding 250 square metres but not exceeding 255 square metres.	No	1		
16 Set up in position and build in anodised aluminium doors and windows with pressed aluminium external cill including bedding same solid including covering up and protecting and on completion clean down exceeding 5 square metres but not exceeding 10 square metres.	No	37		
17 Set up in position and build in anodised aluminium doors and windows with pressed aluminium external cill including bedding same solid including covering up and protecting and on completion clean down not exceeding 5 square metres.	No	403		
18 Set up in position, cross brace and build in pressed steel cupboard door frame not exceeding 5 square metres.	No	5		
19 Leave or form opening for two hour fire rated door not exceeding 5 square metres.	No	23		
<b><u>EXTERNAL CILLS</u></b>				
20 Brick on edge cills in cement mortar	m	1 720		
<b><u>PAVING</u></b>				
<b><u>Quarry tiles, cement, terrazzo and similar tiles, precast concrete bricks, blocks, etc.</u></b>				
Tiles shall be of approved manufacture, well burnt or cured, and uniform and true in size, shape and colour				
<b><u>GRANITE PAVING</u></b>				
<b><u>Black granite paving with polished finish, bedded in cement mortar (fixed with screed)</u></b>				
21 Paving to floors of 20mm thick slabs not exceeding 0,5m <sup>2</sup> on face	m <sup>2</sup>	113		
22 Polished fair edges to 20mm thick paving	m			RATE ONLY
23 80mm high Skirtings with moulded and polished top edge	m	103		
24 150 x 150 x 25mm Polished black granite internal cill set sloping and bedded in cement mortar and pointing on top, frony edge and projecting soffit including fair splay cutting brickwork under.	m	1 720		
Carried to Collection			\$	





Amount

**BILL NO. 4**  
**MASONRY**  
**COLLECTION**

Page No

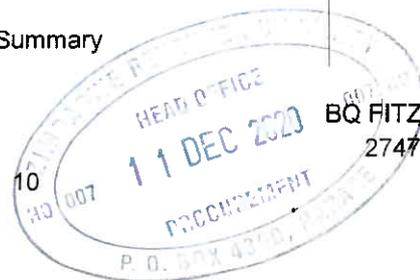
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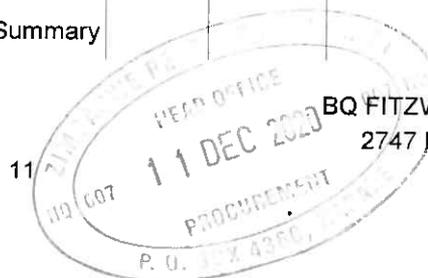
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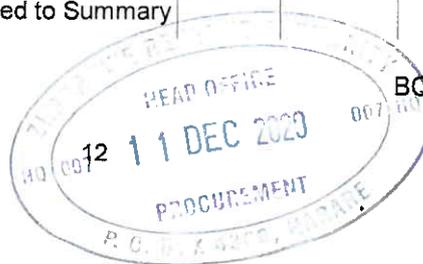
	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 5</u></b>				
<b><u>WATERPROOFING</u></b>				
<b><u>WATERPROOFING SEALANTS TO NEW WALLS, FLOORS, ROOFS, ETC.</u></b>				
<b><u>Trinidad Mastic Asphalt to central African Specification A1 /1960 to be laid in strict accordance with the British code of practice 114 - CI 201 (1952) the asphalt contractor to provide a written 15 year guarantee as to the contents and quality of the asphalt.</u></b>				
<b><u>Tanking in three layers each 10mm thick with staggered joints on</u></b>				
1	Concrete slabs to flat areas to falls and cross falls	m <sup>2</sup>	552	
2	Gutters	m <sup>2</sup>	133	
3	Skirting including mitres, ends, etc, with double angle fillet a bottom and turn-in at top exceeding 100mm and not exceeding 200mm high	m	463	
<b><u>Sundries</u></b>				
4	Dress into 110mm fulbore outlet	No	106	
<b><u>Cooler Blocks</u></b>				
5	500mm x 500mm cooler blocks laid with close butt joints bedded in bitumen over asphalt roofing including easing into intersection of falls and cross falls and all square cutting	m <sup>2</sup>	552	
Carried to Summary				\$



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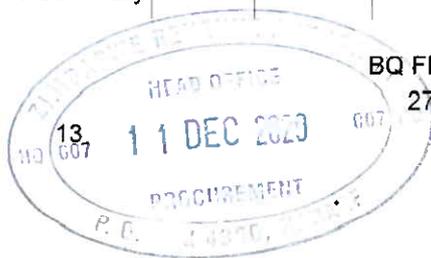
	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 6</u></b>				
<b><u>ROOF COVERINGS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>ROOF COVERINGS</u></b>				
<b><u>0.6 mm Coloured chromadek I.B.R. Roof sheeting of approved manufacturer including all fixings and square cuttings</u></b>				
1				
Roof covering to steel purlins at maximum 1 710 mm centres.	m <sup>2</sup>	3 964		
2				
Fair raking cutting and waste.	m	310		
<b><u>Flashings</u></b>				
<b><u>0.6mm Chromadeck sheet iron as described.</u></b>				
3				
Flashings	m <sup>2</sup>	12		
<b><u>INSULATION</u></b>				
4				
4 mm Thick white 'Alucushion' (Code 2906) thermal insulation cushion sheeting laid on and including plastic coated 1.5 mm diameter galvanised straining wires at 500 mm centres, tightly stretched and secured to timber purlins spaced 1 200 mm apart.	m <sup>2</sup>	3 964		
5				
Fair raking cutting and waste.	m	310		
Carried to Summary				\$



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	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 7</u></b>				
<b><u>CARPENTRY AND JOINERY</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>CARPENTRY</u></b>				
<b><u>JOINERY AND IRONMONGERY</u></b>				
<b><u>Commercial quality plywood</u></b>				
1	No	2		
44 mm Cupboard door in two leaves with wrot hardwood edging all round and rebated meeting stiles. Size overall 1 200 x 2 100mm high.				
2	No	1		
44 mm Cupboard door in two leaves with wrot hardwood edging all round and rebated meeting stiles. Size overall 1 600 x 2 100mm high.				
3	No	1		
44 mm Cupboard door in two leaves with wrot hardwood edging all round and rebated meeting stiles. Size overall 900 x 2 100mm high.				
4	No	1		
44 mm Cupboard door in three leaves with wrot hardwood edging all round and rebated meeting stiles. Size overall 2 000 x 2 100mm high.				
<b><u>Sundries</u></b>				
5	No	574		
CZ8731SC Door Stop screwed to plug in wall or floor.				
6	No	8		
Model-N0. 009952 Duravit karee soap holder				
7	No	1		
Model-N0. 009958 duravit TWO SWIVELLING ARMS CHROME ,78mm				
8	No	46		
wsb20w Lunar Sanitary Bin (White)				
9	No	66		
Model-No. 009955 Duravit Karree Paper holder				
<b><u>PANELLING ETC</u></b>				
<b><u>Interior type particle board with veneer and veneered edges at open vertical joints:</u></b>				
10	m <sup>2</sup>			RATE ONLY
80mm Panelling 2 680mm high fixed to and including 38 x 38 mm wrought horizontal grounds at 500mm centres plugged.				
Carried to Summary			\$	



BQ FITZWILLIAM PARTNERSHIP  
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**BILL NO. 8**  
**CEILINGS PARTITIONS AND ACCESS FLOORING**

**SUSPENDED CEILINGS**

**The following in approved proprietary suspended ceiling system comprising "Sage Sparkle or equal 600 x 600mm tiles set in exposed aluminium main tees and exposed aluminium cross tees on and including galvanised hoop iron hangers including all square cutting and waste. (Decoration complete). (To be executed by an approved firm of Specialists)**

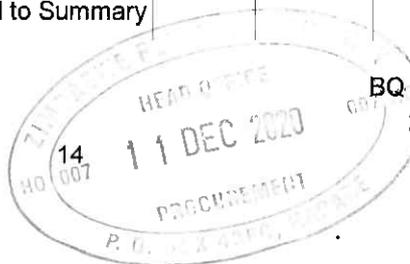
	Unit	Quantity	Rate	Amount
1	Ceilings suspended not exceeding 1m below concrete soffits.	m <sup>2</sup>	12 673	
2	Ceilings suspended exceeding 1m below steel trusses.	m <sup>2</sup>	3 464	
3	Opening for sprinkler head.	No	420	
4	Extra over ceiling for opening for 450 x 450 mm light fitting.	No	420	

**DEMOUNTABLE TOILET PARTITIONS**

5	50mm Thick shadow blue melamine timber partitioning, 3 000mm high with and including framing and skirting, supplied fixed and decorated complete.	m		RATE ONLY
6	Extra over partitions for 40mm semi-solid flush doors 760 x 2 125mm high with hardwood edge strips to vertical edges, hung to and including standard natural anodised aluminium door frame with one pair of 100mm nylon washered aluminium hinges to each hanging stile, including additional studding, trimming, etc. to partitions and lockset	No	57	
7	Extra over partition 3m high for vertical abutment	No		RATE ONLY
8	Extra over partition 3m high for corner	No		RATE ONLY
9	Extra over partition 3m high for irregular corner	No		RATE ONLY
10	Extra over partition 3m high for T-intersection	No	21	
11	Extra over partition 3m high for T-intersection of solid with half-glazed partition	No		RATE ONLY
12	Extra over partition 3m high for fair end	No		RATE ONLY

Carried to Summary

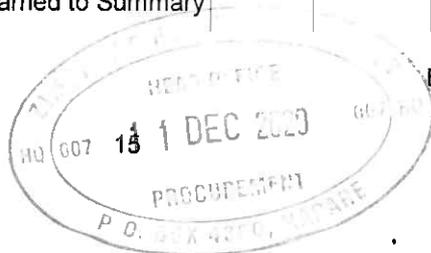
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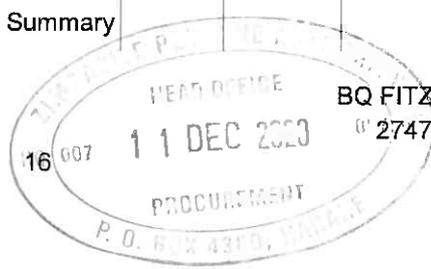


	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 9</u></b>				
<b><u>FLOOR COVERINGS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>FLOOR COVERINGS</u></b>				
<b><u>Cement and sand (1:4) screeds as described</u></b>				
1	m <sup>2</sup>	25 777		
<b><u>Untinted granolithic as described including all labours</u></b>				
2	m <sup>2</sup>	964		
3	m	544		
<b><u>THE FOLLOWING SUPPLIED AND LAID BY AN APPROVED FIRM OF SPECIALISTS WITH AN APPROVED ADHESIVE TO SCREED INCLUDING ALL SQUARE CUTTING</u></b>				
<b><u>PORCELAIN FLOOR TILES</u></b>				
<b><u>600 x 600 x 10 mm High traffic non slip porcelain floor tiles laid on and including cement and sand screed (1:3) to an overall thickness of 40 mm strictly in accordance with the manufacturer's recommendations</u></b>				
4	m <sup>2</sup>	24 535		
5	m <sup>2</sup>			RATE ONLY
6	No			RATE ONLY
7	m	7 325		
<b><u>DIVISION STRIPS</u></b>				
8	m	845		
Carried to Summary			\$	





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 10</u></b>				
<b><u>STRUCTURAL STEELWORK</u></b>				
<b><u>STEEL TRUSSES ETC</u></b>				
<b><u>Welded roof trusses of angle section rails, struts, braces, cleats, etc and flat section bearer, gusset and connection plates bolted to steel:</u></b>				
1	RooF Trusses.	Kg	115 980	
<b><u>STEEL COLUMNS AND BEAMS ETC</u></b>				
<b><u>Welded beams and wall plates in single lengths with flat bearer and connection plates, bolted to steel</u></b>				
2	Steel Beams as per Engineer's Specification	Kg	5 741.55	
3	Wall plates as per Engineer's Specification	Kg	3 827.70	
	Carried to Summary			\$



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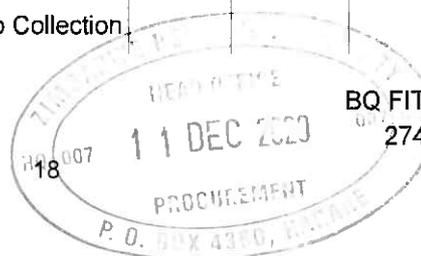
	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 11</u></b>				
<b><u>METALWORK</u></b>				
<b><u>STAINLESS STEEL HANDRAILS, BALUSTRADES, ETC.</u></b>				
<b><u>Welded handrails to staircases and landings:</u></b>				
1	m	246		
50 mm External diameter 1.5mm thick continuous pipe handrails.				
2	No	12		
Extra over for rounded closed end.				
3	No	9		
Extra over for ramp or knee.				
4	No	52		
50 mm Diameter threaded lug 100 mm long with one end welded on and other end fitted with nut and washer.				
<b><u>Welded steel and 12mm structural glass balustrading to staircases and landings:</u></b>				
User Note : Core drilling of substructure (say) 60mm diameter x 150mm deep for each end stanchion and (say) 50mm diameter x 150mm deep for each middle stanchion, to be measured elsewhere.				
5	m	246		
Balustrade system 1000mm high formed of 50mm external diameter x 1.5mm thick continuous tubular middle and bottom rails				
6	No	246		
38mm External diameter x 2mm thick tubular stanchions 1000mm high overall, pin welded to top rail and bedded with polyester non-shrink grout in holes (elsewhere measured) including 76mm diameter x 2mm thick pressed steel flange cover plates.				
7	No	23		
Extra over balustrade system for rounded rounded closed end.				
<b><u>CUPBOARD DOOR FRAMES</u></b>				
<b><u>Standard pressed steel cupboard door frames (building in elsewhere measured)</u></b>				
8	No	1		
Cupboard frame type CBA 1 (1 600 x 2 100mm)				
9	No	1		
Cupboard frame type CBA 2 (900 x 2 100mm)				
10	No	1		
Cupboard frame type CBA 2 (2 000 x 2 100mm)				
11	No	2		
Cupboard frame type CBA 3 (1 200 x 2 300mm high)....				
Carried to Collection				\$



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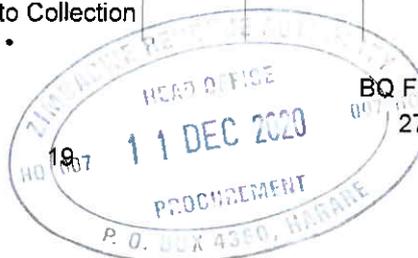
	Unit	Quantity	Rate	Amount
<b><u>ALUMINIUM WINDOWS, DOORS, ETC. (BUILDING IN MEASURED ELESWHERE)</u></b>				
<b><u>Standard White Powder coated aluminium windows and doors in pressed aluminium intermediate and end mullions, 6.38mm laminated shatter glass, and the whole to be executed by an approved firm of specialists to the Architect's approval with aluminium permavents where specified supplied, fixed and decorated complete to Arch spec.</u></b>				
12	No	47		
13	No	2		
14	No	1		
15	No	1		
16	No	2		
17	No	1		
18	No	1		
19	No	3		
20	No	24		
21	No	2		
22	No	1		
23	No	.2		
24	No	2		
25	No	2		
26	No	15		
27	No	16		
28	No	5		
29	No	1		
30	No	22		
31	No	25		
32	No	1		
33	No	1		
34	No	156		
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
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	Unit	Quantity	Rate	Amount
35 Window type W24, Size 5 530 x 1 540mm high	No	1		
36 Window type W25, Size 5 531 x 2 000mm high	No	5		
37 Window type W26, Size 5 533 x 2 000mm high	No	11		
38 Window type W27, Size 5 535 x 800mm high	No	74		
39 Door type D01, Size 600 x 2100mm high	No	2		
40 Door type D02,D03, Size 600 x 2100mm high	No	32		
41 Door type D04, Size 600 x 2 500mm high	No	26		
42 Door type D05, Size 743 x 2 125mm high	No	2		
43 Door type D06, Size 743 x 2 500mm high	No	4		
44 Door type D11,D12,, Size 813 x 2 125mm high	No	50		
45 Door type D13,D14,, Size 813 x 2 500mm high	No	22		
46 Door type D15, Size 830 x 2 456mm high	No	2		
47 Door type D16, Size 830 x 2 541mm high	No	2		
48 Door type D17,D18, Size 1 100 x 2 125mm high	No	57		
49 Door type D19, Size 1 100 x 2 300mm high	No	9		
50 Door type D20,D21, Size 1 100 x 2 500mm high	No	25		
51 Door type D22, Size 1 100 x 2 790mm high	No	1		
52 Door type D23, Size 1 200 x 2 100mm high	No	1		
53 Door type D24, Size 1 500 x 2 100mm high	No	4		
54 Door type D25, Size 1 500 x 2 100mm high	No	1		
55 Door type D26, Size 1 500 x 2 100mm high	No	1		
56 Door type D27, Size 1 500 x 2 500mm high	No	2		
57 Door type D29, Size 1 136 x 2 100mm high	No	1		
58 Door type D29, Size 1 800 x 2 100mm high	No	1		
59 Door type D30, Size 1 904 x 2 100mm high	No	1		
60 Door type D31, Size 2 500 x 2 100mm high	No	1		
61 Door type D32, Size 3 000 x 2 100mm high	No	4		
62 Door type D33, Size 3 000 x 2 500mm high	No	2		
63 Door type D34, Size 3 005 x 2 100mm high	No	1		
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare



	Unit	Quantity	Rate	Amount
64 Door type D35, Size 3 025 x 2 100mm high	No	1		
65 Door type D36.D37, Size 3 079 x 2 100mm high	No	4		
66 Folding Door type D38, Size 4 060 x 2 700mm high	No	1		
67 Folding Door type D39, Size 4 140 x 2 700mm high	No	1		
68 Folding Door type D40, Size 5 470 x 2 700mm high	No	2		
69 Folding Door type D41, Size 5 517 x 2 700mm high	No	1		
70 Folding Door type D42, Size 5 530 x 2 700mm high	No	1		
71 Glazed Partition 2 640mm high with aluminium frames by specialist to Arch specs.	m	1 946		
72 Extra over partition for door type D18, Size 1 100 x 2 125	No	10		
73 Extra over partition for door type D18, Size 1 100 x 2 500	No	6		
74 Extra over partition for door type D18, Size 813 x 2 125mm high	No	93		
75 Extra over partition for door type D18, Size 813 x 2 500mm high	No	104		
76 Extra over partition for door type D24, Size 1 500 x 2 100mm high	No	3		
77 Extra over partition for door type D28, Size 1 691 x 2 100mm high	No	1		
78 Purpose made curtain wall 12 200mm x 23 160mm high	No	1		
79 Purpose made curtain wall 6 515mm x 10 956mm high	No	2		
<b><u>STRONG ROOM DOORS, ETC., (BUILDING IN ELSEWHERE MEASURED)</u></b>				
80 "Chubb" or other equal and approved strong room door and frame with duco finish and with a combination lock overall size 1 100 x 2 125mm high	No	14		
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare



Amount

**BILL NO. 11**  
**METALWORK**  
**COLLECTION**

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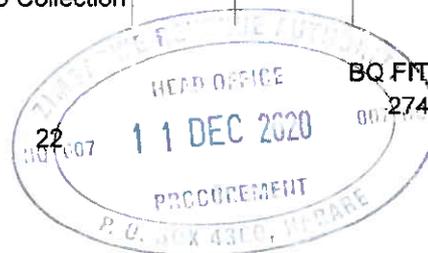
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**BQ FITZWILLIAM PARTNERSHIP**  
2747 Princess Margaret Road,  
Malborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 12</u></b>				
<b><u>PLASTERING</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>PLASTERING</u></b>				
<b><u>INTERNAL PLASTER</u></b>				
<b><u>Render one coat cement plaster and set in Rhinoset plaster including all labours with a steel trowel finish on concrete</u></b>				
1	Walls.	m <sup>2</sup>	21 511	
2	On walls, reveals, etc in narrow widths.	m <sup>2</sup>	291	
3	Sides of Square and rectangular columns.	m <sup>2</sup>	2 593	
4	Sides of Square and rectangular columns in narrow widths.	m <sup>2</sup>		RATE ONLY
5	Sides of beams.	m <sup>2</sup>	15 768	
6	Soffits of beams.	m <sup>2</sup>	3 627	
7	Soffits of landings.	m <sup>2</sup>	78	
8	Sides of landings in n.w.	m <sup>2</sup>	28	
9	Raking soffits of stairs.	m <sup>2</sup>	125	
10	Raking sides of stairs in narrow widths.	m <sup>2</sup>	67	
<b><u>EXTERNALLY</u></b>				
<b><u>One coat cement plaster as described including all labours with a fine woodfloat finish on</u></b>				
11	Walls.	m <sup>2</sup>	9 614	
12	On walls, reveals, etc in narrow widths.	m <sup>2</sup>	291	
13	Sides of beams.	m <sup>2</sup>	2 082	
14	Raking soffits of stairs.	m <sup>2</sup>	94	
15	Soffits of landings.	m <sup>2</sup>	59	
16	Raking sides of stairs in narrow widths.	m <sup>2</sup>	51	
17	Sides of square and rectangular columns in narrow widths.	m <sup>2</sup>		RATE ONLY
18	Sides of square and rectangular columns.	m <sup>2</sup>	1 945	
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare



	Unit	Quantity	Rate	Amount
19 Sides of Circular columns.	m <sup>2</sup>	1 395		
20 Sides of landings in n.w.	m <sup>2</sup>	21		
21 Sides of gutters	m <sup>2</sup>	133		
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
 2747 Princess Margaret Road,  
 Malborough, Harare



Amount

**BILL NO. 12**  
**PLASTERING**  
**COLLECTION**

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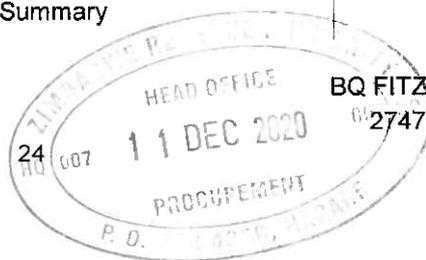
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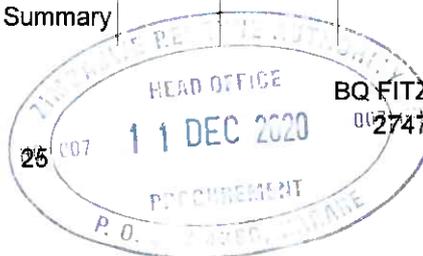
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**BQ FITZWILLIAM PARTNERSHIP**  
2747 Princess Margaret Road,  
Malborough, Harare



		Unit	Quantity	Rate	Amount
<b><u>BILL NO. 13</u></b>					
<b><u>TILING</u></b>					
<b><u>WALL TILING</u></b>					
<b><u>600 x 600mm glazed ceramic wall tiles fixed with adhesive to plaster (plaster elsewhere) and flush pointed with tinted grout</u></b>					
1	On walls	m <sup>2</sup>	3 819		
2	On narrow widths	m <sup>2</sup>	10		
Carried to Summary					\$



BQ FITZWILLIAM PARTNERSHIP  
 002747 Princess Margaret Road,  
 Malborough, Harare



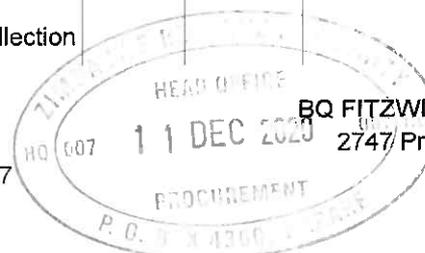
	Unit	Quantity	Rate	Amount
<b>BILL NO. 14</b>				
<b><u>PLUMBING AND DRAINAGE</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>RAINWATER DISPOSAL AND FLASHINGS</u></b>				
<b><u>0.6 mm Galvanised sheet iron as described in</u></b>				
1	Flashings.	m <sup>2</sup>	113	
2	150mm x 150mm roof gutters with beaded front edge	m	439	
3	Extra for stopped end.	No	20	
4	Ditto outlet with nozzle for and joint to 110mm UPVC (class 16) rainwater down pipe	No	98	
<b><u>"Promat" or equal rigid P.V.C piping with solvent cement joints and fittings as described</u></b>				
5	110mm UPVC (Class 16) pipe wired to reinforcement and cast into concrete as the work proceeds	m	2 016	
6	110mm UPVC (Class 16) pipe fixed to underside of beams with brackets	m	840	
7	Extra for shoe.	No	70	
8	Ditto eaves offset.	No	70	
<b><u>SANITARY FITTINGS</u></b>				
NOTE: No sanitary fittings are to be ordered until approved by the Architect				
9	Model-No. 1010004 FRANKE 1010004 NEX621 NEPTUNE RHD 1160X510 Standard stainless steel double bowl sink top with double bowl and double drainer with intergral overflow and chromium plated waste outlets with plugs and chains with tiling key at back and set on steel framing. Size overall 1 150 x 533 mm.	No	2	
10	Model-No. 1010005 FRANKE 1010005 NEX621 NEPTUNE LHD 1160X510 Standard stainless steel sink top with double bowl and double drainer with intergral overflow and chromium plated waste outlets with plugs and chains with tiling key at back and set on steel framing. Size overall 1 150 x 533 mm.	No	3	
11	Model-No. 045450 Duravit Vero Washbasin on			
Carried to Collection				\$

BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare

26 HQ 007 11 DEC 2020 007 HQ

P. O. BOX 27, HARARE

	Unit	Quantity	Rate	Amount
granite top and pair of cast iron brackets complete with integral overflow, chromium plated waste outlet and captive plug, pair of 15 mm chromium plated colour coded pillar taps, bolt brackets to tiled wall and connect up.	No	12		
12 Model -No. 235312 Duravit DURASQUARE DOUBLE WASHINGBASIN and pair of cast iron brackets complete with integral overflow, chromium plated waste outlet and captive plug, pair of 15 mm chromium plated colour coded pillar taps, bolt brackets to tiled wall and connect up.	No	37		
13 Model-No. 253309 Duravit Starck 2 Toilet wall mounted	No	66		
14 Model-No. 705327 VAAL 705327 FLATBACK WATERLESS URINAL c/w HANGERS & SPRAY with chromium plated domical grating with pair of hanger brackets with and including "Cobra Flushmaster Junior" urinal flush valve connector and spray rose connect up flush pipe and fix urinal to wall.	No	37		
15 Model-No. 720152 Duravit P3 Comforts Shower tray	No	7		
16 Model-No. 700010 Duravit Starck tubs & showers set on 80mm thick bedding with rim support batten on one end and the void between the bath and enclosing walls filled with 1:10 uncompacted cement mortar	No	1		
<b><u>ELECTRIC WATER HEATERS:</u></b>				
17 100 Litre 'Monarch' or equal and approved wall mounted electric water heater, bolt brackets to tiled wall and connect up.	No	3		
<b><u>TAPES, VALVES, ETC</u></b>				
18 Model-No. B14280008 Duravit B.1 Shower System	No	7		
19 Model-No. C15250000 Duravit C.1 Freestanding bath mixer	No	1		
20 ISCA PALESA 3025NL ISCA PALESA 3025NL SINK MIXER 1TH	No	5		
<b><u>SANITARY PLUMBING</u></b>				
<b><u>'Promat' or equal rigid P.V.C. piping with solvent cement joints and fittings as described</u></b>				
21 50 mm Diameter pipe to walls.	m	275		
Carried to Collection			\$	





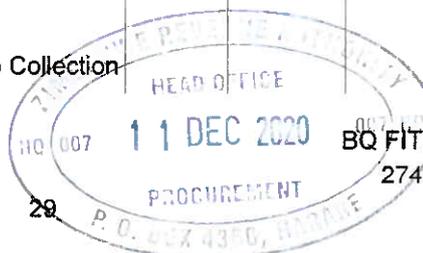
	Unit	Quantity	Rate	Amount
22	50 mm Ditto to soffits of slabs.	m	143	
23	50 mm Ditto in filling under floors.	m	47	
24	110 mm Diameter pipe to walls in ducts.	m	312	
25	100 mm Ditto to soffits of slab.	m	300	
	<b><u>Extra on P.V.C. piping for</u></b>			
26	50 mm Bend.	No	35	
27	50 mm Inspection bend.	No	126	
28	50 mm Inspection junction.	No		RATE ONLY
29	110 mm Inspection bend.	No	48	
30	110 mm Inspection junction.	No	112	
31	110 mm Straight pan connector and joint to W.C. pan.	No	66	
	<b><u>Traps</u></b>			
32	32-40 mm Diameter 'Flexitrap' or equal 'P' trap and joint to fitting and P.V.C. pipe.	No	55	
33	50 mm Chromium plated bottle trap with cleaning eye and joint to fitting and P.V.C. pipe.	No		RATE ONLY
34	40 mm Diameter brass shower trap with chromium plated removable domical grating joint to steel pipe and cast into concrete.	No	7	
35	Commercial Grease Trap 30 Pound 15 GPM Wentworth WP-GT-15 or similar approved.	No	1	
	<b><u>Sundries</u></b>			
36	Galvanised wire balloon grating and fixing in top of 110 mm diameter pipe.	No	10	
37	Joint small pipe to gulley.	No	5	
38	Ditto large pipe to gulley.	No	10	
	<b><u>HOT AND COLD WATER SUPPLIES</u></b>			
	<b><u>Connection</u></b>			
39	Excavate in pickable material not exceeding 1 metre deep for and cut into 50 mm diameter steel main for and provide and insert reducing tee and joint to new 50 mm diameter steel service including any necessary additional fittings and return, fill and ram.	Item		
	Carried to Collection			\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>Galvanised mild steel as described</u></b>				
40	m	15		
41	m	113		
42	m	495		
43	m	150		
44	m	90		
45	m	170		
<b><u>Extra on galvanised mild steel piping for</u></b>				
46	No	120		
47	No	396		
48	No	12		
49	No	1		
50	No	22		
51	No	1		
52	No	22		
<b><u>Copper tubing as described</u></b>				
53	m	396		
54	m	12		
55	m	90		
<b><u>Sundries</u></b>				
56	No	17		
57	No	17		
58	No	7		
59	No	217		
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>FIRE APPLIANCES</u></b>				
60	No	24		
Approved fire hose reel with 23 metres of 20 mm diameter rubber hose, chromium plated nozzle holder and 25 mm chromium plated gate valve, bolt back plate of reel and nozzle holder to wall, connect up and joint 50 mm diameter steel pipe.				
61	No	48		
9 Litre approved CO2 fire extinguishers charge and place in position.				
62	No	48		
3 Kilogram dry powder fire extinguishers, charge and place in position on and including bracket plugged and screwed to wall.				
<b><u>BUILDER'S WORK</u></b>				
63	No			RATE ONLY
Hole half brick wall for small pipe.				
64	No	170		
Hole one brick wall for small pipe.				
65	No	61		
Ditto large pipe.				
66	No	2		
Hole concrete slab for small pipe.				
<b><u>TESTING</u></b>				
67	Item			
Allow for testing and commissioning the whole of the Plumbing and Drainage work in this Bill, make good all defects and for re-testing until approved, no trenches are to be filled until approved.				
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Malborough, Harare



Amount

**BILL NO. 14**  
**PLUMBING AND DRAINAGE**  
**COLLECTION**

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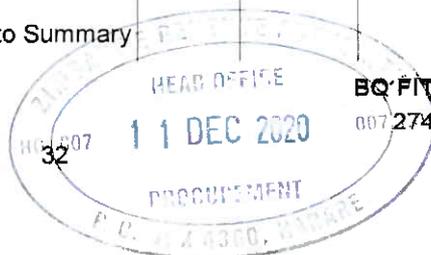
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**BQ FITZWILLIAM PARTNERSHIP**  
2747 Princess Margaret Road,  
Malborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 15</u></b>				
<b><u>GLAZING</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>GLAZING</u></b>				
<b><u>Glazing to metal with beads including bedding in approved mastic</u></b>				
1	4 mm Clear float glass.	m <sup>2</sup>	246	
<b><u>MIRRORS ETC</u></b>				
2	Model-No. LM7805. Duravit Universal Light and mirror Mirror with lighting on top of every washing basin	No	46	
Carried to Summary				\$



**BO FITZWILLIAM PARTNERSHIP**  
 007 2747 Princess Margaret Road,  
 Malborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 16</u></b>				
<b><u>PAINTWORK</u></b>				
<b><u>(For Preamble see General Specification)</u></b>				
<b><u>PAINTING</u></b>				
<b><u>ON PLASTER, ETC.</u></b>				
<b><u>Prepare and apply three coats internal quality P.V.A. emulsion paint internally on</u></b>				
1	m <sup>2</sup>	42 358		
2	m <sup>2</sup>	314		
<b><u>Prepare and apply three coats external quality P.V.A emulsion paint externally on.</u></b>				
3	m <sup>2</sup>	13 279		
4	m <sup>2</sup>	363		
<b><u>ON METAL</u></b>				
<b><u>Clean down, touch up priming coat and apply one undercoat and two finishing coats high gloss enamel paint on</u></b>				
5	m <sup>2</sup>	18		
6	m <sup>2</sup>	60		
<b><u>ON WOOD, ETC.</u></b>				
<b><u>Knot, prime, stop and apply one undercoat and two finishing coats high gloss enamel paint on</u></b>				
7	m <sup>2</sup>	47		
<b><u>LEAVE CLEAN</u></b>				
8	Item			
Carried to Summary				\$



BQ FITZWILLIAM PARTNERSHIP  
 12747 Princess Margaret Road,  
 Malborough, Harare

Bill No.	<b>ZIMRA MAIN BUILDING SUMMARY</b>	Page	Amount (USD)
1	FOUNDATIONS		
2	CONCRETE, FORMWORK AND REINFORCEMENT		
3	MASONRY		
4	WATERPROOFING		
5	ROOF COVERING		
6	CARPENTRY AND JOINERY		
7	CEILING, PARTITIONS AND ACCESS FLOORING.		
8	FLOOR COVERINGS		
9	STRUCTURAL STEELWORK		
10	METAL WORKS		
11	PLASTERING		
12	PLUMBING AND DRAINAGE		
13	GLAZING		
14	PAINTING		
	<b>SECTION TOTAL TO FINAL SUMMARY</b>		

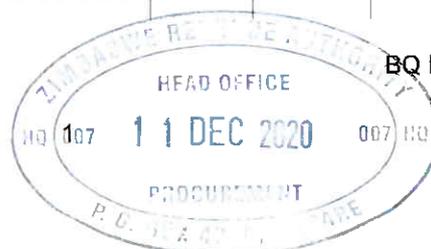




## GATE HOUSE



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 1</u></b>				
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>CONCRETE</u></b>				
<b><u>Vibrated reinforced concrete (Grade 30-20mm stone)</u></b>				
<b><u>in</u></b>				
1	Slabs.	m <sup>3</sup>	1	
2	Beams.	m <sup>3</sup>	3	
<b><u>Vibrated reinforced concrete (Grade 35-20mm stone)</u></b>				
<b><u>in</u></b>				
3	Square or Rectangular Columns	m <sup>3</sup>	3	
<b><u>FORMWORK</u></b>				
<b><u>Sawn formwork as described to</u></b>				
4	Sides of square or rectangular columns.	m <sup>2</sup>	6	
5	Soffits of suspended slabs.	m <sup>2</sup>	14	
6	Soffits of beams .	m <sup>2</sup>	4	
7	Sides of beams in narrow widths.	m <sup>2</sup>	10	
<b><u>REINFORCEMENT</u></b>				
<b><u>High yield deformed rods</u></b>				
8	Not exceeding 8 mm diameter.	Kg	367	
9	Exceeding 8 mm and not exceeding 12 mm diameter.	Kg	367	
10	Exceeding 12 mm and not exceeding 30 mm diameter.	Kg	367	
<b><u>PRECAST CONCRETE</u></b>				
<b><u>Pre-cast concrete (Grade 20-20mm stone) finished</u></b>				
<b><u>fair on all exposed surfaces:</u></b>				
11	110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 3 300 mm long.	No	2	
12	110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 2 100mm long.	No	6	
13	110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 1 130mm long.	No	6	
14	110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 830mm long.	No	2	
Carried to Collection				\$





	Unit	Quantity	Rate	Amount
15 20 x 150mm Cill cast in suitable lengths finished fair with polished terrazzo finish in approved colours on top, exposed edge and soffit including ends, and hoisting, bedding, jointing in cement mortar	m	8		
Carried to Collection				\$



**BQ FITZWILLIAM PARTNESHIP**  
 2747 Pnncess Margaret Rd,  
 Marlborough, Harare



Amount

**BILL NO. 1**  
**CONCRETE, FORMWORK AND REINFORCEMENT**  
**COLLECTION**

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Carried to Summary

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3



**BO FITZWILLIAM PARTNERSHIP**  
2747 Princess Margaret Rd,  
Marlborough, Harare



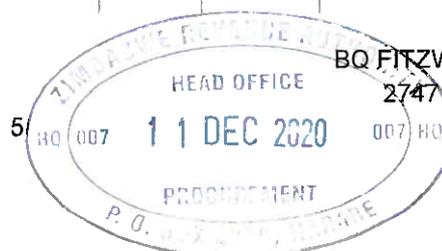
	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 2</u></b>				
<b><u>MASONRY</u></b>				
1				
One brick wall.				
	m <sup>2</sup>	37		
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>BRICKWORK</u></b>				
<b><u>Brickwork in common bricks in cement mortar as described</u></b>				
2				
Half brick wall.				
	m <sup>2</sup>	8		
<b><u>REINFORCEMENT</u></b>				
<b><u>Brickforce lapped at joints and junctions and building in as the work proceeds (measured nett)</u></b>				
3				
Ref. C1 in half brick walls.				
	m	24		
4				
Ref. C2 in one brick walls.				
	m	109		
<b><u>DAMP PROOF COURSE</u></b>				
<b><u>One layer of three ply bituminous felt sheeting as damp proof course as described well lapped at joints and junctions</u></b>				
5				
On walls.				
	m <sup>2</sup>	4		
6				
Stepped under cills.				
	m <sup>2</sup>	3		
<b><u>BUILDING IN</u></b>				
7				
Set up in position, cross brace and build in pressed steel door frame not exceeding 5 square metres.				
	No	2		
8				
Set up in position and build in anodised aluminium doors and windows with pressed aluminium external cill including bedding same solid including covering up and protecting and on completion clean down not exceeding 5 square metres.				
	No	6		
Carried to Summary				\$

BQ FITZ WILLIAM PARTNESHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare

4  
110 007  
11 DEC 2020  
PROCUREMENT  
P. O. BOX 3011, HARARE



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 3</u></b>				
<b><u>ROOF COVERINGS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>ROOF COVERINGS</u></b>				
<b><u>0.6 mm Coloured chromadek I.B.R. Roof sheeting of approved manufacturer including all fixings and square cuttings</u></b>				
1				
Roof covering to steel purlins at maximum 1 710 mm centres.	m <sup>2</sup>	17		
2				
Fair raking cutting and waste.	m	8		
<b><u>INSULATION</u></b>				
3				
4 mm Thick white 'Alucushion' (Code 2906) thermal insulation cushion sheeting laid on and including plastic coated 1.5 mm diameter galvanised straining wires at 500 mm centres, tightly stretched and secured to timber purlins spaced 1 200 mm apart.	m <sup>2</sup>	17		
4				
Fair raking cutting and waste.	m	8		
Carried to Summary				\$



BQ FITZWILLIAM PARTNESHIP  
 2747 Princess Margaret Rd,  
 Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b>BILL NO. 4</b>				
<b><u>CARPENTRY AND JOINERY</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>CARPENTRY</u></b>				
<b><u>JOINERY AND IRONMONGERY</u></b>				
<b><u>Sundries</u></b>				
1	No	2		
38mm Diameter rubber door stop screwed to plug in wall or floor.				
Carried to Summary				\$

BQ FITZWILLIAM PARTNESHIP  
2747 Pnncess Margaret Rd,  
Marlborough, Harare

ZIMBABWE REVENUE AUTHORITY  
HEAD OFFICE  
6 HQ 007 11 DEC 2020 007 HQ  
PROCUREMENT  
P. O. BOX 570, HARARE



**BILL NO. 5**  
**FLOOR COVERINGS**

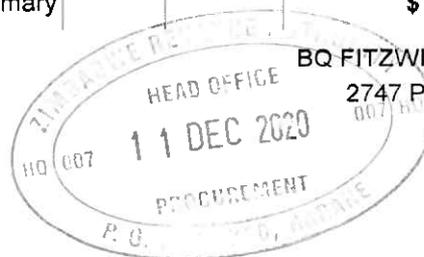
**(For Preambles see General Specification)**

**FLOOR COVERINGS**

**PORCELAIN FLOOR TILES**

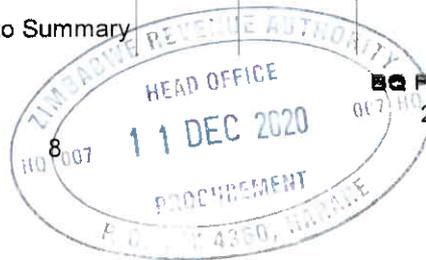
**600 x 600 x 10 mm High traffic non slip porcelain floor tiles laid on and including cement and sand screed (1:3) to an overall thickness of 40 mm strictly in accordance with the manufacturer's recommendations**

	Unit	Quantity	Rate	Amount
1	m <sup>2</sup>	14		
2	No	1		
3	m	21		
Carried to Summary				\$





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 6</u></b>				
<b><u>STRUCTURAL STEELWORK</u></b>				
<b><u>STEEL TRUSSES ETC</u></b>				
<b><u>Welded roof trusses of angle section rails, struts, braces, cleats, etc and flat section bearer, gusset and connection plates bolted to steel:</u></b>				
1	Roof Trusses.	Kg	411	.
<b><u>STEEL COLUMNS, BEAMS ETC</u></b>				
<b><u>Welded beams, wall plates etc in single lengths with flat bearer and connection plates, bolted to steel</u></b>				
2	Steel wall plates to Engineer's detail	Kg	69.20	
Carried to Summary				\$



**BQ FITZWILLIAM PARTNERSHIP**  
 2747 Princess Margaret Rd,  
 Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 7</u></b>				
<b><u>METALWORK</u></b>				
<b><u>ALUMINIUM WINDOWS AND FRAMES (BUILDING IN ELSEWHERE MEASURED)</u></b>				
<b><u>Purpose made natural anodised aluminium windows and doors in pressed aluminium intermediate and end mullions and with pressed aluminium external cills the whole to be executed by an approved firm of specialists to the Architect's approval with aluminium permavents where specified supplied, fixed, glazed and decorated complete</u></b>				
<b><u>(Types in parenthesis referred to Manyara Design Architects Window Schedule)</u></b>				
1	No	2		
2	No	1		
3	No	1		
4	No	1		
5	No	1		
6	No	1		
7	No	1		
<b><u>STEEL STAIRS</u></b>				
<b><u>Demountable steel stair to Eng. Specs</u></b>				
8	Item			
Carried to Summary				\$



BO FITZWILLIAM PARTNESHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 8</u></b>				
<b><u>PLASTERING</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>INTERNAL PLASTER</u></b>				
<b><u>Render one coat cement plaster and set in Rhinoset plaster including all labours with a steel trowel finish on concrete</u></b>				
1	Walls.	m <sup>2</sup>	53	
2	Walls, reveals, etc. in narrow widths.	m <sup>2</sup>	2	
3	Square and rectangular columns.	m <sup>2</sup>	3	
<b><u>PLASTERING</u></b>				
<b><u>EXTERNALLY</u></b>				
<b><u>One coat cement plaster as described including all labours with a fine woodfloat finish on</u></b>				
4	Walls.	m <sup>2</sup>	37	
5	Walls, reveals, etc. in narrow widths.	m <sup>2</sup>	2	
6	Sides of square and rectangular columns.	m <sup>2</sup>	4	
Carried to Summary				\$





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 9</u></b>				
<b><u>PLUMBING AND DRAINAGE</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>RAINWATER DISPOSAL AND FLASHINGS</u></b>				
<b><u>0.6 mm Galvanised sheet iron as described in</u></b>				
1	m <sup>2</sup>	2		
3mm Mild steel rectangular gutter with square beaded top edge on brackets as described to steel.				
2	No	2		
Extra for stopped end.				
3	No	2		
Ditto outlet with nozzle for and joint to 75mm diameter rainwater down pipe				
4	No	2		
Extra for shoe.				
<b><u>SANITARY FITTINGS</u></b>				
5	No	1		
'Vaal Potteries' white glazed vitreous china vanity basin and pair of cast iron brackets complete with integral overflow, chromium plated waste outlet and captive plug, pair of 15 mm chromium plated colour coded pillar taps, bolt brackets to tiled wall and connect up.				
6	No	1		
'Vaal Potteries' low level W.C. suite comprising white glazed vitreous china pan with 'P' trap, white plastic double flap seat, 9 litre white enamelled cast iron cistern and white porcelain enamel flush pipe, bolt cistern to tiled floor, fix pan to tiled wall and connect up.				
<b><u>SANITARY PLUMBING</u></b>				
<b><u>'Promat' or equal rigid P.V.C. piping with solvent cement joints and fittings as described</u></b>				
7	m	2		
50 mm Diameter pipe to walls.				
8	m	2		
110 mm Diameter pipe to walls.				
<b><u>Extra on P.V.C. piping for</u></b>				
9	No	2		
50 mm Bend.				
10	No	1		
50 mm Inspection bend.				
11	No	1		
110 mm Inspection bend.				
12	No	1		
110 mm Inspection junction.				
13	No	1		
110 mm Straight pan connector and joint to W.C. pan.				
Carried to Collection				\$



BQ FITZWILLIAM PARTNESHIP  
2747 Pnncess Margaret Rd,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>Traps</u></b>				
14	No	1		
32-40 mm Diameter 'Flexitrap' or equal 'P' trap and joint to fitting and P.V.C. pipe.				
15	No	1		
50 mm Chromium plated bottle trap with cleaning eye and joint to fitting and P.V.C. pipe.				
<b><u>Sundries</u></b>				
16	No	1		
Galvanised wire balloon grating and fixing in top of 110 mm diameter pipe.				
17	No	1		
Joint small pipe to gully.				
18	No	1		
Ditto large pipe to gully.				
<b><u>HOT AND COLD WATER SUPPLIES</u></b>				
<b><u>Connection</u></b>				
19	Item			
Excavate in pickable material not exceeding 1 metre deep for and cut into 50 mm diameter steel main for and provide and insert reducing tee and joint to new 50 mm diameter steel service including any necessary additional fittings and return, fill and ram.				
<b><u>Galvanised mild steel as described</u></b>				
20	m	5		
20 mm Diameter pipe fixed to walls.				
21	m	5		
25 mm Diameter pipe fixed to walls.				
22	m	10		
25 mm Ditto laid in ground including excavating trench not less than 460 mm deep, fill in, ram and cart off surplus excavated material.				
23	m	15		
50 mm Ditto ditto.				
<b><u>Extra on galvanised mild steel piping for</u></b>				
24	No	2		
20 mm Bend.				
25	No	2		
25 mm Bend.				
26	No	2		
25 mm Tee.				
27	No	3		
25 -20 mm Reducer.				
28	No	2		
50 mm Bend.				
29	No	3		
50 -25 mm Reducer.				
<b><u>Copper tubing as described</u></b>				
30	m	5		
15 mm Diameter pipe fixed to walls.				
31	m	150		
22 mm Diameter pipe fixed to walls.				
Carried to Collection			\$	





	Unit	Quantity	Rate	Amount
<b><u>FIRE APPLIANCES</u></b>				
32	No	1		
Approved fire hose reel with 23 metres of 20 mm diameter rubber hose, chromium plated nozzle holder and 25 mm chromium plated gate valve, bolt back plate of reel and nozzle holder to wall, connect up and joint 50 mm diameter steel pipe.				
33	No	1		
9 Litre approved CO2 fire extinguishers charge and place in position.				
34	No	1		
3 Kilogram dry powder fire extinguishers, charge and place in position on and including bracket plugged and screwed to wall.				
<b><u>BUILDER'S WORK</u></b>				
35	No	2		
Hole one brick wall for small pipe.				
36	No	1		
Ditto large pipe.				
<b><u>TESTING</u></b>				
37	Item			
Allow for testing and commissioning the whole of the Plumbing and Drainage work in this Bill, make good all defects and for re-testing until approved, no trenches are to be filled until approved.				
Carried to Collection				\$



BQ FITZWILLIAM PARTNESHIP  
2747 Pnncess Margaret Rd,  
Marlborough, Harare



Amount

**BILL NO. 9**  
**PLUMBING AND DRAINAGE**  
**COLLECTION**

Page No

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12

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Carried to Summary

\$

14



BQ FITZWILLIAM PARTNESHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 10</u></b>				
<b><u>PAINTWORK</u></b>				
<b><u>(For Preamble see General Specification)</u></b>				
<b><u>PAINTING</u></b>				
<b><u>ON PLASTER, ETC.</u></b>				
<b><u>Prepare and apply three coats internal quality P.V.A. emulsion paint internally on</u></b>				
1	m <sup>2</sup>	56		
2	m <sup>2</sup>	2		
<b><u>Prepare and apply three coats external quality P.V.A emulsion paint externally on.</u></b>				
3	m <sup>2</sup>	39		
4	m <sup>2</sup>	2		
<b><u>LEAVE CLEAN</u></b>				
5	Item			
Carried to Summary				\$



BQ FITZWILLIAM PARTNESHIP  
2747 Pnncess Margaret Rd,  
Marlborough, Harare



## GATE HOUSE SUMMARY



Bill No.	<b>ZIMRA GATE HOUSE</b>	Page	Amount (USD)
	<b><u>SUMMARY</u></b>		
1	CONCRETE, FORMWORK AND REINFORCEMENT		
2	BRICKWORK		
3	ROOF COVERING		
4	CARPENTRY AND JOINERY		
5	FLOOR COVERINGS		
6	STRUCTURAL STEEL WORK		
7	METAL WORKS		
8	PLASTERING		
9	PLUMBING AND DRAINAGE		
10	PAINTING		
	<b>SECTION TOTAL TO FINAL SUMMARY</b>		





## **ELECTRICAL OUTBUILDINGS**



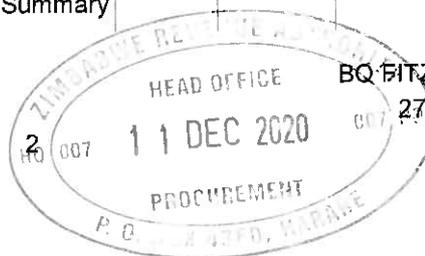
	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 1</u></b>				
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>CONCRETE</u></b>				
<b><u>REINFORCED CONCRETE CAST ON/IN FORMWORK</u></b>				
<b><u>30MPa/19mm concrete</u></b>				
1	Slabs	m <sup>3</sup>	6	
2	Beams	m <sup>3</sup>	11	
<b><u>FORMWORK</u></b>				
<b><u>Sawn formwork as described to</u></b>				
3	Soffit of slabs.	m	55	
4	Soffit of beams.	m <sup>2</sup>	15	
5	Sides of beams in narrow widths.	m <sup>2</sup>	70	
<b><u>REINFORCEMENT</u></b>				
<b><u>High yield deformed rods</u></b>				
6	Not exceeding 8 mm diameter.	Kg	806	
7	Exceeding 8 mm and not exceeding 12 mm diameter.	Kg	806	
8	Exceeding 12 mm and not exceeding 30 mm diameter.	Kg	806	
<b><u>PRECAST CONCRETE</u></b>				
<b><u>Pre-cast concrete (Grade 20-20mm stone) finished fair on all exposed surfaces:</u></b>				
9	110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 1 700 mm long.	No	10	
10	110 x 165 mm 'Fort Concrete' or equal prestressed lintol, 1 500mm long.	No	12	
11	20 x 150mm Cill cast in suitable lengths finished fairwith polished terrazzo finish in approved colours on top, exposed edge and soffit including ends, and hoisting, bedding, jointing in cement mortar	m	7	
Carried to Summary				\$



BQ FITZWILLAM PARTNERSHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 2</u></b>				
<b><u>MASONRY</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>BRICKWORK</u></b>				
<b><u>Brickwork in common bricks in cement mortar as described</u></b>				
1	m <sup>2</sup>	58		
<b><u>Brickforce lapped at joints and junctions and building in as the work proceeds (measured nett)</u></b>				
2	m	171		
<b><u>DAMP PROOF COURSE</u></b>				
<b><u>One layer of three ply bituminous felt sheeting as damp proof course as described well lapped at joints and junctions</u></b>				
3	m <sup>2</sup>	6		
4	m <sup>2</sup>	1		
<b><u>BUILDING IN</u></b>				
5	No	5		
<b><u>REINFORCEMENT</u></b>				
Carried to Summary				\$



BQ FITZWILLAM PARTNERSHIP  
 2747 Princess Margaret Rd,  
 Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b>BILL NO. 3</b>				
<b><u>ROOF COVERINGS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>ROOF COVERINGS</u></b>				
<b><u>0.6 mm Coloured chromadek I.B.R. Roof sheeting of approved manufacturer including all fixings and square cuttings</u></b>				
1	m <sup>2</sup>	60		
2	m	25		
<b><u>INSULATION</u></b>				
3	m <sup>2</sup>	60		
4	m	25		
Carried to Summary				\$



**BQ RITZWILLAM PARTNERSHIP**  
 2747 Princess Margaret Rd,  
 Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 4</u></b>				
<b><u>FLOOR COVERINGS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>FLOOR COVERINGS</u></b>				
<b><u>Tinted granolithic as described including all labours</u></b>				
1	40 mm (Nominal) paving to floors.	m <sup>2</sup>	55	
2	75mm High skirting with cove at junction with floor and square top edge.	m	51	
Carried to Summary				\$





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 5</u></b>				
<b><u>STRUCTURAL STEELWORK</u></b>				
<b><u>STEEL TRUSSES ETC</u></b>				
<b><u>Welded roof trusses of angle section rails, struts, braces, cleats, etc and flat section bearer, gusset and connection plates bolted to steel:</u></b>				
1	Roof Trusses.	Kg	411	
<b><u>STEEL COLUMNS, BEAMS ETC</u></b>				
<b><u>Welded beams, etc in single lengths with flat bearer and connection plates, bolted to steel</u></b>				
2	Steel beams to Engineer's specification	Kg	367.50	
3	Wall plates to Engineer's specification	Kg	245.00	
Carried to Summary				\$



BQ FITZWILLAM PARTNERSHIP  
 2747 Princess Margaret Rd,  
 Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b>BILL NO. 6</b>				
<b>METALWORK</b>				
<b>ALUMINIUM WINDOWS AND FRAMES (BUILDING IN ELSEWHERE MEASURED)</b>				
<u>Purpose made natural anodised aluminium windows and doors in pressed aluminium intermediate and end mullions and with pressed aluminium external cills the whole to be executed by an approved firm of specialists to the Architect's approval with aluminium permavents where specified supplied, fixed, glazed and decorated complete</u>				
<u>(Types in parenthesis referred to Manyara Design Architects Window Schedule)</u>				
1	No	6		
Window type W7, Size 1 500 x 1 300mm high				
2	No	.5		
Folding Door type D11, Size 1 500 x 2 700mm high				
<b>STEEL RAMPS</b>				
<b>Steel ramps to Eng Spec</b>				
3	Item			
Provide an amount of ZWL 246,000.00 for steel ramp supply and fix complete				
Carried to Summary				\$



BQ FITZWILLAM PARTNERSHIP  
 02747 Princess Margaret Rd,  
 Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 7</u></b>				
<b><u>PLASTERING</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>INTERNAL PLASTER</u></b>				
<b><u>Render one coat cement plaster and set in Rhinoset plaster including all labours with a steel trowel finish on concrete</u></b>				
1	Walls.	m <sup>2</sup>	38	
<b><u>PLASTERING</u></b>				
<b><u>EXTERNALLY</u></b>				
<b><u>One coat cement plaster as described including all labours with a fine woodfloat finish on</u></b>				
2	Walls.	m <sup>2</sup>	33	
Carried to Summary				\$



BQ FITZWILLAM PARTNERSHIP  
 2747 Princess Margaret Rd,  
 Marlborough, Harare





## **ELECTRICAL OUTBUILDINGS SUMMARY**



Bill No.	<b>ZIMRA ELECTRICAL OUTBUILDINGS SUMMARY</b>	Page	Amount (USD)
1	CONCRETE, FORMWORK AND REINFORCEMENT		
2	MASONRY		
3	ROOF COVERING		
4	FLOOR COVERINGS		
5	STRUCTURAL STEEL WORK		
6	METAL WORKS		
7	PLASTERING		
8	PAINTING		
	<b>SECTION TOTAL TO FINAL SUMMARY</b>		





## BATTERY PADS





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 1</u></b>				
<b><u>FOUNDATIONS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>Note: Site clearance measured in Civil works Bill.</u></b>				
<b><u>EXCAVATION</u></b>				
<b><u>Pumping</u></b>				
<b><u>Note: Should pumping be necessary, the Contractor must forward to the Quantity Surveyor, on a monthly basis, a statement showing the number of hours worked by each pump, signed by the Engineer and Foreman, failing which, no payment for pumping will be made. Only actual pumping hours will be paid for.</u></b>				
1	Item			
Allow for keeping the excavations free from storm, surface water and mud by pumping and baling.				
2	No	5		
Allow for keeping the excavations free from underground water by pumping with a pump not exceeding 2.5 kw and allow for all necessary hosing, piping, fuel, attendance, temporary drainage and anything else necessary and clear away and reinstate all surfaces disturbed. (In hours).				
<b><u>Excavation</u></b>				
3	m <sup>2</sup>	76		
Excavate over site to remove vegetable soil average 150 mm deep and cart off site.				
<b><u>Excavate in pickable material for</u></b>				
4	m <sup>3</sup>	20		
Surface trenches not exceeding 2 metres deep.				
5	m <sup>3</sup>	1		
Bases				
6	m <sup>3</sup>	1		
Extra over excavation in pickable material for excavation in hard pickable material.				
7	m <sup>3</sup>	1		
Ditto for excavation in rock.				
<b><u>Planking and strutting</u></b>				
8	m <sup>2</sup>	58		
Allow for maintaining and supporting sides of all excavations and making good all slips.				
<b><u>Disposal</u></b>				
9	m <sup>3</sup>	11		
Redig from spoil heap and cart off site.				
10	m <sup>3</sup>	11		
Redig from spoil heap, return fill and ram.				
Carried to Collection				\$



BO FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>Formation</u></b>				
11				
Scarify ground to a depth of 150 mm and compact to 95% H.C.E density.	m <sup>2</sup>	59		
12				
Selected imported inert granular material, spread, level and compact in maximum 150 mm layers to make up levels under floors to 95% H.C.E density.	m <sup>3</sup>	9		
<b><u>Sundries</u></b>				
13				
250 Micron black polythene sheeting well lapped at joints and junctions including all cutting and waste (measured nett) laid over filling to receive concrete.	m <sup>2</sup>	59		
<b><u>TERMITES</u></b>				
14				
Termite treatment as described to top of filling and walls.	m <sup>2</sup>	58		
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>Unreinforced concrete (Grade 10-20 mm stone) in</u></b>				
15				
50 mm Blinding under strip footings.	m <sup>2</sup>	20		
16				
50 mm Blinding under hardcore.	m <sup>2</sup>	59		
<b><u>Vibrated reinforced concrete (Grade 25-20 mm stone) in</u></b>				
17				
Strip footings.	m <sup>3</sup>	5		
18				
Bases and stubcolumns	m <sup>3</sup>	1		
19				
Surface beds.	m <sup>3</sup>	11		
20				
Retaining Wall.	m <sup>3</sup>	6		
<b><u>Sundries</u></b>				
21				
Strike off and cure top of concrete.	m <sup>2</sup>	59		
<b><u>Formwork</u></b>				
<b><u>Sawn formwork as described to</u></b>				
22				
Sides of Retaining Wall	m <sup>2</sup>	58		
23				
Sides of Columns	m <sup>2</sup>	2		
<b><u>Reinforcement</u></b>				
<b><u>Welded fabric reinforcement of approved manufacturer including all cutting, tying, placing in position with necessary temporary supports and minimum 300 mm laps both ways (measured nett)</u></b>				
24				
Ref S245 (mass of 2.45 kg/square metre) in top reinforcement to surface bed cast in panels.	m <sup>2</sup>	59		
Carried to Collection				
			\$	





	Unit	Quantity	Rate	Amount
<u>High yield deformed rods</u>				
25 Reinforcement All sizes	Kg	898		
<u>SITE CLEARANCE</u>				
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare



Amount

**BILL NO. 1**  
**FOUNDATIONS**  
**COLLECTION**

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Carried to Summary

\$

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BO FITZWILLIAM PARTNERSHIP  
2747, Princess Margaret Rd,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 2</u></b>				
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>CONCRETE</u></b>				
<b><u>Vibrated reinforced concrete (Grade 30-20mm stone)</u></b>				
<b><u>in</u></b>				
1	Ramp	m <sup>3</sup>	11	
2	Columns	m <sup>3</sup>	1	
<b><u>FORMWORK</u></b>				
<b><u>Sawn formwork as described to</u></b>				
3	Sides of Ramp	m <sup>2</sup>	1	
4	Sides of Columns	m <sup>2</sup>	5	
<b><u>REINFORCEMENT</u></b>				
<b><u>High yield deformed rods</u></b>				
5	Reinforcement all sizes	Kg	680	
Carried to Summary				\$

ZIMBABWE REVENUE AUTHORITY  
 HEAD OFFICE BQ FITZWILLIAM PARTNERSHIP  
 2747 Princess Margaret Rd,  
 Marlborough, Harare  
 11 DEC 2020  
 HO 007  
 PROCUREMENT  
 P O BOX 4260, HARARE



Unit      Quantity      Rate      Amount

**BILL NO. 3**  
**PLUMBING AND DRAINAGE**

**Sundries**

1 Hole one brickwall for 50mm diametre weep holes

No

6

Carried to Summary

\$



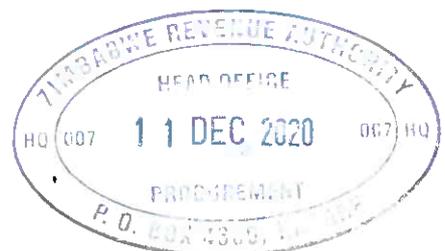
BQ FITZWILLIAM PATNERSHIP  
2747 Princess Margaret Rd,  
Marlborough, Harare



## BATTERY PADS SUMMARY



Bill No.	<b>ZIMRA BATTERY PADS SUMMARY</b>	Page	Amount (USD)
1	FOUNDATIONS		
2	CONCRETE, FORMWORK AND REINFORCEMENT		
	<b>SECTION TOTAL TO FINAL SUMMARY</b>		



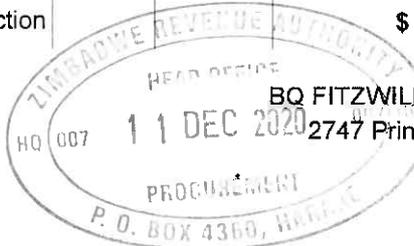


## GENERATOR PADS





	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 1</u></b>				
<b><u>FOUNDATIONS</u></b>				
<b><u>(For Preambles see General Specification)</u></b>				
<b><u>Note: Site clearance measured in Civil works Bill.</u></b>				
<b><u>EXCAVATION</u></b>				
<b><u>Pumping</u></b>				
<b><u>Note: Should pumping be necessary, the Contractor must forward to the Quantity Surveyor, on a monthly basis, a statement showing the number of hours worked by each pump, signed by the Engineer and Foreman, failing which, no payment for pumping will be made. Only actual pumping hours will be paid for.</u></b>				
1	Item			
Allow for keeping the excavations free from storm, surface water and mud by pumping and baling.				
2	No	.5		
Allow for keeping the excavations free from underground water by pumping with a pump not exceeding 2.5 kw and allow for all necessary hosing, piping, fuel, attendance, temporary drainage and anything else necessary and clear away and reinstate all surfaces disturbed. (In hours).				
<b><u>Excavation</u></b>				
3	m <sup>2</sup>	15		
Excavate over site to remove vegetable soil average 150 mm deep and cart off site.				
<b><u>Excavate in pickable material for</u></b>				
4	m <sup>3</sup>	7		
Surface trenches exceeding not exceeding 2 metres deep.				
5	m <sup>3</sup>	1		
Extra over excavation in pickable material for excavation in hard pickable material.				
6	m <sup>3</sup>	1		
Ditto for excavation in rock.				
<b><u>Planking and strutting</u></b>				
7	m <sup>2</sup>	20		
Allow for maintaining and supporting sides of all excavations and making good all slips.				
<b><u>Disposal</u></b>				
8	m <sup>3</sup>	4		
Redig from spoil heap and cart off site.				
9	m <sup>3</sup>	5		
Redig from spoil heap, return fill and ram.				
Carried to Collection				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Marlborough, Harare

	Unit	Quantity	Rate	Amount
<b><u>Formation</u></b>				
10				
Scarify ground to a depth of 150 mm and compact to 95% H.C.E density.	m <sup>2</sup>	12		
11				
Selected imported inert granular material, spread, level and compact in maximum 150 mm layers to make up levels under floors to 95% H.C.E density.	m <sup>3</sup>	2		
<b><u>Sundries</u></b>				
12				
250 Micron black polythene sheeting well lapped at joints and junctions including all cutting and waste (measured nett) laid over filling to receive concrete.	m <sup>2</sup>	12		
<b><u>TERMITES</u></b>				
13				
Termite treatment as described to top of filling and walls.	m <sup>2</sup>	20		
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
<b><u>Unreinforced concrete (Grade 10-20 mm stone) in</u></b>				
14				
50 mm Blinding under strip footings.	m <sup>2</sup>	7		
15				
50 mm Blinding under hardcore.	m <sup>2</sup>	12		
<b><u>Vibrated reinforced concrete (Grade 25-20 mm stone) in</u></b>				
16				
Strip footings.	m <sup>3</sup>	2		
17				
Surface beds.	m <sup>3</sup>	2		
18				
Retaining Wall.	m <sup>3</sup>	2		
<b><u>Sundries</u></b>				
19				
Strike off and cure top of concrete.	m <sup>2</sup>	12		
<b><u>Formwork</u></b>				
<b><u>Sawn formwork as described to</u></b>				
20				
Sides of Retaining Wall.	m <sup>2</sup>	20		
<b><u>Reinforcement</u></b>				
<b><u>Welded fabric reinforcement of approved manufacturer including all cutting, tying, placing in position with necessary temporary supports and minimum 300 mm laps both ways (measured nett)</u></b>				
21				
Ref S245 (mass of 2.45 kg/square metre) in top reinforcement to surface bed cast in panels.	m <sup>2</sup>	12		
<b><u>High yield deformed rods</u></b>				
22				
Reinforcement All sizes	Kg	150		
Carried to Collection			\$	





Amount

**BILL NO. 1**  
**FOUNDATIONS**  
**COLLECTION**

Page No

Brought Forward from Page

- 1
- 2
- 3

Carried to Summary

\$



**BQ FITZWILLIAM PARTNERSHIP**  
2747 Princess Margaret Road,  
Marlborough, Harare



	Unit	Quantity	Rate	Amount
<b><u>BILL NO. 2</u></b>				
<b><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></b>				
(For Preambles see General Specification)				
<b><u>CONCRETE</u></b>				
<b><u>Vibrated reinforced concrete (Grade 30-20mm stone) in</u></b>				
1	Ramp	m <sup>3</sup>	4	
<b><u>FORMWORK</u></b>				
<b><u>Sawn formwork as described to</u></b>				
2	Sides of Ramp	m <sup>2</sup>	1	
<b><u>REINFORCEMENT</u></b>				
<b><u>High yield deformed rods</u></b>				
3	Reinforcement all sizes	Kg	163	
Carried to Summary				\$



BQ FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Road,  
Marlborough, Harare



## GENERATOR PADS SUMMARY



Bill No.	<u>ZIMRA GENERATOR PADS</u>	Page	Amount (USD)
	<u>SUMMARY</u>		
1	FOUNDATIONS		
2	CONCRETE, FORMWORK AND REINFORCEMENT		
	<b>SECTION TOTAL</b>		





## CIVIL WORKS



**ZIMBABWE REVENUE AUTHORITY  
CORPORATE HEAD  
OFFICE:**

***CIVIL ENGINEERING WORKS  
SPECIFICATIONS  
AND  
BILLS OF QUANTITIES***

**NOVEMBER 2020**

**CONSULTANTS**



**Galaxy Engineering Design Consultants P/L**

*No 7 The Chase, Ashbrittle  
P.O.Box MP850, Mt Pleasant, Harare  
Tel: 263-04-333660, 333706, 0734553298  
e-mail: wvengesayi@gmail.com,  
bhmashaa@gmail.com*

**CLIENT**

**Zimbabwe Revenue Authority**

*Kurima House  
Harare*





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## **1. INTRODUCTION**

These specifications are for Civil Engineering Works to be carried out at the proposed Zimbabwe Revenue Authority Corporate Headquarters in Harare.

## **2. CONDITIONS OF CONTRACT**

The General Conditions of Contract shall be the Conditions of the Main Building Contract under which the Civil Engineering Works will be done. However the general conditions of Contract "The General Conditions of Contract for use in connection with works of Civil Engineering Construction ( Fourth Edition 1984) ZGCC4 and recommended for use in Zimbabwe by the Zimbabwe Institution of Engineers, the Federation of Civil Engineering Contractors of Zimbabwe and The Zimbabwe Association for Consulting Engineers" shall apply for the civil engineering works where there is no conflict with the conditions of contract the Main building contract. Where there is conflict the general conditions of the main building contract takes precedence.

## **3. SUPERVISION OF THE WORKS**

Galaxy Engineering Design Consultants (Pvt) Ltd shall be responsible for the overall supervision and control of the Civil Engineering Works to be done under this Contract and shall include their personal representatives or successors.

## **4. DOCUMENTS RELATED TO SPECIFICATIONS**

The specifications are to be read in conjunction with the following documentation: -

- (a) Government Standard Specifications for Building works, Civil Engineering, Structural Engineering, Electrical Engineering and Public Health Engineering
- (b) Local Municipal Model Building By - Law.
- (c) Standards and Codes of practice issued by the Standard Association of Zimbabwe.
- (d) Standards and Codes of practice issued by the British Standards Institution.
- (e) Standards and Codes practice issued by the South African Standards Institution.
- (f) Environmental and Social Impact Assessment Report.

## **5. STANDARD SPECIFICATION**

### **SECTION I – GENERAL**

#### **5.0 SCOPE OF CIVIL ENGINEERING WORKS**

The Contract comprises the construction of services for the proposed Zimbabwe Revenue Authority Corporate Head Office in Harare:-

- a) The construction of earthworks, roadworks and parking areas and stormwater drainage and
- b) The construction of water and sewer reticulation.

The Employer may vary the extent of civil engineering works prior to the award of Contract to suit available funding/finances. The Preliminary and generals will also have to be adjusted proportionally to suit the reduction in scope of works.



#### **5.1 CONDITIONS OF CONTRACT**

The General and Special Conditions of contract must be read in conjunction with this Specification, and matters referred to therein are not necessarily referred to hereinafter.

#### **5.2 DRAWINGS**

The relevant drawings for this tender are as listed in Appendix A at the end of these specifications.

#### **5.3 FIRST AID OUTFIT**

The Contractor shall provide on the site of the Works an adequate and easily accessible First Aid Outfit as required in terms of the Workman's Compensation Act of 1941 or any amendment thereto.

#### **5.4 DEVIATIONS AND TEMPORARY ACCESSES**

The Contractor shall carry out the construction of the Works in such a manner that the least possible inconvenience is caused to the client, public and to owners of adjacent buildings and land. Reasonable access must be provided at all times to and upon roads and tracks to ensure that obstruction to pedestrians and vehicular traffic is kept to a minimum.

Where required by the Engineer, the Contractor shall provide and maintain to a standard approved by the Engineer adequate detours and deviations to ensure full compliance with this Clause. The cost of detours or deviations as well as their maintenance and any necessary signs in connection therewith will be paid for as plant hire and day work, and a provisional item to cover this will be included  
se. The cost of detours or deviations as well as their maintenance and any necessary signs in connection therewith will be paid for as plant hire and day work, and a provisional item to cover this will be included  
e. The cost of detours or deviations as well as their maintenance and any necessary signs in connection therewith will be paid for as plant hire and day work, and a provisional item to cover this will be included in the Bill of Quantities.

es.  
s.

#### **5.5 ADJOINING WORKS AND PROPERTY**

In carrying out the Works, the Contractor shall at his own expense make such provision in the nature of temporary works as may be required for ensuring the safety of adjoining works and property and for the protection and convenience of all persons.

#### **5.6 BEACONS AND PEGS**

When the Contractor moves onto the site, survey beacons and pegs will have been established defining stand boundaries, road reserves, outer perimeters and all other necessary primary identification of sub-divisional boundaries. The Contractor is to make every effort to avoid damaging or interfering with such beacons and pegs or covering them with spoil.

Any repairs or replacements necessitated by neglect on the part of the Contractor to comply with this Clause will be carried out at the Contractor's expense.

The Contractor shall exercise similar care in regard to any pegs established by the Engineer specifically for



purposes of the contract until such time as the Engineer may authorise their destruction or removal.

#### **5.7 SETTING OUT**

The Contractor's attention is drawn to the conditions of, which makes him responsible for the true and proper setting out of the works.

#### **5.8 LEVELS**

No work shall commence upon any portion of the contract until such time as ground levels have been taken by the Contractor in an approved manner, and checked and accepted by the Engineer to ensure that a firm basis has been established for measurement and setting out purposes. Should the Contractor fail to comply with this Clause, the Engineer reserves the right to base the final measurement on other survey data.

#### **5.9 INSTRUMENTS**

The Contractor shall provide at his own expense all survey and measuring instruments of every kind necessary for his use in the execution of the work. He shall also provide such equipment and instruments as are required for the use of the Engineer's Representative and his staff and as are detailed below: -

- (a) 1 x Automatic level with horizontal circle with its tripod
- (b) 1 x approved Theodolite with its tripod
- (c) 5 m and 100 m measuring tapes
- (d) 2 x metric staff
- (e) pegs, ranging rods
- (f) 1 large umbrella

#### **5.10 WATER, ELECTRICITY AND TELEPHONE**

The Contractor shall make all necessary arrangements for the supply of all water, electricity, and telephone services required by him for the construction of the works or any other purposes. His tender shall be deemed to include the cost of all such arrangements including tariff charges raised by the service Authorities, and items are included in the Bill for this purpose.

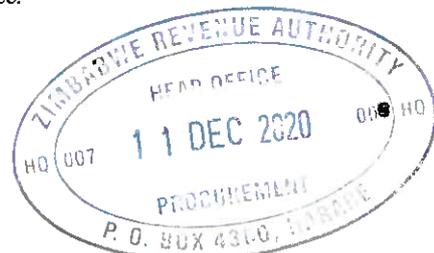
- (a) Water

The Contractor shall apply to City of Harare for a metered point of supply in the immediate vicinity of the Contractor's Yard and the Engineer's office. The Contractor will pay for the water used for the project.

All temporary piping, storage tanks, bowsers etc. required to distribute water to all points within the site for the purpose of construction are to be provided by the Contractor and removed by him upon completion of the works. The Contractor shall provide a water supply to the Engineer's office and residence.

- (b) Electricity

The Contractor is to make his own arrangements with Z.E.S.A. for temporary supply for his own use and installation in the Engineer's office.



### **5.11 CONTRACTOR'S RISKS/ALLOWANCES IN EXCAVATION**

The Contractor shall allow in his rates for excavation, for the following ancillary works: -

- a) any timbering and shoring necessary for the safety of excavations and to comply with the law;
- b) all measures necessary to keep the excavations free of surface or subsoil water from whatever source, including the obliteration of all temporary works such as channels or banks when no longer required;
- c) all risks of damage or injury from blasting, which shall in all cases comply with any applicable regulations, and shall not unduly interfere with the operations of any other contractor or the convenience of the public;
- d) correction to the satisfaction of the Engineer of any excavation in excess of that required or specified, including the use of concrete.
- e) the repair of any damage resulting from slips, falls or cave-ins and the filling of all resultant cavities when the Engineer so instructs;
- f) any measure, not specifically mentioned elsewhere, necessary to maintain excavation in a safe and proper condition to the Engineer's satisfaction both before and after backfilling;
- g) the protection and restoration where necessary of any existing services affected by his excavation.

### **5.12 VARIATIONS IN PRICE**

Escalations for the Civil Works Contract Price will be as per Clause 70 of the General Conditions of Contract. The Contractor's attention is drawn to the various provisions of Clause 70 and he is reminded of the importance of maintaining detailed records of prices and costs and of complying fully with the requirements set out in Clause 70 in order to substantiate any claims which he may make. Variations of price will be paid in terms of Clause 70 of the general Conditions of Contract.

### **5.13 SOILS TESTING AND COMPACTION CONTROL**

The Employer will provide on site a soils testing laboratory when required and the Contractor will not be required to meet the costs of this facility. He may provide at his own cost any similar facilities required for his own purposes. The Contractor shall give the Engineer's Representative at least 48 hours notice in writing of his requirements for compaction tests to be carried out which tests shall not unreasonably be delayed. Any re-testing that may be required due to the failure of test Sections to meet specified requirements, shall be at the Contractor's expense.

### **5.14 PERIOD OF MAINTENANCE**

The period of maintenance is twelve months which is the Defects Liability Period specified in the main Buildings Contract.

### **5.15 SITE OF WORKS AND ACCESS**

Access to the site will initially be through the main gate.



#### **5.16 COMPLETION DATE AND PROGRAMME OF WORKS**

Tenderers are to submit a preliminary programme with their tender detailing the amount of time required for the main stages of the works based on time for completion given in the Tender.

The successful Tenderer will be required to submit to the Engineers a fully detailed programme within ten days of being awarded the contract.

#### **5.17 VALUE ADDED TAX**

Allowance must be made by the Tenderer for the cost of Value Added Tax levied on any article, materials or service that he shall be called upon to supply for the purpose of carrying out the Works, except for the articles or materials for which Prime Costs Sums have been allowed. He must accordingly make allowance for this Value Added Tax.

The Contractor shall provide the Engineer with whatever information the Employer may require for the recovery of Value Added Tax from the authorities in terms of Government Notice No. 438 of 1972 or any other regulations, and if necessary provide original relevant invoice and payment receipts.

#### **5.18 PERMITS AND CUSTOMS CLEARANCE**

The Contractor shall be responsible for obtaining any import or export permits which may be required in connection with goods to be supplied by him under this Contract, for obtaining any foreign exchange which may be required and for all customs clearance and expenses connected with such matters.

#### **5.19 TEMPORARY WORKS AND SAFETY PRECAUTIONS**

The Contractor shall so carry out all his operations as not to encroach upon, or interfere with, trespass on, or injure adjoining lands, buildings, property, roads, structures, places and things in the vicinity of the Works.

The Contractor shall at his own cost provide whatever temporary works may be required for the purpose of ensuring the safety of adjoining works and property and for the protection of all persons or animals. He shall make full provision to the satisfaction of the Engineer for all barricading, watching and lighting necessary for the protection of persons, animals, vehicles etc; from injury by reason of the Works. He shall provide ample warning signs, guard rails, etc; around open excavations, stacks of materials, debris, or the like.

The Contractor must comply in every respect with any requirements of the Police, Local or Traffic Authorities.

Particular care should be taken to prevent veld fires and erosion.

The Contractor shall assume full responsibility for any failure on his part to observe these conditions. He shall relieve the Employer of all liability incurred as a result of his failure in this respect and he shall be held liable for all claims made upon himself or upon the Employer by reason of his neglect of any such precautions and provisions.

The rates for excavation must allow for all these safety measures.

#### **5.20 LIABILITY IN RESPECT OF OBSTRUCTION, INTERRUPTION AND DAMAGE**



During the period of construction and maintenance of the Works, the Contractor shall take sufficient and adequate measures, to the satisfaction of the Engineer, the Local Authorities and the Proprietors interested, to avoid interrupting the use of roads, footpaths, railways, watercourses, gutters, drains, channels, pipes, telephones, electric wires and cables, premises, places and works, public or private, with which his operations may in any way interfere or alternatively take measures approved by the Engineer for their effective temporary diversion. The Contractor shall also afterwards permanently restore all structures and everything, which may have been temporarily displaced or otherwise, suffered interference and remove all temporary diversion works, all to the Proprietors without extra charge beyond the Contract Price except in instances where specifically allowed for in the contract.

The Contractor must take all responsibility for damage to property or crops and claims resulting from trespass or depredation by his employees. At all times during the execution of the Contract the Contractor shall be responsible for the closing of all gates and for the proper protection of property of every description which may have been entered upon or interfered with any way by him in carrying out the works.

#### **5.21 TEMPORARY OFFICES, HOUSING AND LATRINES**

The Contractor is to make provision, at his own expense, for temporary offices, housing and latrines for his workmen. The Contractor's latrines shall be made available to all workmen employed on the Employer's project, whether engaged upon this Contract or another.

Buildings and latrines shall be within the areas provided by the Employer for the purpose of the Contract unless the Contractor makes his own arrangements for the use of ground and liable for any resulting charges, costs, damages or penalties. The buildings and latrines shall conform to the requirements of the responsible authorities, be placed where directed by the Engineer and maintained by the Contractor in a clean, sanitary condition to the satisfaction of the Engineer and of every responsible Health Inspector. If at any time the Contractor fails to observe the aforesaid conditions and after being warned, the Engineer shall have the right immediately to order such material, appoint such workmen and institute such measures, all at the Contractor's expense, as in his opinion may be necessary to maintain clean, sanitary conditions.

#### **5.22 CONTRACTOR'S PLANT AND TOOLS**

The Contractor's plant and tools shall be in sound working condition and shall be sufficiently ample in capacity or number for carrying out the work in an efficient and expeditious manner. Should the Engineer be of the opinion that the plant used by the Contractor is insufficient or in any way unsuitable for carrying out the Works in a manner or at a rate commensurate with his requirements, he shall have the right to require that the Contractor provide such additional or approved plant and tools as may, in his opinion, be necessary to attain these requirements.

#### **5.23 RETURNS TO BE SUBMITTED BY CONTRACTOR**

The Contractor shall submit weekly returns in duplicate to the Engineer showing the number of artisans and labourers employed upon the Works, listing plant on site and indicating whether each item of plant is owned by the Contractor, hired, or acquired on hire purchase.

#### **5.24 NOMINATED SUB-CONTRACTORS**

Where any work is ordered by the Engineer to be executed by Nominated Sub-Contractors, the Contractor shall enter into Sub-Contracts as described in the conditions of Contract and shall thereafter be responsible for such Sub-Contractors in every respect.

d Sub-Contractors, the Contractor shall enter into Sub-Contracts as described in the conditions of Contract and shall thereafter be responsible for such Sub-Contractors in every respect.



### **5.25 ASSIGNMENT AND SUB-LETTING**

The contractor shall not assign nor sub-let the Contract, nor any part thereof without the written consent of the Engineer.

## **SECTION II: MATERIALS SECTION IIA - MATERIALS GENERALLY**

### **6.1 STANDARD SPECIFICATIONS**

In this Specification, the letter B.S.S.A.Z. and S.A.B.S. preceding a Standard Number are to identify Standards as being those of the British Standards Institution, the Standards Association of Zimbabwe and the South African Bureau of Standard respectively. Compliance with any such Standards shall include compliance with any amendments thereto current at the date upon which tenders are first invited, and must hold good when the materials are incorporated into the Works. This is not intended to be restrictive, and materials of equivalent or superior quality will be acceptable. The onus is on the Contractor to satisfy the Engineer that any alternatives offered are equivalent or superior to those specified.

### **6.2 PRECEDENCE OF SPECIFICATION**

The order of precedence of the documents and drawings describing specifications and workmanship and forming part of the Contract shall be:

1. Special Specification
2. General Specification
3. Drawings
4. Bill of Quantities

### **6.3 SAMPLES**

When requested to do so, the contractor shall at his own expense, submit in terms of clause 36, to the Engineer for approval, samples of the materials he proposes to use in the Works, including processed items such as bituminous premix. The Contractor shall on request, remove from the site any material supplied which is deemed by the Engineer to be inferior or unequal to the previously approved sample.

### **6.4 CEMENT**

All cement used shall be Portland cement normal setting quality complying with **SAZS A46: 1972**

All cement should be delivered to site in the original sealed bags of the manufacturer and shall be stored not less than 250 mm above the ground level in an approved watertight shed. Cement of different consignments shall be stored separately and shall be used in the order in which they are delivered to site. Cement on site for longer than three months shall be deemed unusable and removed from site.

Manufacturer's test certificates shall be produced to ensure that all cement delivered to site complies with the relevant standards.

### **6.5 AGGREGATE FOR CEMENT PRODUCTS**

Coarse and fine aggregates for concrete and mortar shall comply with **SAZS 233: 1978 AND SAZS 190: 1978**

Aggregates shall consist of river or pit ballast, crushed stone or other hard non-friable materials of approved quality, grading and shape. It shall be clean hard and durable and free from dust slate, clay, loam, slag, breeze, coal or any other deleterious matter. It shall be screened so that all the materials pass the maximum size required. Flaky material will not be accepted. The grading shall be such as to permit the production of sound dense concrete of the strength specified. Sand shall be clean, sharp, river or pit sand washed free from dust, clay, organic matter or any other impurities and shall be graded from fine to coarse as specified and required.

#### **6.6 WATER**

Water used in concrete and mortar shall be clean, free from dirt, vegetable matter, mineral salts or other impurities. The Contractor shall provide a chemical analysis of the water to prove its suitability for use in concrete work.

#### **6.7 BRICKS**

Bricks used in the Works shall comply with **SAZS 221**  
All bricks must be new, well burnt, of uniform colour, size and shape, with straight sharp arises, rectangular and free from defects in quality, shape or substance.

#### **6.8 CEMENT BRICKS**

All cement bricks shall be sound, well cured and conform to **SAZS No. A41** "Cement Bricks". They shall be of 'Common' classification unless otherwise detailed on the drawings.

#### **6.9 PRECAST CONCRETE BLOCKS**

Precast concrete blocks shall comply with SAZS 119 for Type A blocks.

#### **6.10 REINFORCING STEEL**

Steel used for reinforced concrete shall comply with SAZS 157, B.S. 4449 B.S. 4461, and B.S. 4482 or 4483 as appropriate, and at the time of placement shall be free from oil, paint, and excessive rust and scale or coatings of any character, which might impair the bond between steel and concrete.

### **SECTION IIB - MATERIALS - ROADS AND STORMWATER DRAINS**

Note: - Gravels and Crusher Run for sub-base and base are described in Section IIIF,

#### **6.11 MATERIALS FOR SOIL STABILISATION**

- (a) Lime shall comply with SAZS A19 Part I;
- (b) Cement shall comply with SAZS. A19 Part II;
- (c) Curing materials shall be approved by the Engineer.

#### **6.12 MATERIALS FOR SURFACING OF ROADS**

- (a) Straight - run bitumen shall comply with SAZS. 144



- (b) Cutback bitumen shall comply with SAZS. 145;
- (c) Tars shall comply with SAZS. 105;
- (d) Emulsions shall comply with B.S. 434;
- (e) Aggregates shall comply with SAZS. 232 with the following gradings: -

**SINGLE SIZE AGGREGATE FOR SPRAY AND CHIP**

**TOTAL PERCENTAGE PASSING**

B.S. Sieves	-19 + 13,2	-13,2 + 6,7	-9,5 + 3,35
26,5	100	-	-
19,0	90 - 100	100	-
13,2	0 - 20	85 - 100	100
9,5	0 - 5	0 - 55	85 - 100
6,7	0 - 1	0 - 10	0 - 50
4,75	-	0 - 2	0 - 10
2,36	-	-	0 - 2

**GRADED AGGREGATE FOR 25MM PREMIX**

**PERCENTAGE PASSING**

B.S. Sieves	Maximum	Minimum
19mm (3/4")	-	100
13mm (1/2")	100	90
6mm (1/4")	85	75
3mm (1/8")	65	45
No. 10	45	30
No. 25	25	15
No. 52	15	5
No. 100	10	5

**6.13 PRECAST CONCRETE INTERLOCKING PAVERS/ROADSTONES**

Precast concrete Interlocking Pavers/Roadstone shall be of Gee Pattern as per Fort Concrete or similar and shall be of thickness 80mm and standard strength Class 20 and shall comply with SAZ 473: 1994 "Zimbabwe Standard Specification for Precast Concrete Interlocking Pavers".

**6.14 STORMWATER PIPES**

Stormwater pipes shall be concrete and shall comply with SAZS A17 for the class of pipe specified, with ogee joints.

**SECTION IIC - MATERIALS – SEWERAGE**

**6.15 CONCRETE SEWER PIPING**

Concrete sewer pipes shall comply with SAZS A17 (Class S or Class X as specified) using approved calcareous aggregate in the concrete mix.



**6.16 EARTHENWARE SEWER PIPING**

Earthenware sewer pipes, channels and fittings used for sewer mains and connections shall comply with SAZS A16. They shall be of first quality, true to shape, free from cracks or other imperfections, and when struck shall ring clear.

**6.17 ASBESTOS CEMENT SEWER PIPING**

Asbestos cement sewer pipe, channels and fittings used for sewer mains and connections shall comply with SAZS 195.

**6.18 MANHOLE COVERS AND FRAMES**

All manhole covers and frames shall be cast iron to S.A.B.S. 558 or B.S.S. 497 and be of shape and in three qualities as detailed.

- Lightweight - approximately 32kg weight  
(Circular)
- Medium weight - approximately 102kg weight
- Heavy weight - approximately 204kg weight  
(Triangular)

All covers to be dipped in bitumen before installation.

**6.19 BITUMEN FOR EARTHENWARE PIPE JOINTS**

Where bitumen-joining material is used for jointing earthenware pipes the bitumen used shall conform to the following specification:

Penetration at 25 degrees C (0,1mm)	10 - 25
Softening Point degrees C (Ring and Ball)	110 - 120
Ductility at 25 degrees C (cm.min)	2

Blown Bitumen such as Shell R.115/15 or any other equivalent approved make may be used provided a suitable bitumen pipe primer is first applied to the inside of the socket and the outside of the spigot respectively.

**6.20 RUBBER JOINT RINGS**

Rubber jointing rings used in any pipe work shall be the type and quality recommended by the pipe manufacturers and typical samples shall be submitted to the Engineer prior to use for approval. Generally they shall comply with SAZS 196.

**6.21 PRECAST CONCRETE IN MANHOLES**

Precast concrete units used in the construction of manholes shall conform to the requirements of SAZS.A29 or shall be of a similar design satisfactory to the Engineer.

**6.22 STEP IRONS**



Step irons shall be of malleable cast iron and shall comply with B.S. 1247.

## SECTION IID - MATERIALS - WATER RETICULATION

### 6.23 SERVICE WATER METERS

Shall be semi-positive cyclometer pattern in accordance with S.A.B.S. 798, such as Kent P.S.M. domestic water meter or equal approved. The dial should read in cubic metres.

### 6.24 HYDRANTS

Fire hydrants are to be in accordance with B.S. 750 with anti-clockwise valve and 63mm outlet complete with loose cap of cast iron, iron chain and gunmetal screwed outlet with round outlet round thread at 51/5 threads per inch.

### 6.25 AIR VALVES

Air valves shall be the Single Acting type with bronze stop tap screwed make B.S.P.T. and manufactured in accordance with a Specification approved by the Engineer.

### 6.26 STOP VALVES

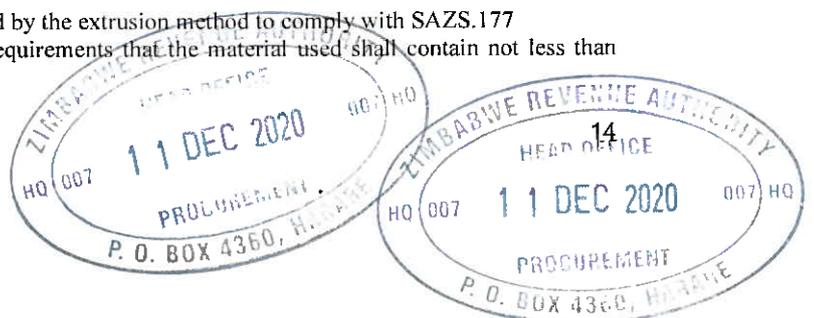
Stop valves, 50mm diameter and under shall be screw-down type manufactured in accordance with B.S. 1010. Ends to be female screwed with hexagonal shoulders. Closing shall be clockwise.

### 6.27 VALVES

- a) **Sluice Valves** to conform to SAZS. 149 Class 10, with following gate, wedge closure and unless otherwise specified, Teflon gland packing and non-rising spindle. Other pressure ratings or accessories may be specified for certain valves bodies, gates and glands shall be gunmetal or stainless steel. All valves shall be clockwise closing.
- b) **Valves on Plastic Pipework** are to be approved by the Engineer.
- c) **Pressure Relief Valve.** The pressure relief valves shall be able to resist an inlet head of up to 100 m with an adjustable spring set to open the valve from 30 to 50 m head. The valve is to be drop tight when closed.
- d) **Test.** Sluice valves shall be tested to twice the rated working pressure on body and one and a half times rated working pressure on either side of the gate. Sluice valves designated as 'scour valves' are to be used in a terminal position rigidly held at one end only, are to be subjected to 'open end' tests as described in BS 5163 and are to be drop tight on gate at nominal pressure.
- e) **Coating.** All valves are to be coated with approved protective paint or solution in an approved manner except when made from non-corrodible material and are to be adequately protected and packed against damage or injury in transport.

### 6.28 P.V.C. WATER PIPING

Polythene water piping shall be manufactured by the extrusion method to comply with SAZS.177 for Type II Class 9 pipes, with the added requirements that the material used shall contain not less than



0,02% by mass of anti-oxidant and that every coil of pipe supplied shall have been tested to a pressure of 180 metres head of water before delivery. Each coil shall be clearly stamped and numbered, and the relevant pressure test certificate must accompany delivery. Coils may additionally be subjected to a similar test by the Engineer, and any failure may result in the rejection of the whole consignment. P.V.C. Pipes shall be manufactured in accordance with I.S.O. 4422.

### **6.29 STORAGE ACCOMMODATION**

The Contractor must allow for the storage, protection and security of all materials brought onto the site for the purposes of the Contract including any supplied by the Employer to the satisfaction of the Engineer at his sole discretion. All materials including cement, sand, stone steel and water shall be stored in such a manner that they are not subject to contamination from any source or to any other deterioration.

For this purpose, the Contractor shall at his own cost provide and maintain, on sites approved by the Engineer, adequate and suitable storage accommodation for the proper housing and storage of all perishable or corrodible materials and fittings. All storage accommodation, particularly cement stores, shall be well ventilated, weather and waterproof, with floors raised off the ground so as to keep the materials perfectly dry and freely aerated and shall be subject to the approval of the Engineer, who shall have free access at all times to the storage sheds and shall be provided, if he so requires, with duplicate keys of doors of the storage shades.

### **6.30 PIPEWORK**

Pipes, fittings and specials are to be as specified in the Contract Documents or approved by the Engineer and, except where otherwise specified, shall conform to the following standards: -

Steel Pipes: SABS 719 and 720	:	SAZS. 102
Welding of Steel Pipes	:	BS 2633
Steel Fittings and Specials	:	BS 534
Cast Iron Pipework	:	BS 2035 Class B This standard is for pipework but the same principles shall be applied to plain-ended pipework with necessary changes
	:	SAZS 141
	:	SAZS 243
Asbestos Cement Sewer Pipework:		SAZS 195
Asbestos Cement Pressure Pipework	:	SAZS 113 and 141
Concrete Pipes (other than agricultural drain pipes)	:	SAZS A17 Joint type as billed Dolomitic aggregate is preferred.



The piping must satisfactorily withstand British Standard Pipe male taper threading so that when jointed with screwed Galvanised Mild Steel fittings a strong watertight joint is made.

The Engineer will require copies of the test certificate of the material from which the pipes are made to be submitted with these first deliveries. If approved, all subsequent deliveries shall be of a similar mixture and texture.

### **6.31 BOXES AND MARKERS**

Valve and hydrant boxes and markers are to be constructed to the pattern and in the manner shown on the Drawings.

### **6.32 GALVANISED MILDSTEEL WATER PIPING**

Galvanised Mild Steel water piping and fittings shall comply with B.S. 1387 and shall be medium thickness' class.

### **6.33 SAMPLES**

It will be incumbent upon the Contractor, before placing any order for materials, to provide samples at his own expense and to take every step necessary to ensure that the materials are approved by the Engineer.

Any material supplied which the Engineer may consider to be inferior to the sample so submitted and approved shall not be used, but must be removed by the Contractor from the Site immediately the Engineer to that effect gives instructions.

### **6.34 PACKING AND DELIVERY**

The Contractor must make his own arrangements for the supply and delivery of all materials required for this Contract. He shall arrange for all materials to be carefully packed so as to ensure safety and efficient transport by road or rail and his prices shall allow for all packing necessary to attain this condition.

The Contractor shall carefully examine all material upon delivery at the site of the Works and shall remove and replace at his own expense all materials showing defects or damage of any description.

All breakage or damage to materials shall be made good at the expense of the Contractor.

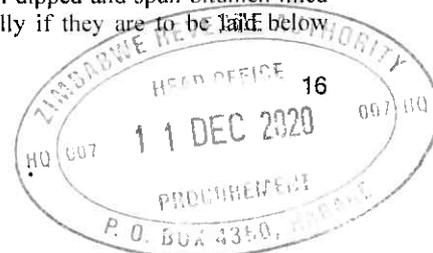
All timber or metal packing materials, which are not returnable to the supplier against a refund shall become the property of the Employer.

Concrete Pipe Fittings, Precast Manholes and Inspection Chambers	:	SAZS A 29
Earthenware Pipework	:	SAZA16
	:	BS 65/540 Part 2 for Flexible Mechanical Joints
PVC Pipework (to be of suitable composition for the liquid to be carried and comply generally with the Standard)	:	CP 312 and BS 1972 or 1973 or SAZS K21 or K28

Asbestos cement pipework may be of various classes and the Contractor must distinguish carefully between these. All casting and, where specified, all asbestos cement sewer pipes, shall be bitumen coated.

Steel pipes and fittings up to 150mm nb are to be hot-dip galvanised and, if exposed, scrubbed external with a galvanised iron primer, one undercoat and two coats enamel.

Larger steel pipes and fittings are to be sand or shot blasted, hot bitumen dipped and spun bitumen lined 3mm thick, and double fibreglass/bitumen sheathed 5mm thick externally if they are to be laid below



ground. These thicknesses shall be minima measured over the weld bead. The manufacturer shall provide an approved instrument for non-destructive testing of thicknesses, and a holiday detector operating at 10 - 15 KV for checking continuity, and carries out tests at his factory to the satisfaction of the Engineer's Representative/Employer's Inspector, repairing all holidays and defects.

Exposed pipework shall be supplied bitumen dipped externally and painted on site with two undercoats and one top coat of approved colour if indoors or two coats bituminous black or aluminium paint (as billed) if outdoors; for these particular care shall be taken to ensure a thin even exterior dip coat e.g. by the use of a squeegee after dipping, the lower undercoat shall be interior/exterior PV

The exterior sheathing of all fabricated steel pipes and fittings is to be painted with one coat Carbox limewash. Both sheathing and limewash are to stop 175 mm short of a plain pipe end; two coats of non-toxic bituminous tank black to be applied to the unsheathed section after wire-brushing and the finished pipe end is to be suitable for a flexible coupling and the completion of external protection after laying.

If, in the opinion of the Engineer, the size or test pressure of any fitting requires that it be reinforced with crotch plates or similar strengthening, the Bill will demand this. The manufacturer shall undertake the design of the reinforcing.

All those parts of the coupling in contact with the liquid in the pipeline shall be sand or shot-blasted, primed and painted with two coats of a white epoxy resin or other approved and taint-free paint. The remaining surfaces of the coupling are to be protected by wire-brushing and painted with two coats of approved paint.

Rubber rings for flexible joints shall comply with SAZ 196.

Couplings shall be supplied assembled complete with all bolts and nuts and the rubber joint rings supplied in separate bags labelled by joint size.

All PVC and polythene pipework and all rubber rings for joints, etc are to be stored under cover in the shade.

### **6.35 FLANGED JOINTS**

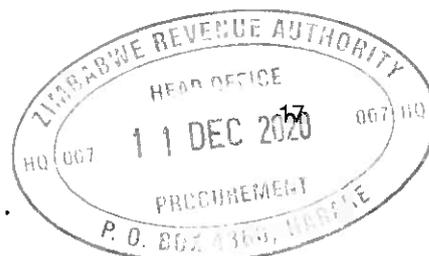
Flanges shall comply with BS 4504 except that bolts of non-preferred diameter shall be replaced by preferred bolts one size smaller and the flanges drilled to suit. Flanges shall be slip-on plate flanges, machined and spirally grooved; a protective coating shall be applied immediately to prevent rust. The sealing face of a flange welded to a pipe shall not be concave but a convexity not exceeding 15% of the flange or fitting, the distance from the end pipe to the front of the flange or fitting, the distance from the end of the pipe to the front of the flange before welding shall not exceed the thickness of the pipe wall by more than 2mm.

Joining gaskets shall be from rubber reinforced jointing material conforming to the requirements of Section 3 of BS 5292 with a thickness of 3.2 mm and hardness of 60 IRHD.

Each set of joining material shall be supplied in a separate bag and suitably labelled.

### **6.36 FLEXIBLE COUPLINGS**

Flexible couplings are to be suitable for use with the plain ended pipes and fittings supplied and rated for the factory test pressure applicable to the matching pipework. The barrel of a flexible couplings is to be fabricated to facilitate easy and watertight deflection of the pipework; metal barrels shall therefore be concave internally or alternatively cambered.



Flexible couplings for steel pipework shall be of approved pattern without central register and with a robust and continuous upstanding flange capable of withstanding without visible deflection a load in the flange bolts well in excess of that corresponding to the recommended torque. The same principle of robust design shall apply to the whole coupling. Couplings are to be self-centering on the pipework and afford effective restraint to the rubber sealing rings to prevent these being blown out under pressure or sucked in under vacuum. All those parts of the couplings in contact with the liquid in the pipeline shall be sand or shot-blasted primed and painted with two coats of a white epoxy resin or other approved and taint-free paint. The remaining surfaces of the couplings are to be protected by wire brushing and painted with two coats of approved paint.

All sand blasting must produce a finish equivalent to Standard two and half of Swedish Specification SIS 05 5900-1967, which, requires the removal of most traces of mill scale, rust and foreign matter.

Rubber rings for flexible joints shall comply with SAZS 196.

Couplings shall be supplied assembled complete with all bolts and nuts and the rubber joint rings supplied in separate bags labelled by joint size.

### **6.37 CAST IN SITU MANHOLES**

The manholes may be either circular or square in plan, and if square they shall have minimum internal width equal to the diameter called for.

The base of the manhole is to be cast around the pipes entering and leaving the manholes, and up to the crown of the pipes in one pour. Benching shall be formed after walls are complete.

Walls shall not be less than 150mm thick and only steel shuttering shall be used for circular manholes, and this shall be strongly constructed to ensure absolute rigidity during pouring of concrete. Except with the written permission of the Engineer, the walls of each manhole shall be cast in one continuous pour and sufficient shuttering must be available to allow this.

Step irons should be cast into the wall but in certain circumstances they may be called into holes cut in the manhole walls using 1:2 cement mortar, mixed very dry, well rammed home and neatly finished flushed with the wall.

The price submitted for the construction of the manhole must include the supply, bending and fixing of reinforcement. A hole shall be formed in the roof slab over the steps irons. This hole shall normally be circular and 600mm in diameter. In order to be more suited to certain types of manhole frame, however, the Engineer may at his discretion require the hole to be of a different shape (probably square or triangular) although of approximately the same size. The price submitted will be deemed to apply to any of these possibilities, including all necessary modifications to reinforcement and shuttering.

The manhole frames shall be set in 1:3 Cement mortar on brick or block work with sides parallel to the wall of the shaft and tilted where necessary to conform with the general slope or camber of the road surface. The manhole shaft shall be a height that the closed cover shall be 150mm above ground level or at such level as the Engineer may direct. Should the frame, in the opinion of the Engineer, not be set correctly in position as regards slopes or level, the satisfaction of the Engineer.

The Contractor may be directed to set the manhole from directly on the roof slab or to cast it into the slab without extra cost.

## **SECTION III – WORKMANSHIP**

### **SECTION IIIA - EXCAVATION**

#### **7.1 TRIAL HOLES**



If at any time during the execution of the works the Engineer may require the Contractor to make trial holes for any purpose; such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of the General Conditions of Contract unless a provisional sum in respect of such work shall have been included in the Bill of Quantities. Such trial holes shall be made under the conditions prescribed for excavation.

## 7.2 CLEARING SITE AND SURFACE EXCAVATION

The term 'Clear Site' is to mean the removal of all rubbish and debris, which may have accumulated or been deposited on site; the cutting down and removing of all grass, shrubs and bushes; the felling of all trees having a trunk girth 250 mm or less measured 1m above ground, and the grubbing up and removal of roots, the filling-in of hollows formed by root holes with approved earth, and ramming.

Demolition and removal of structures where ordered shall be undertaken at rates to be negotiated or at daywork rates.

## 7.3 TYPES OF MATERIAL TO BE EXCAVATED

Excavation shall be carried out to the specified or necessary dimensions in all materials encountered. For payment purposes, material to be excavated shall be divided into three classes viz Rock, Hard Material and Soft Material all as generally described in Clause 4.4.8 of the 'Standard Method of Measurement of Civil Engineering Quantities for Rhodesia (Zimbabwe)' First Edition May 1975.

More specifically 'Rock' shall be defined as: -

- i) Solid undecomposed boulders exceeding 0,10m in volume; or
- ii) Solid unweathered crystalline material in bulk, or in banks or ledges, which in Engineer's opinion cannot be broken up or removed except by the use of explosives;

and 'Hard Material' shall be defined as: -

that material, not rock, which requires the use of pneumatic tools, mechanical breakers, or special cutting tool to mechanical excavators for its practical removal.

## 7.4 BLASTING

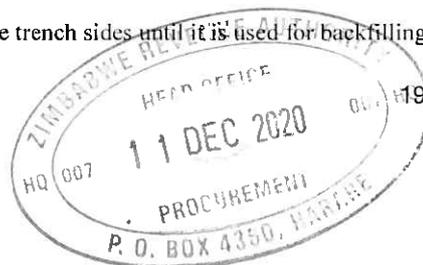
Where the Contractor proposes to excavate by blasting, the authority of the Engineer shall first be obtained. The Contractor will be held responsible for ensuring that the explosive charges used are not excessive, that charged drill holes are properly protected before being fired, that proper precautions are taken for the safety of persons and property and that only licensed persons be engaged to carry out blasting work.

When the excavation of rock is being measured, no allowance will be made for any excess excavation or filling above the net length and width of dimensions specified. Excess may be allowed where it results from the use of minimum charge sizes and cover, laid down by regulations.

## 7.5 METHODS OF EXCAVATION AND BACKFILLING

The methods of excavation and backfilling adopted by the Contractor shall be subject to the approval of the Engineer. In general open trench excavation methods will be favoured, but excavation by means of short headings may be approved. The headings are to be broken down when backfilling. Payments for excavation-using headings will be made as though open trench methods have been employed.

Material excavated from trenches is to be placed well clear of the trench sides until it is used for backfilling



or spread as directed.

## **7.6 TRENCHING AND BACKFILLING**

### **(a) Trench Widths**

The base width of the trench dug for any pipeline is to be such as to permit adequate access for all operations necessary to fulfill the requirements of the contract, having regard to the methods used, and shall be subject to the approval of the Engineer. For purposes of measurement and payment the trench will be deemed to be of a uniform width throughout, 500mm in excess of the internal diameter of the pipe, but not less than 550mm for sewer and stormwater pipes. Trench widths for PVC pipes are to be 300 mm in excess of internal diameter of pipe. Contractor has to allow for working room in his rates where this is necessary and required.

### **(b) Trench Depths**

(i) For water pipes, trenches are to be dug so that in general the depth of cover from the top of the bedded pipe to finished ground level is not less than the following: -

Under Roadways	1200mm
Elsewhere	750mm
Service Connections	450mm

If so directed by the Engineer, minor depressions in the surface will be disregarded in determining the general pipe level. Pipe gradients will normally follow the general slope of the ground, ignoring the occurrence of local irregularities as anthills.

Sewer pipes will usually be laid at such depths as to allow water pipes, laid as described above, to pass over them. Water mains of 50mm internal diameter and over will, however, generally pass below stormwater pipes and channels, necessitating water pipe trenching deep enough to afford clearance. Changes of grades and direction accommodated in the pipe joints or by pipe flexure shall be within the pipe manufacturer's recommended safe limits and trenches are to be dug accordingly.

- (ii) For sewer pipes, depths of trench are to be deducted from the drawings, having regard to the type of bedding to be employed, and manhole invert.
- (iii) Levels for stormwater pipe depths, will be governed by the considerations outlined in Section IIID.

### **(c) Hollows and uneven Trench Beds**

All hollow and uneven places caused by inaccurate or unnecessary excavation in the bottom of trenches, shall be completely filled in with cement concrete (Grade 10 Mpa) or at the Engineer's discretion, with rammed selected fill material or river sand, all at the Contractor's expense. Hollows left at the bottom of trenches caused by the excavation of boulders shall be filled in with similar cement concrete or sand fill and will be measured and paid for. In pipe trenches excavation shall be to the depth of the underside of the barrel of the pipe. The bottom of all excavations shall be trimmed, dressed and rammed in such a way that the pipe barrels rest on a solid foundation from joint to joint. The tendered price for trench excavation shall include for the excavation of all joint holes in the bottom of the trench. Where the bottom of the trench is composed of rock, the excavation shall be taken out to 75mm below the underside of the barrel of the pipe, and the pipe shall be laid on a firm bed of approved soft material, unless the Engineer shall direct, in special cases, the use of river sand concrete Grade 10 Mpa for bedding.



(d) **Trench Lengths**

The permissible length of trench opened up ahead of pipelaying is to be subject to the approval of the Engineer.

(e) **Backfilling Trenches**

Backfilling of trenches shall be carried out as soon as possible after the pipe has been laid. Where the pipe surround does not extend up to a level of 300mm above the top of the pipe, specially selected material of a maximum particle size 12mm shall be laid and evenly compacted with the addition of water in 150 mm thick (after compaction) layers to that level, each layer being hard compacted to 90% LCE (Lower Compactive Effort). Unless otherwise specified the remainder of the backfill shall be of material excavated from the trench, laid and compacted with the addition of water in layers 300 mm thick (after compaction), each layer being compacted to 90% LCE.

(ii) **Backfill to Trenches across Roads and Hardstandings**

Where trenches cross surfaced or gravelled roads, lanes or paved areas, or across which are eventually to be surfaced or paved, the trenches shall be backfilled as described over under 'General Backfill' except that: -

- (1) all backfill material shall be approved by the Engineer before backfilling may commence;
- (2) each layer of backfill shall be compacted with the addition of water to 100% L.C.E.
- (3) the last 450mm backfill shall be compacted to the density specified by the Engineer which shall not exceed 96% mod ASSHTO.

(iii) **Field Density Tests**

The Engineer may control compaction in trench fill by taking a minimum of two Field Density Tests at points selected at random in the backfill. These tests will be regarded as being typical of the backfill under examination, and should any of these tests show that the compaction fails to achieve the required densities the contractor shall, at his own expense, take all necessary steps to ensure that the required densities are achieved. The Engineer will make routine and systematic Field Density Tests in all backfill where trenches cross roads and other areas described in paragraph (ii) above. The Contractor is advised that particular importance is attached to these backfill procedures, which must be rigorously adhered to.

(iv) **Maintenance**

At the ground surface the filling shall be banked to about 100mm above the level of the adjacent ground surface and shall be thus maintained until the completion of the period of maintenance and/or until surfacing has been laid, where this period is less than the period of maintenance.

(f) **Measurement and Payment**

Payment for trench excavations and backfilling for water mains, sewers and stormwater will be by length along the pipe centre line, at the various ranges of depth to pipe invert, billed for each diameter of pipe.

The prime rates shall relate to excavation in "Soft material" as defined. The lineal measurement will be continuous through manholes, valve boxes and the like. The additional excavation for such structures shall be covered in the individual rates for such items.

Payment for excavation in "Hard material" or Rock will be by volume as an extra over excavation in soft material. For measurement purposes widths will be taken as stated in Clause 7.6(a) and depths as the actual depth to the underside of the pipe bedding specified.

Rates for excavation are to include for the provision of extra working room required for installing joints, fittings, valves or other appurtenances, for backfilling as specified, for spreading and leveling surplus material within 1000m free haul, for all items listed in Clause 3.14 and for all other contingent operations described or implied that are not separately billed.

Where excavation is complete but backfilling is not, the Contractor may claim for payment at 60% of the appropriate rate for the complete operation. The balance will be paid only upon satisfactory completion of the backfilling.

(g) **Planking and Strutting**

The Contractor shall allow in his rates for excavation for all necessary planking and strutting to excavations to ensure the safety of the workmen and to prevent any movement, all to the satisfaction of the Engineer and to comply with relevant regulations.

All responsibility for the foregoing shall rest with the Contractor and should any ground fall in due to the omission or insufficiency of the planking and strutting, it will not be paid for as excavation and must be dug out and deposited on site, returned, filled in and rammed or carted away and the depression filled in with concrete as previously described or as directed by the Engineer entirely at the Contractor's expense.

(h) **Keep Excavation Clear**

The Contractor shall allow in his rates for excavation for all necessary baling and pumping by hand or machinery, to keep the excavations free from water. He shall provide all necessary day and night attendance so as to ensure that no water is allowed to accumulate in the excavations and the inverts or bottoms restored to the conditions specified.

(i) **Setting out the Work**

The Contractor will be provided with plans and sufficient reference pegs at the Site of Works to enable him to set out the work. Once datum pegs have been placed by the Engineer, the Contractor shall be responsible for preserving them and for all further setting out and levelling.

(j) **Sight Rails**

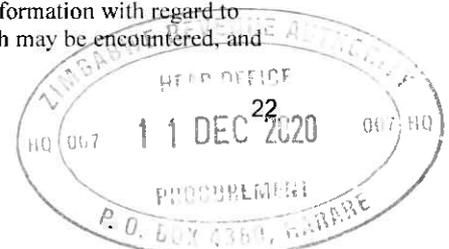
Unless the Engineer considers that they are unnecessary, sight rails shall be erected along the line of any pipe trench at convenient intervals not exceeding 500 meters. Sight rails shall be of Substantial construction and painted on both sides in black and white in such a manner as to indicate clearly the lines and levels' suitable boning rods shall be provided for use with them.

Each sight rail shall consists of two posts firmly planted, one on either side of the trench, and horizontal rail 150mm deep with the top edge planed true and smooth, firmly fixed to the posts. The centre line of the pipe shall be indicated on each sight rail at both the front and the back.

Sight rails shall be left in position until pipes are laid, and the Contractor will be held solely responsible for errors in the excavation of the Work due to any cause whatsoever, including disturbance of sight rails or faulty setting out there from.

(k) **Protection of Existing Pipes, Cables, Services and Services**

Before commencing any excavation, the Contractor shall obtain full information with regard to the position of any water mains, cables, drains and other services which may be encountered, and



he shall notify the proprietors concerned before commencing excavation in the vicinity of any service. He shall at all times exercise the utmost care not to cause any disturbance or damage to services or structures.

Where trenches cross any services or structures the work of excavation shall be carried out wherever possible, by means of headings so as not to disturb them. If electric and telephone cables are exposed in the course of excavation, the Contractor shall immediately notify the proprietors concerned and shall not refill the trench around such cables until the cables have been inspected and passed in writing as intact by their respective owners. See Clause 3.7 and 3.8.

(l) **Timbering and Strutting on Side Sloping**

The contractor's rates for excavation shall allow for any timbering and shoring required and in this connection attention is drawn to the Factories and Works Regulations in regard to the minimum standards for timbering excavations.

The contractor shall assume full responsibility for the safety of excavations, and shall carry out all measures necessary to make the work secure, by timbering and strutting the excavated face or by side sloping where it is not required to act as a mould to concrete work. All timbering and strutting must be of sufficient strength and suitably arranged to permit the placing of concrete and formwork and the laying and jointing of pipes; it must be possible to remove the timber readily as the work proceeds.

If at any time the Engineer considers that an excavation requires additional timbering or support, he may direct the Contractor to provide whatever additional support he considers necessary; the Contractor shall then immediately comply with all these directions without additional charge. Where trenches are timbered and shored, they shall be left thus until after laying and jointing the testing of pipes, and the Contractor's prices must provide for and will be held to be inclusive of the cost of the use of such timbering and shoring for the whole of this period.

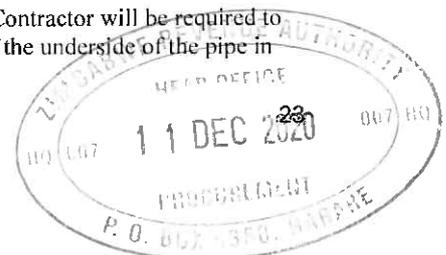
Where an order in writing is given by the Engineer for timbering to be left in place, payment will be allowed for it at the rate to be quoted by the Contractor against the provisional item allowed in the Bill of Quantities to cover such a contingency. The methods of timbering most commonly required will be: -

- (i) Single walling of 225 x 75 mm timber, strutted at right angles with steel trench struts at centres not exceeding 2 metres.
- (ii) double walling, the upper set normally 1 metre below ground level and the other lower but clear of all construction work, both strutted in the same vertical line.
- (iii) Poling Boards of 225 x 75 mm timber placed vertically on each side of trench at a spacing not exceeding 1,5 metres and supported by strutted walling. Intermediate poling boards, i.e. those between struts, may be 225 x 50mm and wedged back from the walling, this system shall be used where the ground is soft and there is a danger of slips and the spacing of the poling boards is to depend upon the nature of the ground. In very bad ground these will be placed side by side, so that the sides of the trench will be afforded continuous support.

In areas where shrinkage can occur the method of timbering must allow props to be tightened each day.

(m) **Additional Excavation Below Underside of Pipe in Rock, Hard Material or Clay**

Where rock, hard material, pot clay or other material occurs, of such a nature that a firm and even bed cannot be readily obtained for the proper grading of pipes the Contractor will be required to excavate the trench to a depth of 75mm below the required grade of the underside of the pipe in



rock or hard material, or 150mm below in clay or soft material, for the full specified width of the trench and shall refill this space with approved filling property compacted to 95% Lower Compactive Effort, as determined by test described in SAZ 185, Part I, before laying commences.

The items in the Bill of Quantities allow for excavation, trimming, refilling and compaction.

As an alternative, concrete bedding may be specified, and an item is also allowed to cover the additional excavation, trimming, concrete and any shuttering required.

(n) **Backfilling and Construction of Subgrade Adjacent to Precast Arch Culverts**

A separate item had been provided in the Bill for the fill adjacent and to 500mm above the arch culverts.

This fill shall be constructed in horizontal layers of not more than 200mm thickness using approved granular material for the full height of the embankment. Compaction of approved filling shall be controlled and to a density of 93% H.C.E. unless otherwise specified. A separate item has been provided in the Bill for the fill adjacent, and to 500mm above, the arch culverts.

The backfill material is to be brought up equally to both sides of the arch at the same time in order to be brought up equally on both sides of the arch at the same time in order to eliminate the possibility of vertical skewness.

The compaction equipment is to be kept a little away from the concrete arch in order not to damage the thin concrete shell.

## SECTION IIIB – PIPELAYING

### 7.7 GENERAL

(a) **Preliminary**

A prime function of any type of bedding adopted shall be to provide even support throughout the length of the pipeline. No pipes or fittings shall be laid unless the Engineer or his representative has inspected and approved the trench immediately beforehand. Immediately before laying each pipe and fitting is to be inspected internally and externally for damage or defects and all stone, soil, dirt or foreign matter is to be removed.

Generally, pipelaying shall always be carried out from the lower to the higher end. Pipe sockets shall always lie upstream of spigots in each individual length of pipe.

In general, water pipes will not be laid to predetermined depths or gradients. The depth will be fixed as described in Clause 7.6 (b). The trench floor shall be trimmed as necessary to meet the specified bedding requirements.

Sewer invert levels will be shown on the Drawings. The method of ensuring the accurate laying of such pipes to the required lines, levels and gradients, whether by means of sight rails and boning rods, or by means of crown and side lines, or by any other means, shall be at the Contractor's discretion as long as the provisions of the Contract are met to the Engineer's satisfaction.

During breaks in continuity of pipe laying, open ends shall be suitably plugged to prevent ingress of soil or any other foreign matter.

Open ends of junctions or pipework intended for stand connections are to be closed off after



testing, using end cap or other approved means.

**b. Handling of Materials**

The Contractor shall be responsible for supplying, transporting, off-loading, storing and distribution of pipes and fittings throughout the site.

**c. Laying to Gradients**

All pipelines shall be laid to regular gradients either as indicated on the drawing or as dictated by specified cover consideration or as fixed by consecutive manhole invert levels.

**d. Cutting**

Cutting of pipes shall be kept to the minimum required for the works to conform with the drawings and specifications.

On asbestos cement pipes, cut ends on to which a joint is to be fitted shall be turned on the correct external diameter for the joint by means of the special tool made by the manufacturers. This tool is to be provided by the Contractor.

No special payment will be made for the operations mentioned in this Clause, which are to be covered in the Tender's rates for pipelaying including for additional materials such as joint sleeves and all contingent operations described or implied.

**e. Setting Valves and Fittings**

All valves and fittings shall be set correctly in the positions shown on the drawings and shall be bends, tees, and fittings of any kind where the use of plain-ended pipes with non-positive flexible couplings gives rise to unbalanced horizontal thrusts, and at any other points as directed by the Engineer. Concrete shall be kept clear of joints.

**f. Concrete Thrust Blocks**

Concrete Thrust Blocks as detailed on the Drawings shall be placed at all permanent end caps, bends, tees, and fittings of any kind where the use of plain-ended pipes with non-positive flexible couplings gives rise to unbalanced horizontal thrusts, and any other points as directed by the Engineer. Concrete shall be kept clear of joints.

Payment for Thrust Blocks will be by net volume and the all-in-rate shall include for extra excavation shuttering and all contingent items.

**g. Valve Chambers and Marker Plates**

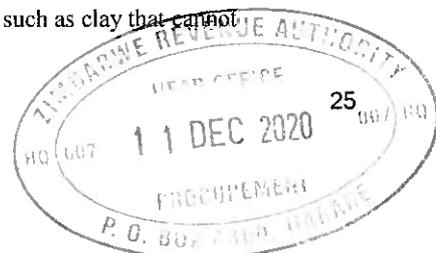
Valve Chambers shall be constructed in accordance with the Drawings and Marker Plates as detailed shall be placed at all chamber locations.

**7.8 ASBESTOS CEMENT PIPES**

**a. Bedding**

Unless otherwise directed, asbestos cement pipes, whether for water or sewage are to be added where practicable as illustrated and described in the Drawings for Class D2 bedding.

Where the trench passes through rock, or through any material such as clay that cannot



economically be trimmed to an even bed, or is otherwise unsuitable for bedding the pipe, the Engineer may direct that a layer of selected or imported material be provided below the pipe and be well rammed in the manner illustrated and described in the Drawings for Class D1 bedding leaving a compacted thickness of not less than 100mm of such material below the pipe barrel. Payment will be made for this operation, provided the unsuitability or unsoundness of the natural material of the trench floor is not due to any fault of the Contractor, such as failure to keep the excavation free from clean or pool water provided the Engineer has ordered such work in writing.

Payment for this operation will be made per cubic metre of bedding material based on the volume of a 100mm depth over the specified width. The rate shall include for importing, placing and compacting selected material from the trench excavation with a free haul of 1000 metres.

**b. Jointing**

Jointing of asbestos cement pipes shall be carried out in all respects in accordance with the manufacturer's recommendations. Unless otherwise directed, the appropriate asbestos cement joint shall be used for jointing adjacent lengths of asbestos cement pipe and asbestos cement fittings, but a cast iron plain-ended valve or fitting, and between adjacent cast iron fittings. Cast iron short or long collar joints may be required elsewhere, as may be specified or directed. Cast iron joints will be separately billed.

In general, joints between steel and asbestos cement water mains shall be made by matching the outside diameter of the steel to the asbestos cement, and installing cast iron short collar joint.

**7.9 EARTHENWARE AND CONCRETE SEWER PIPES USING**

**RUBBER JOINTING RINGS.**

**a) Bedding**

Unless otherwise directed, earthenware or concrete sewer pipes are to be bedded as illustrated and described on the Drawings for Class D2 bedding. Testing shall be carried out after the soil haunch has been compacted and before any backfilling is undertaken. In general selected soil from the excavated material will be acceptable for the soil haunch and the backfilling to 150mm above the top of the pipe.

**b) Jointing**

Jointing of earthenware or concrete sewer pipes shall be effected using rubber rings and shall be carried out in all respects in accordance with the manufacturer's recommendations.

**7.10 GALVANISED MILD STEEL WATER PIPES**

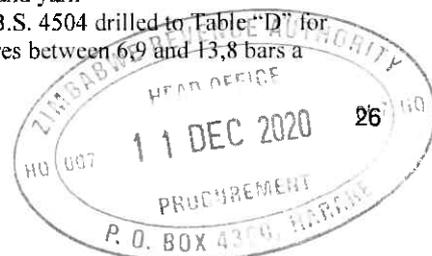
**a. Bedding**

Galvanised steel screwed and socketed pipes shall in general be bedded as illustrated and described on the Drawing for Class D2 bedding. Flexure of pipes to accommodate changes in grade and direction will be permitted within the manufacturer's recommended limits.

**b. Jointing**

Screwed joints between pipes and sockets or fittings shall be effected using an approved pipe jointing compound, complying with B.S. 217 or B.S. 1737, and yarn.

Flanges used for flanged joints shall be in accordance with B.S. 4504 drilled to Table "D" for working pressure up to 6,9 bars and to Table "E" for pressures between 6,9 and 13,8 bars a



required. Rubber insertion ring shall comply with B.S. 1737.

**7.11 POLYTHENE WATER PIPE AND PRV PIP**

e

jointing compound, complying with B.S. 217 or B.S. 1737, and yarn  
Flanges used for flanged joints shall be in accordance with B.S. 4504 drilled to Table "D" for working pressure up to 6,9 bars and to Table "E" for pressures between 6,9 and 13,8 bars a required. Rubber insertion ring shall comply with B.S. 1737.

**7.11 POLYTHENE WATER PIPE AND PRV PIP**

**a. Class of Pipe**

Polythene piping used as water piping shall be Type II Class (working pressure nine bars) unless otherwise directed.

**b. Bedding**

Polythene piping shall in general be bedded as illustrated and described on the Drawings for Class D2 bedding. The pipe bed and the material used for backfilling around and for 150 m above the pipe are to be free of stones or sharp objects that might cut or gouge the pipe.

**c. Laying**

To reduce tension on joints induced by contraction when its temperature falls, the pipe is to be snaked along the trench floor when it is laid. Backfilling is only to be undertaken when the pipe has cooled overnight or after filling with water. Payment will be made for the actual length of pipe laid.

**d. Jointing**

The Contractor is to follow exactly jointing and laying instructions as given by the manufacture Joints and fittings used with polythene water piping are to be of galvanised mild, steel, screwed on the threads cut in the pipe. The dies used for thread cutting on polythene pipe shall be fixed dies and shall have been used on polythene pipe only. The use of adjustable dies will not be permitted.

When cutting a thread, a suitable mandrel is to be fixed in the open end of the pipe to prevent distortion and twisting.

When screwing a joint or fitting, on to the pipe, care is to be taken to avoid stripping the thread. To this end the use of tools such as pipe wrenches or spanners will not normally be permitted and tightening is to be effected by hand.

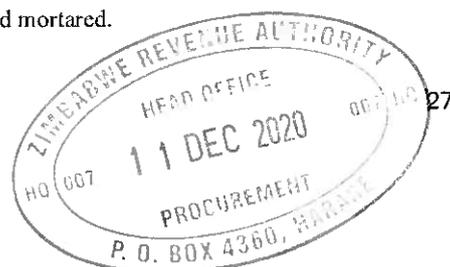
**7.12 STORMWATER PIPES**

**a. Bedding**

Unless otherwise directed, stormwater pipes are to be bedded as illustrated and described on the Drawings for Class D2 bedding.

The Contractor may be permitted to use a method of bedding other than that described, if approved by the Engineer.

Pipes shall be laid with the ogee joints fully home and mortared.



### **7.13 SPECIAL BEDDING**

Where directed by the Engineer, bedding of the Class A, Class B or Class C type illustrated and described on the Drawings, or a concrete surround as shown on the same drawing, shall be used.

### **7.14 TESTING**

#### **a) General**

The Contractor shall conduct the tests prescribed herein as construction work progress, repeating any test as often as may be necessary to achieve a satisfactory result.

All tests shall be conducted in the presence of the Engineer, and over such lengths of pipeline as he may direct.

Unless otherwise instructed, the Contractor shall proceed expeditiously with the backfilling of any length satisfactorily tested.

No special payment will be made for testing, and the Tenderer shall allow for the cost in his pipe laying rates.

#### **b) Pressure mains and Connections**

Pressure mains, service pipes across roads, and underground building connection pipework are to be simultaneously tested after installation, by applying internal water pressure, before any bedding material or backfilling is placed around the joints, or the service connections.

Any bedding and partial backfilling executed clear of the joints to anchor the installation during testing shall be carried out strictly in accordance with the clauses of this specification relating to those operations.

All permanent thrust blocks in the section to be tested shall be in position and the concrete set before any testing is undertaken.

The ends of the mains in the test section are to be closed off for test purposes with temporary blank end-caps, which are to be adequately strutted to prevent movement whilst testing. The ends of underground connection pipework are to be closed off with galvanised steel double socket unions and plugs which are to be left in position until the building connections are completed at a later date. Stopcocks may be substituted for socket unions if shown on the drawing.

Clean water is to be introduced into the pipework, and any trapped air released as far as is practicable. Where appropriate, the water is to be allowed to stand in the pipeline for long enough, in accordance with the pipe manufacturer's recommendations, to allow for water absorption by the pipes and joints.

The test pressure is to be introduced into the pipework, shall be as noted in the Bill of Quantities, measured at the lowest point of the section under test.

The test pressure to be applied by means of a suitable pump with all necessary equipment, supplied by the Contractor at his own expense. When the test pressure has been reached, the test section shall be sealed off by means of a suitable stopcock for the period of the test, which shall be at not less than 30 minutes.

A test shall be considered satisfactory if: -



- (i) there is no drop in the test pressure at the end of a period of 30 minutes or if
- (ii) not more than 0,1 litres of make-up water per mm of pipe diameter per 24 hours per Kilometre length of pipeline, is required to maintain the test pressure, and that this Quantity of make-up water progressively decreases in three successive tests of 30 minute each.

A minimum number of 90 per cent of all pipeline tests carried out shall comply with condition (i) above i.e. they shall register no drop in test pressure over a period of 30 minutes.

Where a satisfactory test is not achieved and no source of leakage can be established, either by inspection or by isolation of pipe lengths for individual testing, then the Engineer may call for a longer test period extending up to 72 hours to establish whether the applied pressure will stabilise.

The Contractor is to include in his billed rates for any attendance required at such extended tests.

**c. Gravity Sewers**

Applying internal air pressure will normally test gravity sewers and building connections

When pipework is to be bedded in material other than concrete, the test is to be conducted after the pipe has been bedded, but before any backfilling is placed

Where concrete is specified in the bedding, the test is to be conducted when the pipe has been laid true to line and level but before any concrete is placed on contact with the pipe barrels.

Sewer mains will normally be tested between manholes. The section of pipe to be tested is to be suitably plugged at all open ends and an internal air pressure equivalent to 150mm head of water is to be applied. The pressure is to be maintained for a period sufficient to allow for the stabilisation of the air temperature. The system shall then be sealed off at this pressure, and the test shall commence.

For a satisfactory test, no discernible drop in pressure as indicated by a U-tube shall occur over a period of 5 minutes.

If the Engineer considers that conditions at the time of the proposed test are unsuitable, because of temperature or other factors, for a reliable air test to be conducted, he may order that the test be deferred until he considers conditions are favourable.

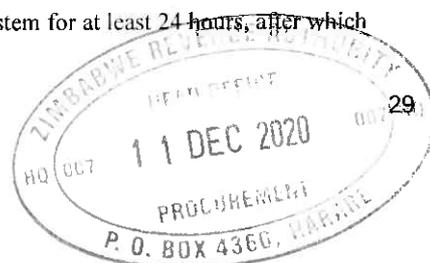
**d. Stormwater Pipes**

Stormwater pipes will not normally be tested for water-tightness.

**7.15 STERILISING WATER MAINS AND BUILDING CONNECTIONS**

Having obtained satisfactory tests on each section of the water reticulation, the Contractor shall empty the section and flush it out thoroughly. The Contractor shall then refill the system with water from the Municipal mains at a controlled rate, at the same time introducing into the water a suitable sterilising chemical containing chlorine at such a rate that a dose of 0,03 ml of chlorine is applied to each litre of water.

The chlorinated water shall be allowed to stand in the system for at least 24 hours, after which



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the Contractor shall once more flush out the system and refill it with water from the Municipal mains.

The Engineer will arrange for bacteriological tests of water in the system after completion of the operations. If these tests are unsatisfactory, the Contractor shall repeat the sterilisation at his own expense and continue so doing until satisfactory bacteriological tests are obtained.

No special payment will be made for sterilising water mains and building connections and the Contractor is to allow for the cost in his rates for pipelaying.

**7.16 MEASUREMENT AND PAYMENT**

**a. Pipes**

Payment for pipes supplied, laid bedded as specified in Clauses 7.8 to 7.12 inclusive, jointed as specified, and tested and sterilised if so required, shall be per lineal metre measured along the centre line of the pipeline. The rate shall include for sleeve joints in the case of asbestos cement pipes.

In measuring the length for payment, no deductions shall be made for joints, valves, fittings or specials, but on sewers and stormwater pipes the gap between the ends of pipes within manholes, junction boxes, catchpits, etc shall not be included in the measured length.

**b. Special Bedding**

The unit for measurement of special bedding shall be the cubic metre in place of concrete or crushed stone as the case may be, to the net dimensions indicated on the Drawings and the rate shall include for any excavation in normal material in excess of that for normal bedding, and for any shuttering required.

**c. Valves, Fittings and Specials**

Payment for supplying, laying and jointing valves, fittings and specials and for cast iron flexible joints shall be per unit or item as an extra over the pipelaying item.

**d. Scope of Rates**

The Contractor's rates shall include for all labour, materials, power, transport, plant, testing, sterilising new water pipes, and for all contingent operations described or implied that are not separately billed.

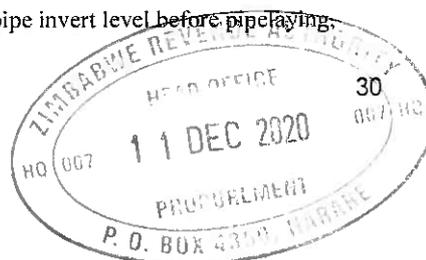
**7.17 SEWER MANHOLES**

**a. Construction**

Unless otherwise directed, manholes shall be constructed so as to conform to the Drawings supplied. Full details of any alternative design, which the Contractor wishes to use, must be submitted, with his tender, for consideration. Drawings and full technical details must be furnished.

Where there is a change of direction at a manhole, the channel shall be formed with the greatest practicable horizontal radius of curvature so as to ease the flow. In general the slope of channel invert shall be that of the outgoing pipe.

The lower part of the manhole base slab shall be poured to pipe invert level before pipelaying.



and the upper part after pipelaying. In clay or similar soil, the Engineer may direct that backfilling in contact with the manholes shaft shall be of crusher dust or other approved material for such thickness not less than 75mm as may be directed.

The permissible tolerance in the level of a manhole invert shall be 15mm above or below the level specified sewer gradient between two manholes is 1,25% (1 in 80) or less, the "as built" gradient shall not be less than nine-tenths of that specified.

**b. Testing**

Completed manholes shall be subjected to a water-tightness test. The manhole shall be filled with water to the top of the cover level and left for 24 hours. Thereafter, the water level shall be restored to top cover level. After the elapse of one hour, there shall be no signs of leakage or weeping and there shall be no discernible drop in the water level.

**c. Measurement and Payment**

Payment for manholes of each particular chamber diameter will be made as a lump sum per manhole up to 1,5m depth and depth in excess of 1.5 m

The depth will be measured from the invert level of the channel to the underside of the manhole cover frame.

The rates entered in the Bill of Quantities shall include for extra excavation beyond the normal trench width and depth in normal material and for all labour and materials and contingent operations required to complete the construction of the manhole in accordance with the specification and drawings. They shall include for make-up concrete or concrete or brickwork and plastering beneath the cover, and for the supply, delivery and fixing in place of a medium duty cast iron manhole cover and frame. Heavy duty covers shall be measured and paid as an extra over item. Step-irons are not included in the rates.

No extras will be allowed for bends or junctions in the main sewer or for connections into the chamber.

The rate per manhole shall include for all excavation, backfilling labour, materials, step irons and incidental expenses involved in testing the manhole for water-tightness as specified.

Payment for special backfilling around manhole shafts shall be by the cubic metre in place.

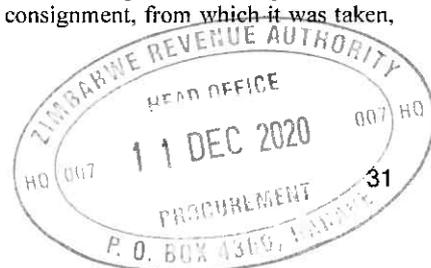
**SECTION IIIC - REINFORCED CONCRETE**

**7.18 SUBMISSION OF SAMPLES**

Before the commencement of the work, samples of sand and aggregate intended to be used shall be submitted to the Engineer for approval. The quantities to be submitted are to be as follows: -

Sand	5kg
Stone etc.	10kg

Tests shall be carried out to monitor compliance with specifications, and representative satisfactory samples shall be kept by the Engineer. A sample shall be taken from each consignment arriving on site and where this does not match up with the approval sample, the whole consignment, from which it was taken, shall be rejected and removed from site.



### 7.19 STORAGE OF AGGREGATES

Aggregates shall be stored in separate heaps on the site in such a manner that the material cannot run into one another or be fouled with earth, grass or other impurities. Aggregate piles shall be no more than 2 metres high.

### 7.20 CONCRETE

#### a. General

Concrete mixes required for various parts of the works are indicated on the Drawings and/or in the Bill of Quantities, and are designated by their characteristic strengths in N/mm (Mpa) in accordance with the provisions of British Standard Code of Practice No. BS 8110 Table 1 below, which is an abstract from that code, gives details of the prescribed concrete mixes which may be used on the Works.

Unless otherwise directed the Contractor shall comply with all the relevant provisions of BS 8110: 1985 for proportioning, whether by mass or by volume, and mixing concrete. Proposed methods for transporting and placing concrete shall be submitted to the Engineer for approval before any work is commenced. Concrete shall be placed with due dispatch after mixing.

TABLE I

#### PRESCRIBED MIXERS FOR ORDINARY STRUCTURAL CONCRETE WHERE AGGREGATES ARE BATCHED BY WEIGHT

GRADE (MPa)	NOMINAL SIZE OF STONE (mm)	QUANTITIES OF AGGREGATES (KG/SACK)				MAX ALLOW. AMOUNT OF WATER (LITRES) /SACK	MIN CEMENT CONTENT SACKS/ CU.M	MIN CURRENT MARGIN (MPa)	CEMENT WATER RATIO
		SAND	STONE (MM)						
		40	20	10					
5	40	220	225	125	-	42.0	3.3	3	1.19
	20	240	-	305	-	42.0	3.6		1.19
10	40	160	200	95	-	32.5	4.3	5.0	1.54
	20	170	-	225	-	32.5	4.7		1.54
20	40	100	140	65	-	24.0	6.1	11.0	2.08
	20	110	-	165	-	23.5	6.6	15.0	2.13
	10	125	-	-	110	23.5	7.4		2.13
25	40	90	132	66	-	22.0	6.6	15	2.27
	20	100	-	150	-	22.0	7.2		2.27
	10	110	-	-	100	22.0	8.0		2.27
30	20	90	-	145	-	20.5	7.7	15	2.43
	10	100	-	-	95	20.5	8.6		2.43

**NOTE:** Provided the sum total of the quantities of sand and stone for a mix is not altered, the proportions of sand and stone for a mix is not altered, the proportions of sand and stone may be revised by +/- 15Kg. Maximum slump - 60mm.

- Notes :
- Weights of cement and total dry aggregates in Kg to produce approx 1 cu.m of fully compacted concrete.
  - Fine Aggregate expressed as percentage by weight of total dry aggregate.
  - In each mix, the concrete grade number is also the 'Characteristic Strength' of the mix.



4. No fines concrete shall be made by thoroughly mixing 10 parts of coarse aggregate to 1 part of fine aggregate to 1 part of cement.

Construction joints shall be avoided as far as possible. Where they are necessary, the surface of the old concrete shall be roughened and all laitance and scum shall be removed. Immediately before placing the fresh concrete, the joint face shall be wetted and coated with a thin layer of neat cement paste.

After concrete has been placed, appropriate measure must be taken, as approved by the Engineer, to prevent the concrete drying out too rapidly.

All finished concrete must be sound, and any that is honeycombed or is in any other way defective may be rejected by the Engineer. In such cases it is to be broken out and replaced at the Contractor's expense.

**b. Placing**

The contractor shall give to the Engineer a minimum of 72 hours notice of his intention to place concrete.

An experienced person, skilled in this class of work, shall be in charge of mixing and placing throughout the concreting operations, whether plain or reinforced.

All concrete shall be transported in a manner to avoid any segregation of materials and placed as rapidly as possible after mixing and before initial set takes place. It shall be deposited as neatly as possible in its final position in small quantities, so as to avoid remanding or flowing. In no case is concrete to be dropped from a height of more than 1,5m except when prior approval has been obtained from the Engineer.

Care shall be taken to ensure that the reinforcement is not displaced from its correct position and that the concrete entirely surrounds the rods. Once placed in position the concrete is to be left undisturbed and protected from vibration, loading, excessive temperature variations and rapid drying out. In walls, the concrete shall be placed in horizontal layers about 150mm thick.

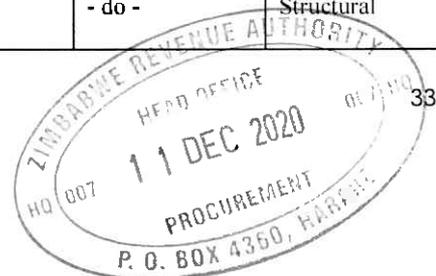
**c. Slump test**

Slump tests in accordance with BS.1881 shall be carried out at regular intervals during mixing and at the request of the Engineer. Tests to be carried out at the expense of the Contractor.

TABLE II

TABLE OF CONCRETE MIXES

GRADE OF CONCRETE (MPa)	MAXIMUM AGGREGATE SIZE	SLUMP LIMITS	TYPE OF CEMENT	INDICATED CLASS
10A	20	25 - 75	Portland of PC 15	Blinding
10B	40	50 - 100	- do -	Backfilling
20A	20	25 - 75	- do -	Structural
20B	40	50 - 100	- do -	Backfilling
25A	20	25 - 75	- do -	Structural



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25B	40	50 - 100	- do -	Mass Sections
25 WR	20	25 - 50	- do -	Water Retaining
25 HA	20	25 - 50	- do -	Special Structures
30A	20	25 - 75	- do -	Structural
30B	40	50 - 100	-do-	Large Structural Section
30 WR	20	25 - 50	- do -	
40A	10	10 - 25	- do -	Special Structural Sections
40B	20	25 - 50	- do -	Structural
50A	10	10 - 25	- do -	Special Structural Sections
50B	20	25 - 50	-do -	Structural

**\* Concrete Mixes 25 WR and 30 WR**

To have a minimum cement content of 360Kg/cu.m.

**\*\* Concrete Mixes 25 HA**

To have a minimum content of 400 Kg/cu.m of high alumina cement.

**d. Weather Conditions**

Concreting shall not be carried out during frost conditions. During excessively hot weather, all exposed concrete surfaces which have recently been cast, shall be made suitable to the satisfaction of the Engineer to prevent or minimise the harmful effects of rain during placing of concrete.

**e. Test cubes**

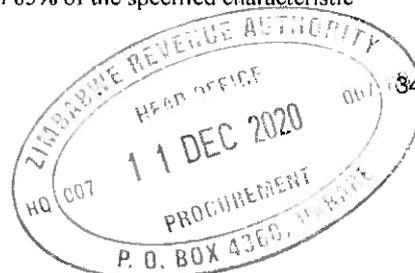
The contractor shall at his own expense cast die square cubes of concrete 150 x 150 x 150, as deposited in the work, as often as directed by the Engineer. Such cubes must be cast in the presence of the Engineer or his representative and in the form and manner described in B.S. 1881.

Test cubes are to be cast in groups of four and are to be tested as directed. They shall normally be taken from each 30 cubic metre of concrete or from each continuous pour of less than 30 cubic metres. They shall be marked with a distinguishing sign, which shall be entered in a Concrete Cube Log Book with origin of each cube and date of casting also entered.

**f. Acceptance Criteria**

Concrete shall be deemed to satisfy the cube test criteria if when tested at 28 days: -

- (i) The average crushing strength determined from any group of four consecutive test cubes exceeds the specified characteristic strength by not less than 0,5 times the current margin, and
- (ii) the crushing strength of each test cube is greater than 85% of the specified characteristic strength.



The "current margin" shall be two-thirds of the specified characteristic strength for concrete of Grade 7 10, and 15, and 15 Mpa for concrete of Grade 20 and 25.

Sampling, compacting and curing of test specimens shall conform to B.S. 1881. Cubes must be dispatched packed in damp sand and in good time to arrive for testing. Storage, packing and dispatching to the laboratory shall be at the expense of the Contractor.

**g. General**

The Contractor shall supply and deliver to the Engineer, at least six weeks before the placing of any concrete in the Works, suitable samples of the aggregates which he proposes to use in the concrete mixes.

The Engineer may direct the Contractor to dispatch these samples to a specified laboratory for approval of the materials, the detailed design of concrete mixes and the preparation and testing of trial cubes. The Contractor shall use only the mixes recommended by this laboratory, which for this Contract is likely to be the Cement and Concrete Institute, Harare. No concrete shall be placed until the Engineer has received from the laboratory, and endorsed, approval of the aggregates, the design mixes, and the results of the laboratory tests.

**h. Cost of Tests**

The cost of carrying out all tests as described together with all attendance, labour and materials etc, shall be deemed to have been included in the Contractor's rates for concrete (excluding compress strength tests). The cost of any tests, remedial action or any other steps that the Engineer may instruct the Contractor to carry out as a result of the failure, or apparent failure of the concrete shall be entirely at the Contractor's expense.

**Characteristic Strength.**

The characteristic strength determined from crushing tests shall be: -

Grade	Characteristic Strength at 28 Days MegaPascals Newtons per square millimetre
30	30
25	25
20	20
15	15
10	10

**(i) Measurement and Payment for concrete work**

All grades of concrete whether reinforced or unreinforced shall be measured and paid for on a cubic metre basis, excluding blinding which shall be measured by the square metre of specified thickness. All calculations shall be derived from the dimensions given on the drawings or subsequent variations authorised by the Engineer.

The rate tendered for concrete shall be deemed to include for the supply of all water and cement, supply and processing of all aggregates or other materials, mixing, transporting, handling placing, compacting and vibrating, all as specified, wring and protecting of all concrete; testing of concrete, cement and aggregates, preparation of the various surfaces to receive the concrete and the labour and materials required for the formation of all construction joints and other incidental and necessary work.



## 7.21 FORMWORK

### a General

Forms shall conform to the shape, lines, levels and dimensions of the concrete as shown on the Engineer's drawings. The centering, shuttering and casing of the concrete work shall be true, rigid and properly braced and sufficiently strong to resist without bulging or distortion, loads and socks.

If in the opinion of the Engineer, the formwork is at any time insufficiently rigid or in any way Defective, the Contractor shall strengthen and improve such formwork in such a manner as the Engineer shall direct.

All joints shall be sufficiently tight to prevent leakage. The centering is to be constructed in such a manner that the sides of the beams can be taken down first, then the slab centering complete, leaving the beam soffits with supporting props in position for a longer period. Immediately before concreting, the area of timber in contact with concrete shall be thoroughly wetted, if it is not treated with an approved shutter oil. When shutter oil is used, care shall be taken to ensure that it does not come in contact with the reinforcement.

The bottom of beam forms shall be cambered to the following amounts: -

Below 5m span	No camber
5m to 6m span	15mm to 20mm camber
6m to 8m span	20mm to 25mm camber
8m to 10m span	25mm to 30 mm camber

The supports for centering are to be fixed on wedges for raising or lowering, or are to be of the adjustable type to allow for correct positioning. Props and struts to formwork must be so arranged that the load carried by them does not cause over-loading of that part of the structure

carrying them. All wedges are to loosened and centering eased one day before removing.

No formwork shall be removed without the permission of the Engineer, and unless otherwise instructed by the Engineer, it shall be left in position before easing and removal for the following Minimum times: -

Beam sides, wall and columns (unloaded)	3 days
Slabs (props left under)	7 days
Beam soffits (props left under)	12 days
Removal of props to slabs	12 days
Removal of props to beams	21 days

The Contractor shall be responsible for any injury to the work and any consequent damage caused by or arising from the removal or striking of moulds, centering and supports, and any advice, permission or approval given by the Engineer relative to the removal or striking of moulds, centering and supports shall not relieve the Contractor from the responsibility herein defined.

Immediately before commencing concreting the centering and shuttering is to be thoroughly washed out. Care must be taken to keep centering wedged up to its proper position, which must be checked by levelling immediately before concreting.

The contractor's rates are to include for all formwork in the relevant Item in the Bill of Quantities.

## 7.22 REINFORCEMENT

### a. General



Bends in bars shall be cold formed on approved machines in which the power is applied smoothly and evenly and at such a speed so as to cause no fracture or damage in the reinforcement, Reinforcement damaged in any way shall be removed from the site. Before being placed in position, the rods shall be thoroughly cleaned of all grease, dirt, bituminous material, scale and loose rust.

Great care must be taken in placing the rods in their correct positions as shown on the drawings and in retaining them during the placing of the concrete.

When the ends of bars are to be formed into a U-hook, they must be bent to a semi-circular hook, the internal diameter of which is to be not less than twice the diameter of the rod, with a straight end beyond the semi-circular portion having a length of not less than four times the diameter of the rod.

Unless otherwise shown on the drawings, all joints in reinforcing rods are to be lapped 24 times the diameter of the rod for compression laps and 30 times the diameter of the rod for tension laps. The lap must be securely tied with 16 or 18 S.W.G. annealed iron wire. Rods crossing one another is to be bound at every intersection, unless otherwise directed with 16 or 18 S.W.G. annealed iron wire.

All stirrups are to be properly fastened to the main reinforcement so as to retain their position during the placing of the concrete.

Welding will not be permitted in any rods.

The Contractor will be provided with bending schedules giving the cut lengths, diameter, bending dimensions and location of each bar in the work. The Contractor should however satisfy himself that no discrepancies exist between reinforcing drawings and schedules.

The Contractor shall notify the Engineer when any section is ready for concreting and no concrete shall be placed in position until the steelwork has been inspected and approved by the Engineer or his representative.

**b. Cover**

The concrete cover to the main reinforcement shall not be less than the following: -

Slabs	15mm
Ends of beams	50mm) or the diameter
Soffits and sides of beams	25mm) of the rod
Columns	30mm) whichever is
Retaining wall	50 mm)
Columns bases	60mm) the greater

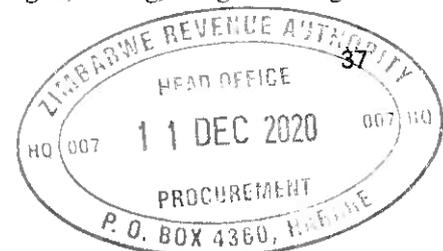
The cover for steel in cast-in situ manholes and water-bearing structures shall be 40mm.

In all other cases the cover to the reinforcement shall be not less than 25mm, unless stated on the drawings.

Cast cement spacers composed of two parts of sand and one part cement, 40 x 40 x 10 thick, or of the requisite size to give the required concrete cover, slightly tapered on side, shall be used for lifting the reinforcement up from the formwork. The concrete spacers must be at least three weeks old before being used. Small pieces of steel rod shall be used for distance pieces for spacing the rods in beams.

**c. Rates of Payment**

The rates for steel reinforcement are to include for cutting to lengths, bending, fixing and wiring



in position and all necessary spacers.

The rates are also to include for any additional weight due to irregularity of rolling margin, and also for weight of binding wire.

#### **7.23 CEMENT GROUT**

The composition of cement grout shall be 1 part of cement to 2 parts of fine sand, by volume, mixed as described for cement mortar but with additional water so that it will be just fluid enough to fill readily all recesses and air spaces in the work to be grouted. The surfaces of work to be grouted shall be thoroughly cleaned and flushed with water, but where surfaces are accessible they shall first be roughened. The method of application of grout shall be such that all recesses are effectively filled.

#### **7.24 CONSTRUCTION JOINTS**

Construction joints as may be required to limit the size of a concrete pour shall be to the satisfaction of the engineer and agreed with his prior approval. They shall all have an effective key (formed) on any face against which the subsequent pour is to be bonded.

All construction joints shall be thoroughly chipped back, cleaned out, flushed with neat cement paste before concreting of a subsequent pour proceeds.

The cost of all preparatory work as described shall be deemed to be included in the rate given for concrete under the appropriate item in the Bill of Quantities.

#### **7.25 EXPANSION JOINTS**

Expansion joints shall be provided of the sizes and in the position indicated on the drawings.

All expansion joints except those in the roof slab (if any) and around columns at floor level are to be fitted with rearguard "R" section type water-stops of the size specified on the drawings and quality equal to those supplied by Messrs. "Expandite".

The joint itself shall be formed against the subsequent pour by the fittings in of an appropriate thickness of resin-bonded cork of quality equal to the proprietary brand supplied by the Expandite Limited, or with Hydrocell" as, indicated on the Drawings, or any equivalent to the Engineer's satisfaction.

No less than 3 weeks after the last concrete has set and dried the joints shall be cleaned first with compressed air and sand-blasting if deemed necessary by the Engineer, roughened by wire brush and scraped of all protuberances and sticking sand.

They shall then be sealed with Thiolex "600" Epoxy sealant or plastic, if selected, in strict accordance with the manufacturer's instructions and to the approval of the Engineer

Rubber or P.V.C. water bars if used shall be continuous over their full length and where but joints are permitted these shall be welded in P.V.C. or vulcanised in the case of rubber.

The application of these jointing compounds may be supervised by a specialist firm of Sub-Contractors approved by the Engineer, at the expense of the main contractor.

### **SECTION IIID - STORMWATER DRAINAGE**



#### **7.26 GENERAL DESCRIPTION**

The works comprising stormwater drainage include lined and unlined open channels, underground piping, culverts headwalls, splash drains, bolters, catchpits and junction boxes. The sizes and dimensions of these items are shown on the Drawings.

#### **7.27 CONTRACTOR'S RESPONSIBILITY**

The Contractor shall take the responsibility for providing adequate drainage (whether such drainage is incorporated in the final work or not) for the protection of all work covered by the contract during the construction. No claim will be entertained arising out of damage caused by flooding due to the lack of proper drainage works.

#### **7.28 PIPE CULVERTS**

1. Pipes for culverts shall be manufactured in accordance with SAZS. A17 "Concrete Pipes (Non Pressure)" All pipes shall be reinforced as specified in the aforementioned Standards Association of Zimbabwe standard, class 'S', or where so specified Class 'X'.
2. Class 'S' pipes shall be laid on a concrete bed Grade 10 Mpa and shall be haunched with the same class concrete where specified.
3. Where approved by the Engineer, Class 'X' pipes may be laid direct on the carefully trimmed bed of the trench.
4. Culvert inverts shall be laid to a grade not flatter than 1: 100.
5. Head walls and wings walls etc, shall be constructed in accordance with the Drawings or as specified by the Engineer.
6. Any pipe which deforms or cracks during the process of the work or during the maintenance Period shall be removed and replaced by the Contractor at his own expense.

#### **7.29 SETTING OUT DRAINS**

Unless otherwise directed, or shown on the Drawings, the gradient of an open drain shall follow the longitudinal gradient of the adjacent roadway.

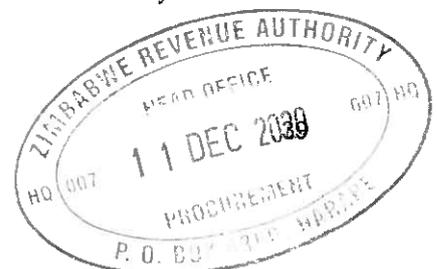
Culvert invert levels are to match those of adjoining open drains and an even fall is to be maintained through the culvert. Pipeline gradients shall be as shown on the drawings or specified on site by the Engineer.

The Engineer will indicate levels for underground stormwater pipelines. These are to be laid in straight lines and at even grades between catchpits junction boxes and access chambers. At changes of diameter, pipes shall be laid off unless otherwise directed.

Levels and grades for drains outside road reserves will be indicated by the Engineer.

#### **7.30 OPEN DRAINS**

Particulars of the types of open drain required are shown on the Drawings. Such drains may be unlined or lined with concrete. Linings are to be cast in alternate bays 3m in length.



Excavation for open drains will be measured by volume and the rate shall include for all necessary trimming, for spreading and leveling surplus material in the vicinity of the drain, and for all other contingent operations described or implied that are not separately billed.

Concrete lining of open drains will be measured by surface area of concrete to the net dimensions shown on the Drawings. The rate shall include for all materials, labour and equipment including frames, templates, shuttering and all other items described or implied that are not separately billed.

#### **7.31 HEADWALLS**

Headwalls shall be constructed of concrete as shown on the Drawings. The unit of measurement shall be volume of concrete and the rate shall include for excavation and shuttering as may be required.

#### **7.32 STONE PITCHING**

Stone pitching, where ordered or shown on the Drawings, shall be of selected approved stone, providing a layer about 150mm thick, firmly grouted with 4:1 sand/cement mortar, all to the approval of the Engineer. Measurement and payment will be by the square metre.

#### **7.33 CATCHPITS AND JUNCTION BOXES**

Catchpits, junction boxes and similar items are to be constructed in accordance with the Drawings supplied and to the Engineer's requirements.

#### **7.34 BOLSTERS**

Bolsters are to be constructed in Grade 10 concrete immediately following construction of the drain and in accordance with the dimensions shown on the drawings. The side-drain must first be brought to shape before constructing the bolsters. A trench should be excavated in the drain to the dimensions shown and the trench should then be filled with the addition of cement mortar as necessary. The shape of the top of the bolster should conform to the side-drain cross-section.

Payment for bolsters shall be on a cubic metre basis against the total volume of the as built bolster. The rate shall include all excavation, materials and shuttering.

### **SECTION III D – ROADS**

#### **7.35 GENERAL DESCRIPTION**

The Workmanship described in the succeeding clauses refers to the construction of roads with flexible pavements, and includes earthworks, formation, sub-grade compaction where directed, sub-bases and bases of natural or stabilised gravel or crusher-run, or other stabilised material, surfacing consisting of prime coat, single or double seal spray and chip, or bituminous premix and roadside drains.

#### **7.36 CLEARING ROAD RESERVES**

Unless otherwise directed, the extent of the road reserve to be cleared is from outside of drain to outside of drain or as indicated on the Drawings. Clearing is to include all grass weeds and similar vegetable matter including their root systems to a depth of not less than 100mm, together with all brush, stumps and trees with their roots and all rubbish or offensive matter. The Engineer may order the preservation of certain trees.

The rate for clearing is to include for tidying up the road reserve on completion of the road works. The

separate rate for removal of trees over 250mm girth is to include for their removal to an approved dumping site within the free haul of 1000m.

The cleared material is to be removed to an approved dumping site within 500 m free haul and spread. Trees and stumps of more than 250mm in girth, measured 1m above the ground or at the top of the stump, whichever is the lesser height, will be measured as separate items. Anthills and sponge areas are to be removed, if so directed, to a depth of 600mm and rock to a depth of 300 mm below finished formation level, and the spoil deposited in approved dumping sites within 500m free haul and spread. The hollows caused by the removal of tree roots, anthills, sponge areas and rock are to be backfilled in properly compacted layers not exceeding 250mm thickness in the loose, with approved material.

In the construction of roadworks, rock will be held to be hard stone boulders exceeding 0.5 cubic metres in volume or hard occurring in beds, banks or dykes, the excavation of which, in the sole opinion of the Engineer, requires the use of explosives or wedges and hammers. All other material will be classed as common material.

### **7.37 SETTING OUT ROADS**

In general residential roads will be constructed longitudinally to the ruling natural grade, and transversely in accordance with the typical cross sections, unless otherwise directed. Should instructions or drawings are issued requiring the Contractor to work to pre-determined levels, the Contractor shall set up level pegs or profiles to the correct levels, clear of construction.

Two level pegs shall be set at each point, one on each side of the carriageway. These shall be used for each stage of construction and shall remain in position until road construction is complete. Any pegs or profiles destroyed during construction shall be immediately replaced.

### **7.38 REMOVAL OF TOPSOIL**

The Engineer may require the Contractor to remove topsoil in designated areas, and spread the material within or adjacent to the road reserve clear of the carriageway and side drain or overhaul to dump area.

### **7.39 FORMATION**

#### **a. Soils Other Than Expansive Soils**

The process of forming in soils other than expansive soils shall comprise grading and shaping the sub-grade including side drains so as to conform with the ruling grade or the longitudinal levels provided, and with the cross sections shown on the drawings, including any side sloping required.

For purpose of payment under the item for formation, cut and fill and lateral and longitudinal movement of materials shall be limited to that normally performed by a self-propelled grader, to a maximum cut or fill of 150mm, measured at the carriageway centre line after completion of preparatory work.

Where filling is required in excess of the above limits, excavated material from another position in the works shall be used unless otherwise ordered. Such filling shall be compacted in layers not exceeding 250mm in the loose, to the densities indicated in the Bill of Quantities.

Payment for formative will be by the square metre over the width described above and for fill by the cubic metre compacted in place. The respective rates shall include for all operations necessary to comply with the contract.



**b. Expansive Soils**

The Engineer will indicate the extent of expansive sub-grade soils on the site. Treatment of such soils will be dependent on the ground soil conditions at the time of construction. The Engineer will decide the method to be adopted after examining the site and will instruct the Contractor accordingly. The method may be either of those described below or may be varied by the Engineer.

**(i) Dry or Damp Soil**

Where the soil is dry enough to carry the weight of the necessary equipment and vehicles without undue deformation, topsoil is to be removed where directed and spread in the immediate vicinity or carted to approved dumping grounds and spread. Disturbances of the underlying sub-soil is to be kept to a minimum. Whilst removing topsoil, and unless otherwise directed, trimming to camber and grade shall be by cut to spoil only. Any necessary fill shall consist of imported material of approved quality, spread in layers not exceeding 50mm thickness in the loose and compacted to the specified density.

**(ii) Wet Soil**

Where the soil is too wet to carry construction equipment, treatment of the existing ground surface is to be limited to burning of the surface vegetation where possible over the construction width. Any trees or bush remaining after these operations are to be cut off at or near ground level.

Filling is then to be built up over the natural surface, in conformity with the road cross sections, using approved imported material. Unless otherwise directed, the thickness of the layer is to be the minimum required to carry the weight of the vehicle and compaction is to be achieved by judicious routing of equipment and vehicles over the whole surface area of the fill.

Whilst the work proceeds the surface of the fill is to be shaped to grade and camber.

Density tests will be taken at the conclusion of work on any given section, and if these lie below 98% of L.C.E. compaction, the Engineer may at his discretion, direct that further compaction be undertaken using suitable rollers.

All embankments on main roads will be compacted to 93% of H.C.E.

**d. Borrow Material**

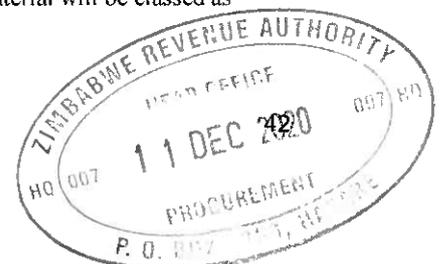
Where it is necessary to borrow material for the construction of the embankments the site of the The Engineer must approve Borrow pit and the material borrowed before commencing operations.

**e. Tolerance**

The finished subgrade level on main roads shall be within +/- 75mm of the width +/-20mm l of the level specified.

**f. Classification**

Unsuitable material is material, which is classified, as unsuitable by the Engineer and will include anthills, expansive material and other material with a high organic content. Wet material is not necessarily unsuitable and must be dried to the optimum moisture content before inclusion in the embankments. Rock material is defined in Clause 5.33. All other material will be classed as common.



**g. Anthills**

Any anthills or termite workings encountered shall be excavated to the extent and depth required by the Engineer, the excavated area shall be treated with an approved insecticide.

**h. Unsuitable Material**

Unsuitable material encountered in road cuts or at roadbed level shall be removed to the extent directed by the Engineer. All waste material shall be neatly dumped and spread to the satisfaction of the Engineer.

Measurement and payment for topsoil removal, cut, fill or overhaul of cut/fill material will be by the cubic metre of compacted material to the net dimension shown on the drawings.

**7.40 PREPARATION OF SUB-GRADE**

**a. Soils other than Expansive Soils**

On completion of the formation as described in Clause 7.39, the sub-grade material beneath the carriageway and shoulders shall be sacrificed to a depth of 150mm with suitable equipment. All stone, Clods, and lumps of material with a maximum dimension exceeding 100mm shall be either broken down or removed.

The material shall then be compacted at or near optimum moisture content to the specified H.C.E. density. Any water required before compaction starts is to be added gradually in successive applications by means of approved sprinkler equipment capable of applying the water evenly and uniformly over the area being processed. Between applications the water shall be thoroughly mixed into the material by means of suitable equipment such as ploughs, disc, harrows or motor-graders, until a uniform mixture is obtained. Should the material be too wet, or for any other reason, it shall be harrowed and allowed to dry out to the required moisture content before compacting proceeds.

On achieving the required water content, compacting shall immediately proceed using approved equipment suitable for satisfactorily compacting the material being processed, and continue until the material has been compacted to not less than the density specified. The required shape of the work shall be preserved during compaction and all ruts, holes and depressions corrected by frequent blading. The finished surface shall be uniform and smooth.

Payment for sub-grade preparation in soils other than expansive soils will be made by the square metre and the Contractor's rate shall include for all operations needed to comply with the requirements of the contract, including the haulage and application of water.

**b. Expansive Soils**

**i) Dry or Damp Soils**

Where the condition of the soil permits forming in the manner described in 7.39(b)(i), no further preparation of expansive soil will normally be undertaken before constructing the sub-base. The finished sub-grade must be examined and passed by the Engineer before sub-base construction starts.

**(i) Wet Soils**

Where procedure described in Clause 7.39 (b) (ii) is adopted, the completed filling will be inspected by the Engineer and he may direct the Contractor to place and compact additional fill



material.

After the Engineer has pronounced the work satisfactory, the top 150mm of the material over the full pavement width is to be scarified and compacted, following the procedure described in Clause 7.39(a).

#### **7.41 CONSTRUCTION OF SUB-BASE AND BASE**

##### **a. Supply of Gravel**

The Contractor shall furnish all the gravel required for the due and proper performance of the work embodied in this Contract. The Bills of Quantities may require him to win and supply gravel from specified areas

All gravel proposed for use may be inspected and tested by the Engineer at any time during preparations and use. After test or trial, if it is found that any sources of supply which have previously been approved do not furnish a uniform product, or if the product from any source proved unacceptable at any time, the Contractor shall furnish gravel from other approved sources. No gravel, which, after approval, has become unfit for use shall be used in the work

##### **b. Tests**

Gravel for use in the work shall conform to the requirements hereinafter specified. The following test methods for quality and workmanship shall apply: -

###### **(i) Soils and Gravel**

For the testing of soils and gravels, the standard methods of testing of the Standards Association of Zimbabwe. Field density tests using alternative methods to that of the Standards Association of Zimbabwe may be used if approved by the Engineer.

###### **(ii) Gravel for Base (Untreated Material)**

###### **(1) Grading**

The gravel shall be free of deleterious organic matter and evenly distributed throughout the particular size range without having an excess of deficiency of any particular size. The table over is given as a guide to this grading and a sample shall be submitted for approval by the Engineer before the commencement of any road works.

###### **(2) C.B.R**

The minimum C.B.R. strength for gravel at 100% H.C.E. and Crusher Run at 100% H.C.E density compacted at optimum moisture content and soaked for four days, shall be 80% and in accordance with CAS A43 Part 2 using Method 2.

###### **(3) Plasticity**

Of that material of the sample passing the 425 um sieve the "Liquid Limit" shall not exceed a valve of 25 per cent and the Plasticity Index shall nor exceed a valve of 6 per cent as determined according to SAZS. 185 Part I unless approved by the Engineer.

**Standard Sieve Size to B.S. 1377    Percent Passing    nominal max size**

75mm

37,5mm

19mm



75mm	100		
37,5mm	80 - 100	100	
20mm	60 - 80	80 - 100	100
10mm	45 - 65	55 - 80	80 - 100
5mm	30 - 50	40 - 60	50 - 75
2mm	-	30 - 50	35 - 60
600um	10 - 30	15 - 30	15 - 35
300um	-	-	-
75um	5 - 15	5 - 15	5 - 15

Not more than 10% shall be retained between each pair of successive sieves excepting the largest pair.

**(iii). Crusher-Run for Base Course( Crushed stone for base**

1 Grading

The crusher-run aggregate shall be hard durable and free from clay and deleterious organic matter. The following table is given as a guide to the grading and a sample shall be submitted for approval to the Engineer before the commencement of any road works.

British Standard Sieve Size	Total Percentage Passing	
	Max	Min
37mm (1.1/2")		100
19mm (3/4")	100	80
10mm (3/8")	80	55
5mm (3/16")	60	40
2,36 mm (No.7)	45	30
1,18 mm(No. 14)	39	22
0,60 mm (No. 25)	32	15
0,30 mm (No. 52)	28	10
0,15 mm (No. 100)	25	6

2 CBR

The minimum CBR strength for crusher run at 100 % MOD AASHTO density compacted at optimum moisture content and soaked for four days, shall be 80 % and in accordance with CAS A43 Part 2 using method 2.

3 Plasticity

On the material of the sample passing the 0.425mm sieve the " Liquid Limit" shall not exceed a value of 25 % and the Plasticity Index shall not exceed a value of 60 % as determined according to CAS 185 Part 1, unless approved by the Engineer.

**(iv) Gravel for Sub-Base (Untreated material)**

1 Grading



The gravel shall be free from deleterious organic matter and evenly distributed throughout the particle size range without having an excess of deficiency of any particular size. The table below is given as a guide to this grading and a sample shall be submitted for approval by the Engineer before the commencement of any roadworks.

Sieve Size	3.75mm	19.0mm	9.5mm	4.75mm	2.36mm	1.18mm
% Passing						
MAX	100	100	100	95	75	62
MIN	100	75	53	37	26	18

2 CBR

The minimum CBR strength of the gravel at 100 % MOD AASHTO density compacted at optimum moisture content and soaked for four days shall be 45 % and in accordance with CAS A43 Part 2 using Method 2.

3 Plasticity

On the material of the sample passing the 0.425 mm sieve the plasticity index shall not exceed a value of 12 % as determined according to SAZs 185 unless approved by the Engineer. The maximum plasticity product shall not exceed 240.

**b. Processing and Compaction**

The surface over which the sub-base or base is to be constructed shall have been approved in writing by the Resident Engineer immediately before construction starts.

Gravel imported for constructing the sub-base or base shall preferably be dumped or tipped in Windows along the edge of the road and then spread by motor graders over the full width between shoulders and to such depth that after compaction the thickness of the layer will be true to lines, grades and cross sections. Spreading shall be executed in such manner as to minimise segregation of the different sizes of particle in the material. Should appreciable segregation occur it is to be corrected by blading from side to side.

The material shall then be thoroughly broken down using scarifiers, disc harrows or other suitable equipment, and compacted to not less than the specified density by the same process described in Clause 5.37 for compacting the sub-grade.

The finished surface of the sub-base shall be checked for uniformity and smoothness. There shall be no depressions or elevations exceeding 10mm under a straight edge or camber board 4m in length. Variations to specified layer thickness shall not exceed +20mm or - 15mm.

Measurement and payment for sub-base and base construction will be by the square metre of compacted material to the net dimensions shown on the drawings while that for overhaul will be by the cubic metre of compacted material multiplied by the kilometres to the net dimensions shown on the drawings.

- (i) The gravel layers shall be compacted to the following relative densities

Main Roads:	Base 2	98% MOD AASHTO
	Base 1	95% MOD AASHTO

- (ii) The maximum level tolerance allowed on the finally compacted layer shall be as follow:-



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	<u>BASE 1</u>	<u>BASE 2</u>	<u>BASE3</u>
Compacted thickness	+20 - 15mm	+/-20mm	-
Level	+/-20mm	+/-20mm	-
Gap under a 3m straight edge	10mm	14mm	-

**7.42 STABILISATION**

Should the sub-grade or the gravel or crusher-run intended for sub-base or base construction require stabilisation with lime or cement, the construction processes described above shall be modified as described in this Clause. After the sub-grade has been scarified and any particles broken down or the gravel or crusher-run has been spread, any large particles removed, and any segregation corrected, but before the application of any water, the specified stabilising agent shall be uniformly applied to the surface of the material to be stabilised, at the specified rate.

It shall then be immediately subjected to an approved method of mixing to the full depth of treatment. Mixing shall be continued for as long a time and repeated as often as may be required to ensure a thorough uniform and intimate mix of the material and the stabilising agent, so that the resulting mixture is homogeneous and of uniform appearance throughout.

Water shall then be added as necessary by means of suitable sprinklers and further mixing executed to ensure an even distribution of moisture throughout the material at not more than 1% above or 2% below the optimum moisture content for H.C.E. density. The rate of application of water shall be controlled to avoid saturation of any portion of the work, but in all other respects the procedure for watering, mixing, compacting and finishing shall be as described in Clause 7.39 and 7.40 within the construction limitations set out below.

The following limitations shall apply when stabilising agents are used: -

- (i) The stabilising agent shall only be applied to such an area that all mixing, compacting and finishing can be completed within the following periods after the first application of water is made to the mixture: -

P.C. 15 Cement	6 hours
Blast Furnace Cement	8 hours
Hydrated Lime	48 hours

- (ii) No cement stabilising agent shall be applied when the moisture content exceeds the optimum moisture content for H.C.E. density by more than two percent by dry weight of the mixture
- (ii) No stabilising shall be carried out during wet weather.

With cement stabilised materials, if the specified density is not achieved, the section in question is to be ripped and re-worked in the manner described above, with the addition of further cement to the extent to 50% of the original application. The required compaction will be indicated by the Engineer.

Curing of cement - stabilised materials shall be affected by keeping the stabilised material continuously damp for seven days or until such time as a subsequent operation covers the surface. Lime-stabilised materials shall be kept damp for four days after completion, and then Allowed to dry out for at least three days before being covered under a subsequent operation.

**7.43 CONTROL OF CONSTRUCTION**



It is the responsibility of the Contractor to notify the Engineer's laboratory staff in good time that compaction tests will be required. The cost of these and other tests arranged by the Engineer, will only be at the expense of the Contractor if they show that the work is not in accordance with the specifications. Payment for compaction and other workmanship, which is the subject of tests will be dependent on satisfactory test results.

#### **7.44 SURFACING OF ROADWORKS**

All equipment for the surfacing of the roads shall be approved by the Engineer and shall be on the site and in proper working condition before surfacing may begin.

The compacted area to be surfaced shall be approved by the Engineer before the start of any surfacing work, and the Contractor shall give the Resident Engineer at least 24 hours' notice of his intention to spray.

##### **a) Prime**

Priming will normally be required before the application of either a spray and chip surface dressing or a premix carpet, but alternative specifications using bitumen emulsion will be considered.

The edges of the work shall be free from irregularities, corrugations, ruts or loose patches. All loose material shall be broomed off the surface.

The surface to be primed shall be damp, and if necessary a light, uniform application of water shall be given to the prepared surface before prime is applied.

Spraying of prime shall not be undertaken when the base is wet, during wet or misty conditions, when rain appears imminent, or when the road temperature is less than 10 degrees C. Prime shall preferably be MC30 cut-back bitumen sprayed at 60 degrees C, or may be tar prime TP7 sprayed at 70 degrees C. The above temperatures are not to be exceeded by more than 10 degrees C nor maintained for longer than six hours.

Arrangements for longitudinal overlaps and for entrance and exit paths for the distributor shall be to approval.

After spraying, the road shall be closed to traffic for at least 3 days and may not be opened without the Engineer's approval.

##### **b) Premix**

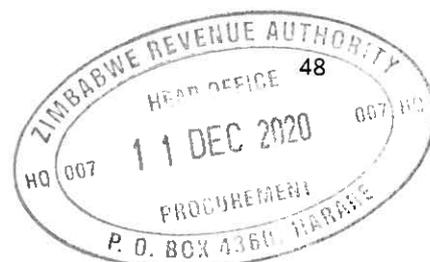
Only straight run bitumen of 80/100 Penetration grade will be acceptable for premix wearing courses.

Before premix application the primed base shall be swept clean of all dust and organic matter, and any remaining pools of prime removed.

Laying of premix shall not be undertaken when the primed base is wet, during wet or misty conditions, when rain appears imminent, or when the air temperature is to be not less than 15 degrees C.

Delivery temperature is to be not less than 120 degrees C.

Whenever practicable, premix is to be laid by mechanical paved and the operation is to be as far as possible continuous. Any unavoidable hand spreading is to be executed by competent staff.



Rolling in a longitudinal direction, starting at the verge and working towards the crown, is to commence as soon as possible after paving, in the first instance using an 8 to 10 Ton steel wheeled roller for at least three passes at premix temperature range of 100 to 120 degrees C.

A 5 - 20 Ton self-propelled pneumatic roller with tyre pressures approximately 600 Kpa (87p.s.i.) is to be used for three to four passes immediately after the steel roller, after which the 8 to 10 Ton steel wheeled roller is to be used for about two passes to restore finish.

Any cold joints between areas of paving are to be cut back vertically, cleaned and painted with a thin coat of Class 3, slow breaking bitumen emulsion

- (c) Bituminous binder shall be applied at the rates specified by the Engineer. The following provides an indication of the general requirements.

	RATE	
Prime	0.8 - 1.0	1/M2
Tack (19mm)	1.47	1/M2
Seal coat (6.7mm)	1.25	1/M2
Single seal (13mm)	1.20	1/M2

The rate of application may not vary by more than +/- 0,05 1/M2 from that specified by the Engineer.

#### **7.45 LAYING PRECAST CONCRETE INTERLOCKING PAVERS/ROADSTONES**

The laying of precast concrete Interlocking/Pavers should be as per SAZS 533: 1996 "Zimbabwe Standard Code of Practice for laying Precast Interlocking Pavers."

#### **7.46 ACCOMMODATION OF PUBLIC TRAFFIC DURING CONSTRUCTION**

##### **a) Requirements and Description of Work**

Any necessary measures for the safety and convince of the public will be the responsibility of the Contractor who shall treat them as of prime importance.

The Contractor shall provide flagmen, signs, fences, barriers and lights for the proper direction of traffic, as directed by the Engineer and shall comply with all regulations governing such matters.

##### **b) Construction of Detours**

Where it is necessary to divert traffic from an existing road, detours shall first be constructed; these shall, as far as is practicable, be within the road reserve.

Where necessary for this purpose, the road reserve on the new alignment will be handed over to the Contractor in advance and in reasonable sections as requested by him.

Where traffic, for any reason, cannot be accommodated within the road reserve, the Contractor shall construct detours where directed by the Engineer.

All detours shall be constructed to standards specified by the Engineer. The alignment of all

detours must be agreed to, in writing, by the Engineer, before the detours are constructed.

**c) Barricades and Signs**

Barricades shall be substantially made and painted in alternate bands of black and white and shall extend across the road. Gaps shall not be left in the barricades for the entrance of construction traffic.

Separate provision shall be made for construction traffic so that the entrance used by it cannot be mistaken for a public entrance.

**d) Maintenance of Detours**

The maintenance of detours will be the responsibility of the Contractor and shall adequately provide for the comfort, convenience and safety of the public.

**e) Routing of Traffic Over Sub-Base and Base**

Traffic shall not be routed over the base or sub-base courses without the written authority of the Engineer. The Contractor shall be responsible for the restoration of these layers before the work proceeds.

**f) Facilities to Adjacent Owners**

The Contractor shall be responsible for ensuring that access to property adjacent to the new road is retained.

**7.47 SIGNS**

**(a) General**

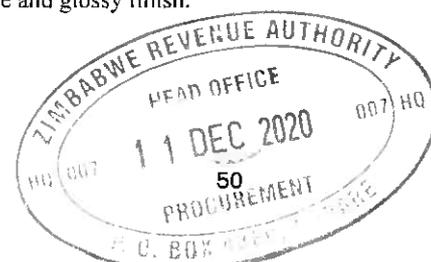
All signs and road markings shall be in the form prescribed in the Roads and Road Traffic (Traffic Signs and Signals) Regulations, or as detailed on the Drawings.

**(b) Materials**

- i) All sign plates shall be constructed of sheet steel, the surface of which shall be free from rust and scale. The metal shall be not less than 16 s.w. gauge.
- ii) The plates shall be cut accurately to the shapes and sizes prescribed, and the cut edges shall be treated to give a smooth square finish free from jagged edges. The signs shall be free from twist, buckle or blemish, and the plates shall be substantially a plain surface.

**(c) Finish**

- i) The surface of all sign plates shall be treated so as to be in a condition suitable to receive a priming coat and a priming coat of approved paint shall be applied. All signs shall be reflective. The reflecting materials shall have a durable smooth surface which will not readily collect or retain dust.
- ii) All paints and other material used shall be of good quality so as not to fade or deteriorate unduly when exposed to the elements. All paints shall have a hard, durable and glossy finish.
- iii) Road marking paints shall be of approved quality.



#### **7.48 KERBING**

Three types of kerbing will be specified.

- (i) Hollow mountable kerbing
- (ii) Heavy Duty Barrier Kerb
- (iii) Light Duty Barrier Kerb

The Contractor shall allow in his price for Bitumen/cement infill if he proposes to place kerbing after surfacing. If kerbing is to be placed before surfacing every precaution must be taken to prevent splash on the kerbing. All kerbing to be set in 10 Mpa concrete and have an earth backfill. Price per metre will include for all the above.

### **SECTION IIIE – MISCELLANEOUS**

#### **7.49 BRICKWORK**

Faced brickwork shall be covered and completely protected from damage or discolouration during construction and thoroughly cleaned and washed immediately before the Works are commissioned. If the Engineer considers the finish unsatisfactory, he may order the application of an approved brick dressing which shall then be supplied and applied without extra costs to the Employer.

##### **(a) Foundation Brickwork**

Brick walls below the concrete ground slab shall be built in English or similar approved Bond with all joints flush pointed below ground and finished with a square recessed joint above finished ground level as the work proceeds. "Brickforce" or similar approved reinforcement is to be built into every fourth course.

##### **(b) Other brickwork**

Cavity walls are to be built in stretched bond with approved butterfly cavities at approximately 1200mm centres in every fourth course. The cavities are to be kept clear of debris. All other one brick walls (25mm) and over are to be built in English Bond or similar approved.

##### **(c) Half-brick walls**

Half-brick walls are to be reinforced with "Brickforce" or similar approved reinforcement built into the joints of the first two courses above the damp proof course and every fourth course thereafter.

Where half-brick walls are used as linings to concrete walls the brickwork is to be tied to the concrete walls with approved ties spaced one metre apart horizontally and 0.5 metre vertically and staggered. The space between the brick and concrete wall is to be carefully maintained at the dimensions given on the Drawing. The cavity is to be kept clear by lifting screeds or other means and openings are to be left at the base of the wall unit until the brickwork is complete. When the cavity is to be cleaned out and the openings bricked up uniformly with the surrounding work.

##### **(d) General**

All bricks must be thoroughly dampened before laying, and each brick is to be laid with full joints and pressed into its mortar bed so as to squeeze out superfluous mortar and give a finished joint not exceeding 10mm. All courses are to be kept to a fixed standard and time line. All angles and

corners are to be built up plumb and frequently checked and raked back as required. Notwithstanding any trade custom to the contrary, all joints both horizontal and vertical are to be filled solid with mortar to their full width and depth, each course being flushed with mortar worked well down into all vertical joints, before succeeding course is laid. All brickwork is to be well and regularly bonded with no false headers and none but whole bricks used except where unavoidable for closure.

(f) **Renderings, plastering and finishing brickwork and concrete**

(i) **Renderings**

Unless otherwise stated renderings on exposed surfaces will be in accordance with SAZS CA3 using a type 3 mix, as Table 1, page 24 (nominally one cement, one pit sand, five or six river sand) but in one coat 20 mm thick finished with a wooden float.

All brick and concrete surfaces internally and externally are to be well saturated with water before plastering. The rendering coat shall properly set and well scratched to form a key before finish.

(ii) **Internal Plastering**

Internal plastering for walls shall accord generally with SAZS CA5 "Internal Plastering in Solid Background" or SABS 021 "Code of Practice for the Waterproofing of Buildings."

**Hardwall plaster** for walls shall consist of one coat using one cement, one lime six parts pit sand finished with skim coat of hardwall plaster applied not thicker than 3mm to give a total thickness of 20 mm in all.

**Cement/sand plasters** shall consist of one coat of one cement and four parts pit sand and a second coat of one cement, one lime and four parts pit sand finished with a steel float to give a total thickness of 20 mm in all.

**Bonding plaster finish** to concrete ceilings shall be concrete bonding plaster applied in accordance with the manufacturer's instructions to a thickness of 5mm and provided with a textured finish to the Engineer's instructions.

**Waterproof plaster** on walls subject to external water pressure shall be two coats cement/sand plaster. Wall surfaces shall be well hacked over the whole surface, brushed with a stiff brush and washed down before plaster is applied. The first coat of one cement and two parts pit sand shall be cast on the wall using a sloppy mix to a thickness of about 6mm, and provide a complete coverage. As soon as the first coat has set apply a second coat of one cement and two and a half parts pit sand floated on to a thickness of 10mm and finished with a wood float. An approved waterproofing additive shall be incorporated in both coats.

Where directed suspended ceilings constructed of gypsum plaster board shall be plastered with a concrete bonding plaster as described above.

Angles and edges are to be carefully plumbed or levelled, as the case may be and corners shall be arris rounded. Before plastering concrete work, the surface of concrete shall first be hacked sufficiently to afford proper bond and the plaster shall then be applied as a thin skimming coat, or coats.

Stairs are to be finished with rounded nosings and covered at the junction of treads and risers. The finish is also to be carried over the open side of the stair, where a band 50mm wide is to be formed following the line of risers and treads, with edges and junctions covered or rounded. A reeding 100mm wide is to be applied to all treads to prevent slip.



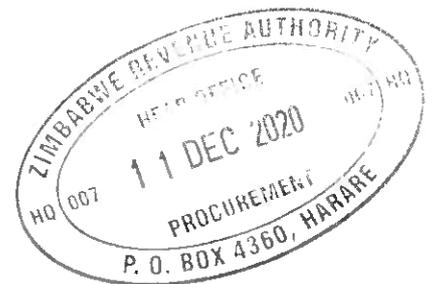
The rates quoted for granolithic are to allow for all vee-joints, metres, returns, covers stopped ends, nosings, steel float finish, tinting etc, but skirtings and reedings will be measured and paid for under the items provided for them in the Bill of Quantities.

**7.50 ANT POISON AND REMOVAL OF ANTHILLS**

Ant poison shall contain not less than 0,5% Dieldrex or Aldinal emulsion in water or 5% pentachlorophenol solution in mineral oil.

Anthills which come within the construction area and 3m clear all round shall be entirely removed and the queen eradicated. The cavity formed by the removal of the nest must be filled in with approved materials in layers not 300mm thick compacted to 100% L.C.E.

Volumes of anthills shall be measured under the formular  $V=C \times C \times H / 25.2$  where volume in cubic metres, C is the circumference in metres around the base taken at the point where the steep slope commences, H is the average vertical height in metres measured from points on the circumference C to the top of the main body of the anthill (ignoring any stalagmite tip.)



## **6. BILL OF APPROXIMATE QUANTITIES**

### **A. PREAMBLE**

1. The rates and prices in the Bill of Quantities shall be deemed to be the full inclusive rates and prices for the finished work described under the respective items and to cover all labour, materials, temporary work, plant, on-cost items and other overhead charges, profit, and the general liabilities, obligations and risks arising out of the Conditions of Contract and the Specification.
2. A rate or price is to be entered against each item in the Bill of Quantities against which a unit of measurements stated, whether quantities are stated or not. Any item which no rate or price is entered will be considered as covered by other rates and prices in the Bill.
3. Except where expressly stated to the contrary all items are measured net in accordance with the drawings, no allowance being made for cutting, waste or contingent work, which will be deemed to have been provided for by the Tenderer in his rates and prices.
4. All quantities given in the Bill of Quantities are estimated quantities only and will be subject to re-measurement during the progress or on completion of the Works. Quantities for materials are to be ordered from the working drawings, checked where necessary by the site measurements.
5. Directions and descriptions of work and material given in the Specification or other parts of the Tender documents are not necessarily repeated in the Bill of Quantities, and references to such documents made in the Bill are not necessarily comprehensive or complete.
6. All prime costs or daywork costs of materials in the Bill refer to cost delivered to site including any Sales Tax/Value Added Tax, duties, etc.
7. These Bill of Quantities have been drawn up in accordance with the standard method of measurement of Civil Engineering, Quantities Second Edition 1994 (ZCE Q2) approved by ZIE. The Federation of Civil Engineering Contractors and the Zimbabwe Association of Consulting Engineers.
8. Contractors are required to use materials produced or manufactured in Zimbabwe provided that the price, quality and delivery of local materials is satisfactory.

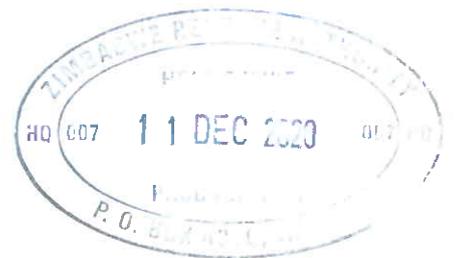


**7. APPENDIX A CIVIL ENGINEERING WORKS DRAWINGS LIST**





# SOIL REPORT





**Contech Geotechnical Laboratory**  
Materials Surveys, Foundations, Construction Quality Control & Soil

36 Cleveland Road  
Milton Park  
P. O. Box ST165  
Southern, Harare  
Tel: 04-253038  
Cell: 091 247 125 /  
011 867 301  
E-mail: ozcel@comone.co.z

**SOIL INVESTIGATION REPORT ON**  
**PROPOSED ZIMRA HEAD OFFICE**  
**(MT PLEASANT BUSINESS PARK)**

**JULY 2007**

Directors: O. Zindi (Cert. Of Comp in Geotechnology, T. Zwc.H.), K. Chizunza





# Contech Geotechnical Laboratory

Materials Surveys, Foundations, Construction Quality Control & Soil Testing

25 Cleveland Road  
Milton Park  
P. O. Box ST165  
Southerton, Harare  
Tel: 04-253038  
Cell: 091 247 125 /  
011 867 301  
E-mail: ozcel@comone.co.zw

03 July 2007

Galaxy Engineering Design Consultants (PVT) LTD  
No 7 The Chase, Ashbrittle  
Mt Pleasant  
Harare

Attention: Engineer Vengesai

**RE: PROPOSED ZIMRA HEAD OFFICE (MT PLEASANT BUSINESS PARK)  
SOILS INVESTIGATION**

## 1.0 INTRODUCTION/SCOPE OF WORK

The terms of reference of the soils investigation were:

To carry out field/ laboratory work and provide recommendations on:

- Insitu Soils Classification
- Shear Strength of insitu soils
- Insitu Soils Bearing Capacity
- Foundation founding depths
- Foundation Type/ Systems

## 2.0 SITE DESCRIPTION

The proposed site is a new development in Mt Pleasant, within the Mt Pleasant Business Park premises

The site has grass cover and no bushes

The site is on a vlel

There is construction work on an adjacent stand to the south of the site

The geology of the area is predominantly Dolerite of Basaltic type (Black Cotton Soils)

## 3.0 FIELD WORK

Ten Trial Pits were excavated by hand to 2.5m, during the course of the investigation

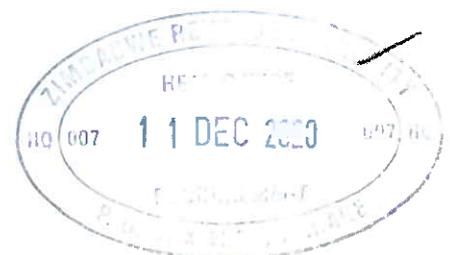
Mechanical Auguring was carried in the trial pits from 2.5m going further down to a maximum 6.0m, after which the ground became very stiff

Soil Profiling was done for each Trial Pit as recorded in Appendix A

Representative disturbed samples were obtained from the Trial Pits and from the Auguring operation. The samples were subjected to careful visual examination as well as subsequent further laboratory tests (Indicator tests, Shear Strength Tests)

DCP Testing was carried out to determine bearing capacity of the insitu soils

**No Ground Water was observed in all the Trial Pits excavated and even from the Auguring test**



#### 4.0 LABORATORY WORK

##### 4.1 Shear Strength Testing (Samples below Basement Level)

Two representative samples were taken from below 4m (from Auguring test) and tested for Shear Strength

Sample 1 – representing Trial Holes TH11 to TH6

Sample 2 – representing Trial Holes TH7 to TH10

##### 4.1.1 Test Results

Sample	<u>Test 1 (5kg)</u>			<u>Test 2 (10kg)</u>			<u>Test3 (15kg)</u>		
	Normal Stress KN/m <sup>2</sup>	Shear Stress KN/m <sup>2</sup>	Tan $\phi$ Degrees	Normal Stress	Shear Stress	Tan $\phi$ Degrees	Normal Stress	Shear Stress	Tan $\phi$ Degrees
Sample 1	242.6	34.2	8	380.1	35.6	5	517.7	37.1	4
Sample 2	242.6	100.2	22	380.1	155	22	517.7	199.2	21

##### 4.1.2 Summary of Test Results

Sample Number	<u>Sample 1</u>	<u>Sample 2</u>
Apparent Cohesion (C) KN/m <sup>2</sup>	30	20
Angle of Shearing Resistance ( $\phi$ )	6	22
Soil Dry Density Kg/m <sup>3</sup>	1438	1235
Soil Type	Firm to soft clay	Firm to Stiff clay with larger Silt proportion

##### 4.2 In situ Soils Classification

Sample Number	Depth	LL%	PI%	+2.36mm%	-75um%	PP
Above Basement Level (<4m)	0-1000 1000-2500	64 41	37 17	03 01	62 88	2294 1496
Below Basement Level (>4m)	2500-4000 2500-5500	38 44	21 17	01 04	83 83	1743 1411

The insitu soils consist of predominantly of two types;

- Black cotton soils of high plasticity and are potentially active, up to 1,5m and
- Clayey gravel with a significant proportion of silt, of medium plasticity, from 2,0m down to 6.0m

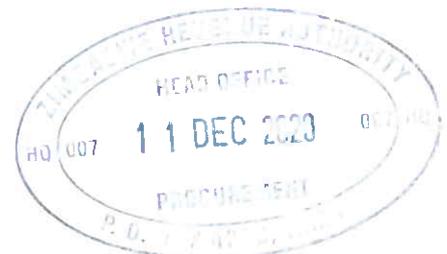


## 4.3

**Insitu Soils Bearing Capacity**

Trial Hole Number	Depth Below Ground level (m)	Equivalent Bearing Capacity (KPa)
TH1	0-0,5	88
	0,5-1,0	165
	1,0-1,5	51
	1,5-2,0	48
	2,0-2,5	155
	2,5+	200
TH2	0-0,5	88
	0,5-1,0	280
	1,0-1,5	53
	1,5-2,0	88
	2,0-2,5	155
	2,5+	400
TH3	0-0,5	110
	0,5-1,0	110
	1,0-1,5	48
	1,5-2,0	51
	2,0-2,5	200
	2,5+	500
TH4	0-0,5	69
	0,5-1,0	110
	1,0-1,5	51
	1,5-2,0	61
	2,0-2,5	165
	2,5+	315
TH5	0-0,5	72
	0,5-1,0	69
	1,0-1,5	225
	1,5-2,0	280
	2,5+	315
	TH6	0-0,5
0,5-1,0		72
1,0-1,5		53
1,5-2,0		110
2,5+		400
TH7		0-0,5
	0,5-1,0	69
	1,0-1,5	53
	1,5-2,0	400
	2,5+	315
	TH8	0-0,5
0,5-1,0		66
1,0-1,5		135
1,5-2,0		180
2,5+		500
TH9		0-0,5
	0,5-1,0	115
	1,0-1,5	34
	1,5-2,0	100
	2,5+	400
	TH10	0-0,5
0,5-1,0		145
1,0-1,5		49
1,5-2,0		88
2,5+		400

The insitu soils are firm to very stiff as we go down the profile.



## 5.0 RECOMMENDATIONS

### 5.1 Foundation Type/Systems

The site has black cotton soils. Such soils change volume with seasonal moisture changes, and are therefore potentially expansive.

Special foundations are necessary to prevent the differential movements caused by heave, which results in structural failures.

However, the proposed structure is going to consist of a 4m Deep Basement. At 4m below ground level, we will be below the zone of expansive soils affected by seasonal moisture changes

It is therefore proposed to adopt a Strip Foundation, which supports structural columns on a concrete slab. The dimensions will be as per Structural Engineer Design

The ground floor slabs should be of an effective suspended design over loose imported fill. The imported fill must be sealed against mixture migration by means of a thin polythene building membrane placed before casting the concrete floor.

Brick reinforcement must be incorporated at all points of structural weakness e.g. below and above window frames and / or at every second or third consecutive brick course.

Load Bearing Bricks with an average strength of 20MPa must be used in all the foundation, basements, ground and subsequent storey brickwork.

Alternatively adopt concrete walls

### 5.2 Foundations Founding Conditions

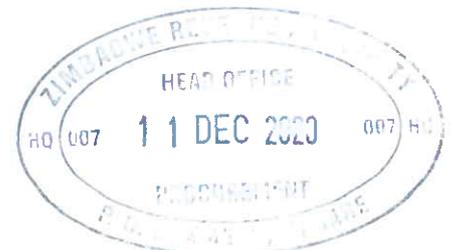
A minimum foundation founding depth of 4.0m below ground level (i.e. the proposed Basement Level), and a safe insitu soils bearing capacity of 315 KPa is recommended.



Appendix 'A'

SOIL PROFILE

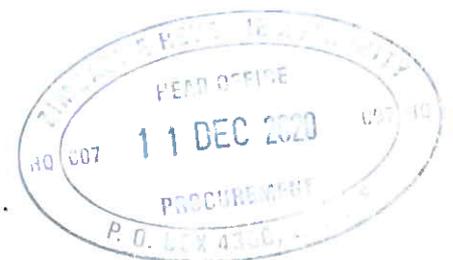
Trial Hole No	Moisture	Colour	Consistency	Soil Type
TH1 0 - 1700 1700-4500	Moist Moist	Grey / Brown Orange / Fawn	Firm Firm/Stiff	Clay Residual Clayey silt
TH2 0 - 1500 1500 - 1800 1800-4500	Moist Moist Moist	Black Grey / Brown Orange / Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt
TH3 0-1500 1500-1800 1800-5000	Moist Moist Moist	Black Grey / Brown Orange / Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt
TH4 0-500 500-1900 1900-5000	Moist Moist Moist	Black Grey /Brown Orange /Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt
TH5 0-500 500-1900 1900-5500	Moist Moist Moist	Black Grey /Brown Orange /Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt
TH6 0-1000 1000-2000 2000-6000	Moist Moist Moist	Black Brown/Grey Orange/Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt
TH7 0-1000 1000-1900 1900-6000	Moist Moist Moist	Black Grey/Brown Orange /Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt Gravel
TH8 0-1000 1000-1900 1900-6000	Moist Moist Moist	Black Brown/Grey Orange/Fawn	Firm Firm Stiff	Clay Clay Residual Clayey silt Gravel
TH9 0-600 600-1800 1800-6000	Moist Moist Moist	Black Brown Light Brown	Firm Firm Stiff	Clay Clay Residual Clayey silt Gravel
TH10 0-600 600-1800 1800-6000	Moist Moist Moist	Black Brown Light Brown	Firm Firm Stiff	Clay Clay Residual Clayey silt Gravel



**DCP TEST RESULTS**

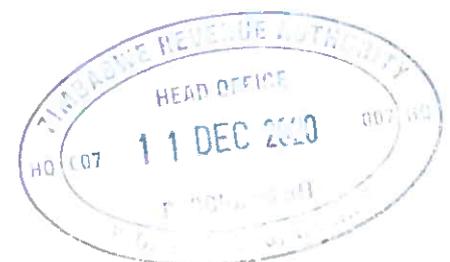
**TH1**

Depth Below Ground level (m)	Penetration Per Blow (mm)	Equivalent Bearing Capacity (KPa)
<b>At Surface</b>		
10	-	-
40	15	155
90	25	88
120	15	155
160	20	110
200	20	110
240	20	110
300	30	69
370	35	57
420	25	88
480	30	69
530	25	88
560	15	155
630	14	165
700	14	165
760	12	200
840	16	145
950	12	200
<b>At 1.0m</b>		
60	-	-
120	30	69
200	40	48
290	45	43
360	35	57
450	45	43
520	35	57
600	40	48
670	35	57
740	35	57
810	35	57
900	40	48
<b>At 2.0m</b>		
70	-	-
130	30	69
230	30	38
340	55	34
400	30	69
430	15	155
500	14	165
600	20	110
660	12	200
700	8	315
760	12	200
810	10	250
850	8	315
900	10	250
<b>REFUSAL</b>		



**TH 2**

Depth Below Ground level (m)	Penetration Per Blow (mm)	Equivalent Bearing Capacity (KPa)
<b>At Surface</b>		
30	-	-
70	20	110
110	20	110
150	20	110
200	25	88
240	20	110
300	30	69
370	35	57
4300	30	69
490	30	69
540	25	88
580	20	110
620	8	315
650	6	500
710	12	200
760	10	250
800	8	315
850	10	250
900	10	250
940	8	315
<b>At 1.0m</b>		
50	-	-
100	25	88
250	35	57
330	40	48
410	40	48
500	40	48
580	45	43
650	40	48
720	35	57
800	35	57
870	40	48
940	35	57
<b>At 2.0m</b>		
30	-	-
90	30	69
160	35	57
210	25	88
280	35	57
330	25	88
360	15	155
410	10	250
450	8	315
500	10	250
540	8	315
600	12	200
640	8	318
670	6	500
700	6	500
730	6	500
760	6	500
810	10	250
830	4	795
860	6	500
890	6	500
920	6	500
<b>REFUSAL</b>		



**TH 3**

Depth Below Ground level (m)	Penetration Per Blow (mm)	Equivalent Bearing Capacity (KPa)
<b>At Surface</b>		
20	-	-
80	30	69
130	25	88
170	20	110
210	20	110
240	15	155
280	20	110
310	15	155
350	20	110
380	15	155
490	22	100
580	18	125
690	22	100
780	18	125
880	20	110
940	12	200
<b>At 1.0m</b>		
70	-	-
120	25	88
200	40	48
290	45	43
370	40	48
450	40	48
530	40	48
610	40	48
700	45	43
780	40	48
860	40	48
940	40	48
<b>At 2.0m</b>		
30	-	-
120	45	43
190	35	57
260	35	57
310	25	88
390	16	145
450	12	200
490	8	315
520	6	500
570	10	250
570	6	500
600	6	500
640	8	315
680	8	315
680	6	500
710	6	500
740	6	500
770	6	500
800	6	500
830	6	500
860	6	500
900	6	500



**TH4**

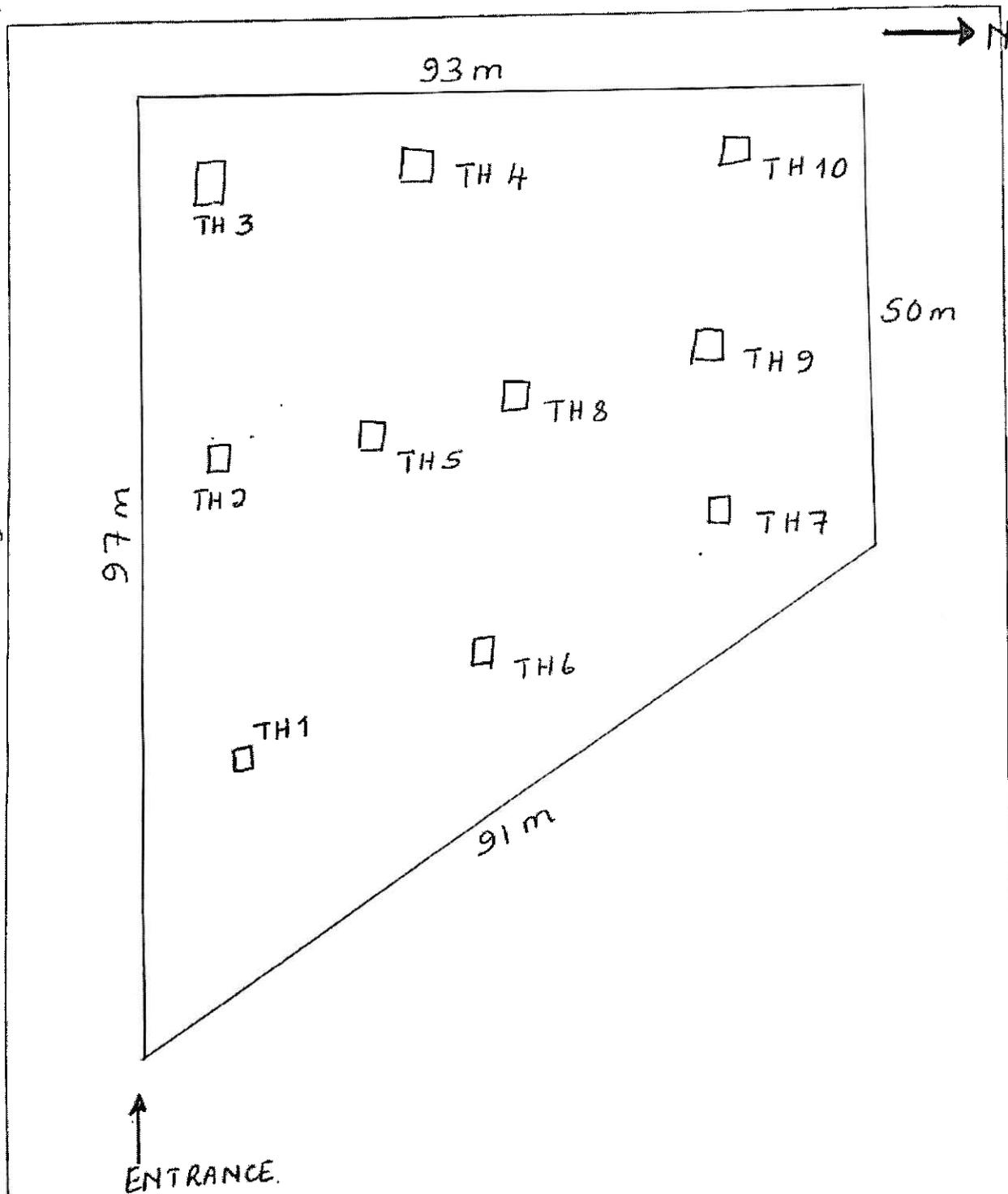
Depth Below Ground level (m)	Penetration Per Blow (mm)	Equivalent Bearing Capacity (KPa)
<b>At Surface</b>		
30	-	-
70	20	110
150	40	48
200	25	88
250	25	88
300	25	88
360	30	69
410	25	88
470	30	69
520	25	88
570	25	88
630	30	69
670	20	110
710	20	110
750	20	110
790	20	110
840	25	88
880	20	110
920	20	110
<b>At 1.0m</b>		
50	-	-
120	35	57
200	40	48
280	40	48
350	35	57
410	30	69
490	40	48
580	45	43
670	45	43
730	30	69
800	35	57
860	30	69
920	30	69
<b>At 2.0m</b>		
40	-	-
130	45	43
190	30	69
230	20	110
320	18	125
400	16	145
460	12	200
520	12	200
570	10	250
610	8	315
650	8	315
690	8	315
730	8	315
760	6	500
800	8	315
840	8	315
880	8	315
920	8	315
<b>REFUSAL</b>		



**TH 5**

Depth Below Ground level (m)	Penetration Per Blow (mm)	Equivalent Bearing Capacity (KPa)
<b>At Surface</b>		
40	-	-
110	35	57
180	35	57
240	30	69
290	25	88
330	20	110
390	30	69
460	35	57
510	25	88
560	25	88
600	20	110
660	30	69
710	25	88
770	30	69
820	25	88
880	30	69
920	20	110
960	20	110
<b>At 1.0m</b>		
60	-	-
160	25	88
240	40	48
300	30	69
350	25	88
390	20	110
470	16	145
550	16	145
610	12	200
670	12	200
720	10	250
760	8	315
800	8	315
850	10	250
890	8	315
940	10	250
<b>At 2.0m</b>		
20	-	-
80	20	110
130	25	88
150	10	250
200	10	250
240	8	315
270	6	500
300	6	500
320	4	795
350	6	500
390	8	315
420	6	500
440	4	795
480	8	315
500	4	795
540	8	315
570	6	500
810	10	250
830	4	795
860	6	500
890	6	500
920	6	500
<b>REFUSAL</b>		





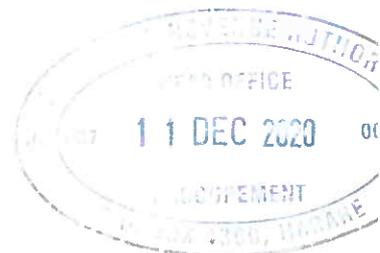
PROJECT PROPOSED ZIMRA	TITLE	FIG. 1 Not to Scale
HEAD OFFICE	POSITION OF TRIAL HOLES	DATE
CLIENT GALAXY	□ Trial Hole Position	03/07/07







# WATER RETICULATION





ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	AMOUNT
	<b>TOTAL BROUGHT FORWARD</b>				
A13.5	Supply and fix etc. S245 mesh	4.32	m2		
A13.6	230 mm Industrial brick wall	1.44	m2		
A13.7	Plaster to brick wall	1.44	m2		
A13.9	Provide covers to chambers	6	No		
A14	Break existing tarmac or concrete and reinstate to the same condition after laying of pipes.	10	m2		
A15	Apply for and make a permanent water connection into municipality water reticulation on behalf of client. Include for excavation, chamber construction all material and making good and testing etc required by Municipality		Sum		
A16	Sterilise Reticulation		Sum		
<b>TOTAL FOR SECTION 'A' CARRIED TO CIVILS SUMMARY</b>					



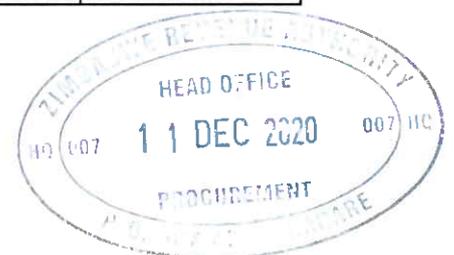


## SEWER RETICULATION



**CIVIL WORKS SECTION B: SEWER RETICULATION**

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
B1	Clear 2m wide route of all grass and bushes and trees of girth less than 1000mm measured at 1m above ground level.	390	m		
B2	Removal of trees, stumps and roots along route, of girth more than 1000mm measured at 1m above ground level.	1	No		
B3	Excavate backfill and compact pipe trenches 650mm wide. (Class D1 bedding).				
B3.1	not exceed 1.5m deep	234	m		
B3.2	over 1.5m but not exceeding 2.5m	156	m		
B3.3	exceeding 2.5m	10	m		
B4	Excavation in				
B4.1	hard material	50.7	m <sup>3</sup>		
B4.2	rock material	25.35	m <sup>3</sup>		
B5	Extra over items B3 for additional compaction up to 95% MOD ASHTO when refilling trenches at road crossings.	10	m		
B6	Supply, lay, joint, test etc the following pipes as specified				
B6.1	100mm nb AC Sewer pipes	10	m		
B6.2	150mm nb AC Sewer pipes	390	m		
B7	Extra over item C6 for 150mm Grade 20 concrete surround to pipes	50.7	m <sup>3</sup>		
B8	Provide and compact sand as bedding and surround to AC where specified.	114.1	m <sup>3</sup>		
B9	Provide 100 mm x 100 mm x 45 deg junction angles for connections to building		No		
B10	Provide 100 mm x 150 mm x 45 deg junction angles for connections to building	10	No		
B11	Supply all materials and construct 1050mm diameter circular precast concrete with medium duty steel covers manholes. Include for excavation bases, steps etc .testing etc.				
B11.1	for manholes not exceeding 1.5m deep	8	No		
B11.2	for manholes over 1.5m deep but not exceeding 2.5m deep.	4	No		
B11.3	exceeding 2.5m	10	No		
B12	Extra over B11 for excavation in				
B12.1	hard material	10	m <sup>3</sup>		
B12.2	rock material	5	m <sup>3</sup>		
B13	Extra over item B11 for heavy duty steel manhole covers	12	No		
B14	Supply all materials and construct rodding ways with steel covers.	4	No		
B15	GREASE TRAP/INTERCEPTER				



ZIMRA CORPORATE HEAD OFFICE: CIVIL ENGINEERING WORKS

B15.1	Excavate in soft material, backfill and compact	13.5	m <sup>3</sup>		
<b>TOTAL CARRIED FORWARD</b>					
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE</b>	<b>AMOUNT</b>
<b>TOTAL BROUGHT FORWARD</b>					
B15.2	Excavate in hard material	1.4	m <sup>3</sup>		
B15.3	Excavate in rock material	0.7	m <sup>3</sup>		
B15.4	Grade 30 concrete in base, walls and top slab. Include for shuttering	1.8	m <sup>3</sup>		
B15.5	Grade 15 concrete as blinding	0.3	m <sup>3</sup>		
B15.6	Supply and fix high tensile round deformed reinforcing steel up to 25 mm diameter bars	173.8	kg		
B15.7	Supply and fix etc S254 mesh	179	kg		
B15.8	230mm industrial brick wall	29.5	m <sup>2</sup>		
B15.9	Plaster to brick wall	59.1	m <sup>2</sup>		
B15.10	Provide cover for chambers	3	No		
B15.11	Provide vent pipes as specified on drawing	1	No		
B16	Break existing tarmac or concrete and reinstatate to the same condition after laying of pipes.	10	m <sup>2</sup>		
B17	Apply for and make a permanent connection into municipality sewer line on behalf of client. Include for excavation, manhole construction all material and making good and testing etc required by Municipality	1	No		
<b>TOTAL FOR SECTION 'B' CARRIED TO CIVILS SUMMARY</b>					

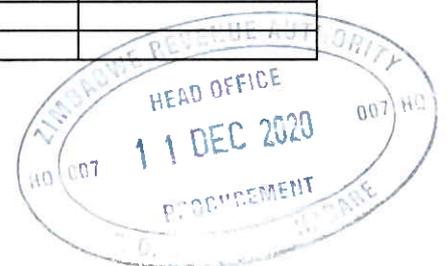


## ROAD WORKS



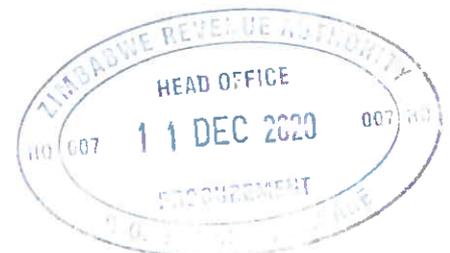
**CIVIL WORKS SECTION C: ROADWORKS & STORMWATER DRAINAGE**

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
<b>CLEARANCE FOR ROADS</b>					
C1	Allow for the clearing of all the bushes, undergrowth and small trees with girth n.e 1000mm along roads	420	m2		
C2	Provisional allowance for use as requested by Engineer for site preparation		Sum		
C3	Remove and grub trees with girth more than 1000mm	20	No		
C4	Remove overburden/topsoil to a depth of 200 mm and stockpile for later use along roads and walkways	100.8	m3		
C5	Spread topsoil and level in specified areas	100.8	m3		
C6	Excavate excess or unsuitable material below formation level to spoil within 0.5km in roads	252	m3		
C7	Source and supply approved fill material and use for fill sections in roads spreading in layers n.e 150mm (measured compacted ) to 91% HCE (free haulage 0.5km)	378	m3		
C8	Excavation in				
C8.1	hard material	70.56	m3		
C8.2	rock material	8.82	m3		
C9	Excavate anthills as to spoil within 0.5km	10	m3		
C10	Treat anthills as specified	5	m2		
C11	Extra over above items for overhaul exceeding 0.5km.	12600	m <sup>3</sup> km		
C12	Form, scarify and compact subgrade as specified 91% HCE along roads and walkways.	420	m2		
C13	Source, supply, spread trim and compact 150mm base 2 layer (free overhaul 0.5 km)	63	m3		
C14	Source, supply, spread trim and compact 150mm base 1 layer (Crusher Run)(free overhaul 0.5 km)	63	m3		
C15	Extra over item C13 & C14 for overhaul	2520	m <sup>3</sup> km		
C16	Supply and spray bitumen prime including preparation and watering of base 2 (cut back) bitumen to be applied at a rate of 1.001/cu.m	30	m <sup>2</sup>		
C17	Supply all materials for and apply double seal spray and cheap surfacing including over shoulders if required by the engineer using the following materials and application rates				
(a)	tack coat of penetration grade bitumen 150/200 0.9 to 1.21/sq.m	30	m <sup>2</sup>		
(b)	19mm stone chips 60 to 80 sq.m per cu.m	30	m <sup>2</sup>		
<b>TOTAL CARRIED FORWARD</b>					



ZIMRA CORPORATE HEAD OFFICE CIVIL ENGINEERING WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
<b>TOTAL BROUGHT FORWARD</b>					
(c)	seal coat of penetration grade bitumen 150/200 0.8 to 1.01sq.m	30	m <sup>2</sup>		
(d)	6,7mm stone chips 115 to 130 sq.m per cu.m	30	m <sup>2</sup>		
C18	Supply and laying of roadstones				
C18.1	Supply sand, spread, compact in preparation for laying roadstones	21	m <sup>3</sup>		
C18.2	light duty Grade 25 (80 mm) Gee pattern roadstones	420	m <sup>2</sup>		
C19	Supply Tarphalt edging (H6) for locking roadstones	100	m		
C20	Extra over for cement stabilization of base				
C20.1	Supply of cement to point of application	420	m <sup>2</sup>		
C20.2	Allow for spreading, firm, mixing and compacting as specified by the Engineer.	420	m <sup>2</sup>		
<b>KERBING AND PAINTING</b>					
C21	Supply, lay and bed precast concrete municipal kerb type H7 (Fort Concrete or similar)	35	m		
C22	Supply, lay and bed precast concrete rollover kerbing kerb type H9 (Fort Concrete or similar)	35	m		
C23	Grade 10 haunching to kerbing as detailed	10	m <sup>3</sup>		
C24	Two coats of road marking paint, external quality PVA (second application at the end of maintenance period)	280.5	m <sup>2</sup>		
C25	Two coats of kerbing paint, external quality PVA (second application at the end of maintenance period)	280.5	m <sup>2</sup>		
<b>PAVING SLABS - WALKWAYS</b>					
C26	Supply, lay and spread and compact 50 mm sand bed for paving slabs	0.75	m <sup>3</sup>		
C27	Supply and lay Precast/Fort Concret 450 x 450 x 50 mm precast concrete paving slabs or similar.	15	m <sup>2</sup>		
<b>STORMWATER</b>					
<b>BRICK AND REINFORCED CONCRETE RECTANGULAR CHANNELS</b>					
C28	Excavate for channels	6.8	m <sup>3</sup>		
C29	Extra over item C28				
C29.1	hard material	1.36	m <sup>3</sup>		
C29.2	rock material	0.68	m <sup>3</sup>		
C30	Construct rectangular drains				
C30.1	Provide Grade 15 concrete blinding	0.3	m <sup>3</sup>		
C30.2	Grade 20 concrete in base for brick channels and top include for shuttering	1.0	m <sup>3</sup>		
<b>TOTAL CARRIED FORWARD</b>					



ZIMRA CORPORATE HEAD OFFICE: CIVIL ENGINEERING WORKS

ITEM	DESCRIPTION		UNIT	RATE	AMOUNT
	<b>TOTAL BROUGHT FORWARD</b>				
C30.3	Grade 30 concrete in base and walls include for shuttering for reinforced concrete channels	10.0	m3		
C30.5	Supply and fix etc S245 mesh	20.0	m2		
C30.6	230 mm common brick wall	60.0	m2		
C30.7	Plaster to brick wall	60.0	m2		
C30.8	Provide 50 x 50 x 6 mm supporting angle for wecrolok including sprags for olding down angles	100.0	m		
C30.9	Provide heavy duty wecrolok cover to rectangular drains	20.0	m2		
	<b>BURIED PIPES</b>				
C31	Clear route for buried pipes	781	m		
C31	Excavate for buried pipes				
A31.1	not exceeding 1.5 m deep	702.9	m		
A31.2	over 1.5m deep	78.1	m		
C32	Extra over item C31				
C32.1	hard material	85.91	m3		
C32.2	rock material	42.955	m3		
C32.3	Unsuitable/expansive material below pipe invert	319.5	m3		
C32.3	Source and supply approved fill material under pipe invert, spreading in layers n.e 150mm (measured compacted ) to 91% HCE (free haulage 0.5km)	319.5	m3		
C33	Supply and lay concrete stormwater pipes with interlocking ogee joints				
C33.1	450 mm nb	781	m		
C33.2	600 mm nb (provisional)	20	m		
C33.4	Supply, lay and backfill 150 mm nb porous pipes including for filter material as specified on drawings	20.0	m		
C34	Grade concrete 10 bed and haunch to buried pipes	117.2	m3		
	<b>CATCHPITS</b>				
C35	Excavate for catchpits	75.3	m3		
C36	Extra over item C35				
C37.1	hard material	15.1	m3		
C37.2	rock material	7.5	m3		
C38	Construct catchpits				
C38.1	Provide Grade 15 concrete blinding	3.8	m3		
C38.2	Grade 20 concrete in base and top include for shuttering	64.9	m3		
C38.5	Supply and fix etc S245 mesh	42.2	m2		
C38.6	230 mm industrial brick in walls	165.6	m2		
C38.7	Plaster to brick wall	165.6	m2		
C38.8	Provide 50 x 50 x 6 mm supporting angle for wecrolok including sprags for holding down angles	57.0	m		
	<b>TOTAL CARRIED FORWARD</b>				



ZIMRA CORPORATE HEAD OFFICE: CIVIL ENGINEERING WORKS

ITEM	DESCRIPTION		UNIT	RATE	AMOUNT
	<b>TOTAL BROUGHT FORWARD</b>				
C38.9	Provide heavy duty wecrolok cover to rectangular drains	43.3	m2		
C38.10	Divert 100 mm Dia downpipes from columns and make connections to catchpits as detailed on the drawings including bends and rodding way	70.0	No.		
C39	Supply all materials and construct 20 Mpa energy dissipator	3	m3		
	<b>CULVERTS</b>				
C39	Excavate for buried pipes/culverts	12	m3		
C40	Extra over item D39				
C40.1	hard material	2.4	m3		
C40.2	rock material	7.2	m3		
C41	Supply and lay concrete stormwater pipes with interlocking ogee joints				
C42.1	450 mm nb	20	m		
C43	Grade concrete 10 bed and haunch to culvert/buried pipes	10.51	m3		
C44	Supply all materials and construct 20 Mpa concrete headwalls	1.2	m3		
C45	Supply all materials and construct 20 Mpa culvert approaches and exits	1.35			
C46	Allow a provisional sum for testing by appointed laboratory		Sum		
C47	Stone pitching 100mm thick	20	m2		
C48	Supply and plant Buffalo grass in specified areas.	4500	m2		
C49	Maintain Buffalo grass inc dweeding, manure, fertilisers etc	12	mnth		
C50	Supply all materials and paint Give Way markings to roads as directed by the Engineer	24	No		
C51	Provide and erect complete Give Way traffic signpost	2	No		
C52	Supply all materials and paint kerbing as directed by the Engineer	30	m2		
C53	Break existing tarmac or concrete and reinstate to the same condition after laying of pipes or other services.	10	m2		
C54	Apply for and make a permanent connection into municipality catchpit/drain on behalf of client. Include for excavation, catchpit construction all material and making good and testing etc required by Municipality	1	No.		
<b>TOTAL FOR SECTION 'C' CARRIED TO CIVILS SUMMARY</b>					





## **BOUNDARY WALL**



Item	Description	Uom	Quantity	Rate	Amount	Total
<b>CIVIL WORKS SECTION E: BOUNDARY WALL</b>						
<b>FOUNDATIONS</b>						
EXCAVATION						
Excavate in pickable material for						
1	Bases not exceeding 2m deep	m3	15.75			
2	Extra over excavation in pickable material for excavation in hard pickable material.	m <sup>3</sup>	1.58			
3	Ditto for excavation in rock.	m <sup>3</sup>	0.79			
Disposal						
4	Redig from spoil heap and cart off site.	m <sup>3</sup>	18.11			
CONCRETE, FORMWORK AND REINFORCEMENT						
Unreinforced concrete (Grade 20-20 mm stone) in						
5	Bases	m3	15.75			
<b>Total</b>						
<b>METAL WORK</b>						
PALLISADE FENCE & GATES						
THE FOLLOWING IN PALLISADE FENCE INCLUDING ALL NECESSARY CUTTING, DRILLING, HOISTING, ETC. CLEAN AND FILE ALL WELDED JOINTS FLUSH AND SET UP AND MAINTAIN IN POSITION						
Fencing and the like						
6	Palisade wall consisting 20mm diameter Powder coated high quality galvanized steel rods with spear end at 100mmc/c, and horizontal flat bars welded together and fixed to brickwork (As detailed on Architect's Drawing)	m	305.80			
7	100 x 100mm Powdercoated hollow boxed steel section post	kg	4817.40			
Mild Steel Gate						
8	Gate in Two equal leaves Size 4 400 x 2 800mm	No	1.00			
9	Sliding Gate 4 400 x 2 800mm high	No	2.00			
<b>Total</b>						
<b>PAINTWORK</b>						
PAINTING						



Item	Description	Uom	Quantity	Rate	Amount	Total
	NOTE: All surfaces specified as clean down are to be thoroughly brushed with a wire brush to remove all loose paint and dust, all crevices, cracks, etc. Are to be stopped and rubbed down with sand paper to a smooth and even surface.					
	METAL					
	Clean down, touch up priming coat and apply one undercoat and two finishing coats high gloss enamel paint on					
10	Palisade Fence.	m <sup>2</sup>	764.50			
	LEAVE CLEAN					
11	Allow for touching up all work through out, clean off all paint, oil, cement, or other stains or marks on walls, floors, ceilings, glass, etc., and leave all surfaces in full and proper working order	Item	1.00			
	<b>Total</b>					
	<b>Section Total Carried Forward</b>					





## CIVIL WORKS SUMMARY



**ZIMRA CORPORATE HEADQUARTERS**

**DATE: DECEMBER 2020**

**SUMMARY OF CIVIL ENGINEERING WORKS ESTIMATES (EXTERNAL WORKS) - BUDGET**

<b>CIVIL WORKS SECTION</b>	<b>DESCRIPTION</b>	<b>AMOUNT (USD)</b>
A	WATER RETICULATION	
B	SEWER RETICULATION	
C	ROADWORKS AND STORMWATER DRAINAGE	
D	BRICK BOUNDARY WALL	

**TOTAL FOR CIVIL WORKS CARRIED TO OVERALL WORKS SUMMARY**

*nb No PGs, CONTINGENCIES and VAT in above figures*





## PROVISIONAL SUMS



Amount

**BILL NO. 1**  
**PROVISIONAL SUMS**

**(For Preambles see General Specification)**

**MATERIAL AND COMPACTION TESTS**

1	Provide the amount of US 6 000.00 (Six thousand dollars) for material and compaction tests executed complete.	Item	6 000 00
2	Profit on above item.	Item	
3	Attendance on ditto.	Item	

**TEST CUBES**

4	Provide the amount of US\$ 2 000.00 (Two thousand dollars) for test cubes executed complete.	Item	2 000 00
5	Profit on above item.	Item	
6	Attendance on ditto.	Item	

**SIGNAGE**

**Signage:**

7	Provide the amount of US\$16 000.00 (Sixteen thousand dollars) for Signage.	Item	16 000 00
8	Profit on above item.	Item	
9	Attendance on ditto.	Item	

**ENTRANCE FACADE**

**Entrance Facade**

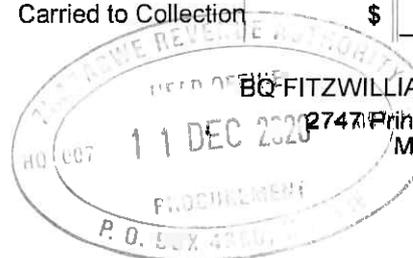
10	Provide the amount of US\$ 50 000.00 (Fifty thousand dollars) for Entrance Façade.	Item	50 000 00
11	Profit on above item.	Item	
12	Attendance on ditto.	Item	

**KITCHEN FITTINGS**

13	Provide the amount of US \$8 000.00 (Eight thousand dollars) for kitchen fittings supplied, fixed and decorated complete.	Item	8 000 00
14	Profit on the above item.	Item	
15	Attendance on ditto.	Item	

Carried to Collection

\$



BQ-FITZWILLIAM PARTNERSHIP  
2747 Princess Margaret Rd,  
Mafiborough, Harare

Amount

**LIFT**

16	Provide a sum of US \$ 400 000.00 (Four hundred thousand dollars) for Lifts (Passenger and Goods) including studded rubber floor finish, stainless steel walls with mirror supplied and fixed complete and one 1 000 kg service lift supplied and fixed complete and fixed complete	Item	400 000 00
17	Profit on the above item.	Item	
18	Attendance on ditto.	Item	

**RECEPTION DESKS.**

19	Provide a sum of US\$ 10,000.00 (Ten thousand dollars) for reception desks supplied, fixed and decorated complete.	Item	10 000 00
20	Profit on the above item.	Item	
21	Attendance on ditto.	Item	

**ELECTRICAL INSTALLATION**

**Electrical installation:**

22	Provide the amount of US\$ 3 500 000.00 (Three million and five hundred thousand dollars) for Electrical Installation.	Item	3 500 000 00
23	Profit on above item.	Item	
24	Attendance on ditto.	Item	

**SOLAR INSTALLATION**

**Solar installation**

25	Provide the amount of US\$ 2 500 000.00 (Two million five hundred thousand dollars) for Solar System Installation.	Item	2 500 000 00
26	Profit on above item.	Item	
27	Attendance on ditto.	Item	

**AIR CONDITIONING INSTALLATION**

**Air conditioning installation:**

28	Allow the sum of US\$3 110 000.00 (Three million One hundred and ten thousand dollars) for Air Conditioning Installation for offices, server rooms, auditorium, basement and canteen.	Item	3 110 000 00
29	Profit on above item.	Item	
30	Attendance on ditto.	Item	

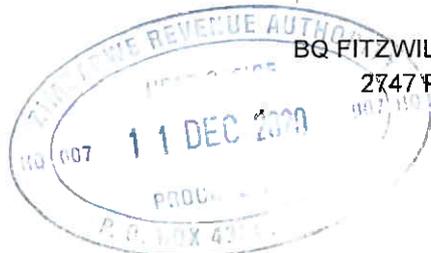
**KITCHEN EQUIPMENT**

**Kitchen Equipment installation:**

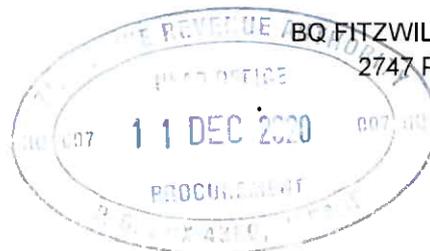
31	Provide the amount of US\$ 80 000.00 (Eighty thousand dollars) for Kitchen Equipment Installation.	Item	80 000 00
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Carried to Collection

\$



		Amount
32	Profit on above item.	Item
33	Attendance on ditto.	Item
<b><u>COLD ROOM AND FREEZER ROOM INSTALLATION</u></b>		
<b><u>Cold room installation:</u></b>		
34	Provide the amount of US\$ 60 000.00 (Sixty thousand dollars) for Cold Room and Freezer Room Installation.	Item 60 000 00
35	Profit on above item.	Item
36	Attendance on ditto.	Item
<b><u>STAIRCASE PRESSURIZATION SYSTEM</u></b>		
<b><u>Staircase pressurization system:</u></b>		
37	Provide the amount of US\$ 200 000.00 (Two hundred thousand dollars) for Staircase pressurization system.	Item 200 000 00
38	Profit on above item..	Item
39	Attendance on ditto.	Item
<b><u>FIRE SPRINKLER INSTALLTION</u></b>		
<b><u>Fire Sprinkler Installation:</u></b>		
40	Provide the amount of US\$ 1 400 000.00 (One million four hundred thousand dollars) for Fire Sprinkler Installation.	Item 1 400 000 00
41	Profit on above item.	Item
42	Attendance on ditto.	Item
<b><u>MIRRORS</u></b>		
<b><u>Bathroom mirrors:</u></b>		
43	Provide the amount of US\$ 8000.00 (Eight thousand dollars) for Mirrors.	Item 8 000 00
44	Profit on above item.	Item
45	Attendance on ditto.	Item
<b><u>AUDITORIUM</u></b>		
46	Provide the amount of US \$ 1 000 000.00 (One million dollars) for Auditorium Fitment.	Item 1 000 000 00
47	Profit on above item.	Item
48	Attendance.	Item
<b><u>PLUMBING WORKS, LANDING VALVES AND SOLAR GEYSERS.</u></b>		
49	Provide the amount of US \$ 600 000.00 (Six hundred thousand dollars) for Plumbing works, Landing valves and solar geysers supply and installation.	Item 600 000 00
Carried to Collection		\$



		Amount
50	Profit on above item.	Item
51	Attendance.	Item
	<b><u>PERGOLA</u></b>	
52	Provide the amount of US \$ 1 500.00 (One thousand five hundred dollars) for Pergola.	Item 1 500 00
53	Profit on above item.	Item
54	Attendance.	Item
	<b><u>SUN SHADES</u></b>	
55	Provide the amount of US \$ 240 000.00 (Two hundred and forty thousand dollars) for Sun shades.	Item 240 000 00
56	Profit on above item.	Item
57	Attendance.	Item
	<b><u>DRILLING/PUMP/STAND &amp; TANK</u></b>	
58	Provide the amount of US\$ 5 000.00 (Five thousand dollars) for Drilling/Pump/Tank	Item 5 000 00
59	Profit on above item.	Item
60	Attendance.	Item
	<b><u>PILING</u></b>	
61	Provide the amount of US\$ 1 450 000.00 (One million four hundred and fifty thousand dollars) for piling works	Item 1 450 000 00
62	Profit on above item..	Item
63	Attendance.	Item
	<b><u>PROJECT VEHICLES</u></b>	
64	Provide the amount of \$ 170 000.00 (One Hundred and Seventy Thousand Dollars) for TOYOTA Diesel Powered Double Cab Vehicles (x 2no.)	Item 170 000 00
65	Profit on above item	Item
66	Attendance	Item

Carried to Collection \$

Amount

**BILL NO. 1**  
**PROVISIONAL SUMS**  
**COLLECTION**

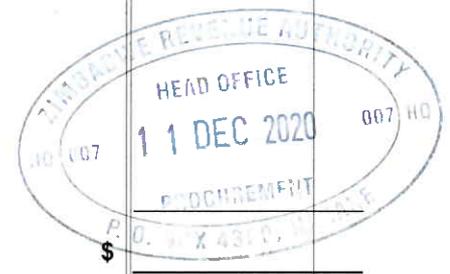
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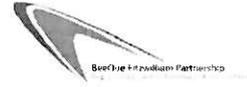
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Carried to Summary

\$



**BQ FITZWILLIAM PARTNERSHIP**  
2747 Princess Margaret Rd,  
Marlborough, Harare



## FINAL SUMMARY



Bill No. ZIMRA HEADQUARTERS  
FINAL SUMMARY

- 1 PRELIMINARIES & GENERAL
- 2 MAIN BUILDING
- 3 GATE HOUSE
- 4 ELECTRICAL OUTBUILDINGS
- 5 BATTERY PADS
- 6 GENERATOR PADS
- 7 CIVIL WORKS
- 8 PROVISIONAL SUMS

**Sub Total**

10% Contingencies

**Sub Total before VAT**

ADD VAT 14.5%

ADD 2% Tax

**Carried to Form of Tender**

AMOUNT (USD)

