

1. Form of Contract

This Contract made the 27TH day of DECEMBER... 2021 between THE TRUSTEES OF THE TANZANIA NATIONAL PARKS OF P.O. BOX 3134, ARUSHA (here in after called ("the Employer")) and ELERAI CONSTRUCTION CO. LTD OF P.O. BOX 7026, ARUSHA (Here in after called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute CONSTRUCTION OF GATE COMPLEX IN MKOMAZI NATIONAL PARK CONTRACT NO. PA/037/TCRP/2021-2022/HQ/W/18 (here in after called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such works and the remedying of any defects therein in the sum of Tsh. 2,129,862,865.00 (Tanzania Shillings Two Billion One Hundred Twenty Nine Million Eight Hundred Sixty Two Thousand Eight Hundred Sixty Five Only) VAT Inclusive (here in after called "Contract Price").

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

1. In this Contract, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Contract.
2. The following documents shall have deemed to form and be read and construed as part of this Contract. Viz:-
 - a) Form of Contract
 - b) Letter of Acceptance
 - c) Form of Tender
 - d) Minutes of Negotiation
 - e) Special Conditions of Contract
 - f) General Conditions of Contract
 - g) Specifications
 - h) Drawings
 - i) Bill of Quantities
 - j) Forms of Securities
3. In consideration of the payments to be made by the Employer to the Contractor as herein after mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects where in the Contract Price of Tsh. 2,129,862,865.00 (Tanzania Shillings Two Billion One Hundred Twenty Nine Million Eight Hundred Sixty Two Thousand Eight Hundred Sixty Five Only) VAT Inclusive or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
5. The contract duration shall be Six (6) months and the starting date shall be within fourteen days after signing project Execution Form

In Witness where of the parties there to have caused this Contract to be executed the day and year first before written.


Sealed with the Common Seal of THE TRUSTEES OF THE TANZANIA NATIONAL PARKS and delivered in our presence this 27 day of DECEMBER 2021

Full Name: DR. ALLAN J.H. KIJAZI
Signature: [Handwritten Signature]
Address: BOX 3134
ARUSHA
Designation: CONSERVATION COMMISSIONER


Full Name: Theophilus Akiba
Signature: [Handwritten Signature]
Address: 3134 ARUSHA
1
Designation: ACE
Date: 27/12/2021

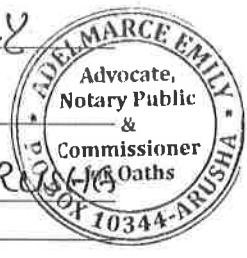


Sealed with the Common Seal of the ELERAI
CONSTRUCTION CO. LTD and delivered in our presence
this 27TH day of .. DECEMBER .. 2021

Full Name: SAMUEL SAM LEMA
Signature: 
Address: P. O. BOX 7026 ARUSHA
Designation: MANAGING DIRECTOR



Full Name: ADELMARCE EMILY
Signature: 
Address: P. O. BOX 10344 ARUSHA
Designation: ADVOCATE
Date: 27.12.2021





I. LETTER OF ACCEPTANCE



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF NATURAL RESOURCES AND TOURISM
TANZANIA NATIONAL PARKS



In reply please quote:
FA.34/347101

08.12.2021

Ref. No:.....

Date:.....

Managing Director,
Elerai Construction Limited
P.O. Box 7026,
ARUSHA.

Re: AWARD NOTIFICATION

This is to notify you that your tender dated 29th November 2021, Tender No. PA/037/TCRP/2021-2022/HQ/W/18 for Construction of Gate Complex, (Construction of 4in1 and 2in1 staff house, Gate house, car parking and public toilet) in Mkomazi National Park for the Contract Price of Tshs.2,129,862,865.00 (Tanzania Shillings Two Billion One Hundred Twenty Nine Million Eight Hundred Sixty Two Thousand Eight Hundred Sixty Five Only) Vat Inclusive as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by us.

2. We hereby confirming National Construction Council to be the appointing authority, to appoint the Adjudicator in case of any arisen disputes in accordance with ITT 43.1.
3. You are hereby instructed to proceed with the execution of the said works in accordance with the Contract documents. You are therefore, required to submit Performance Bond and Program of work within fourteen days after signing the contract.
4. Please return the contract dully signed.

Authorized Signature: _____

Name and Title of Signatory: _____

DR. ALLAN J. H. KIJAZI
CONSERVATION COMMISSIONER

Name of Agency: _____

TANZANIA NATIONAL PARKS

II. FORM OF TENDER

2. Form of Tender

22nd November, 2021

To: Tanzania National Parks,
P.O BOX 3134,
ARUSHA.

We ELERAI CONSTRUCTION COMPANY LTD offer to execute the Construction of Gate Complex in Mkomazi National Park, Tender No. PA/037/TCRP/2021-2022/HQ/W/18 in accordance with the Conditions of Contract accompanying this tender for the Contract Price of TSHS.2,188,072,501.40 [Tanzanian Shillings Two Billion One Hundred Eighty Eight Million Seventy Two Thousand Five Hundred One Cents Forty Only [TSHS].

The Contract shall be paid in the following currencies:

Currency	Percentage payable in currency	Rate of exchange: one foreign equals [<i>insert local</i>]	Inputs for which foreign currency is required
(a)			
(b)			

The advance payment required is:-

Amount	Currency
(a)328,210,875.21	TSHS.
(b)	

We declare that our tendering price did not involve Contracts with other tenderers for the purpose of tender suppression.

We hereby confirming National Construction Council to be the appointing authority, to appoint the adjudicator incase of any arisen disputes in accordance with ITT 43.1[Adjudicator]

We are not participating, as tenders, in more than one tender in this tendering process other than alternative tenders in accordance with the tendering documents.

We declare that, as tenderer (s) we do not have conflict of interest with reference to ITT 3:7 [Eligibility of Tenderers]

With reference to ITT 3.11, it is our intention to subcontract approximately [*insert the percent*] percentage of the Tender /Contract Price, details of which are provided herein.

Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the contract has not been declared ineligible by the Government of the United Republic of Tanzania under Tanzania's laws or any other official regulations.

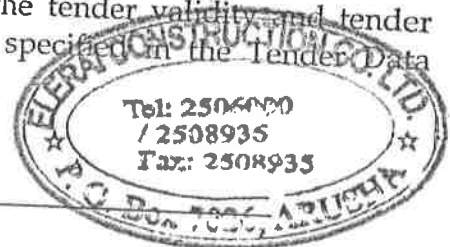
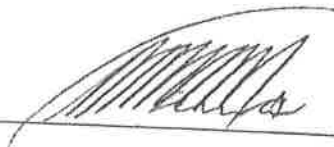
We declare that our tendering price did not involve Contract with other tenderers for the purpose of tender suppression.

This tender and your written acceptance of it shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any tender you receive.

We hereby confirm that this tender complies with the tender validity and tender security required by the tendering documents and specified in the Tender Data Sheet.

Authorized Signature: _____



Name and Title of Signatory: SAMWEL .S.M. LEMA (MANAGING DIRECTOR)

Name of Tenderer: ELERAI CONSTRUCTION COMPANY LTD

Address: P.O.BOX 7026 - ARUSHA.

III. MINUTES OF NEGOTIATION

TANZANIA NATIONAL PARKS



MINUTES OF THE NEGOTIATIONS MEETING FOR TENDER NO. PA/037/TCRP/2021-2022/HQ/W/18 FOR CONSTRUCTION OF GATE COMPLEX IN MKOMAZI NATIONAL HELD ON 3RD DECEMBER 2021

1.0 Venue: TANAPA Board room

2.0 Attendance:

i. Daniel Malima	COII – Infrastrure	Chairman
ii. Frank O. Kudeba	SCA - Infrastructure	Secretary
iii. Angel Lyanga	SCA – Accounts	Member
iv. Anthony Kimani	Quantity Surveyor	Elerai Construction Ltd
v. Saguda M. Saguda	Finance Manager	Elerai Construction Ltd

3.0 Opening

The chairperson welcomed the all members who attended the meeting. He allowed for the introduction of the members. He then proceeded to the agenda of the meeting that is negotiating the tender as it exceeded the allocated budget. He announced that meeting was officially opened at 09:35hrs local time.

4.0 Adoption of the Agenda

The meeting adopted only one agenda for the negotiation of the tender as it exceeded the allocated budget.



5.0 Areas for negotiation

After going through the bill of quantities, it was agreed to:-

- i. Omit some of the elements,
- ii. Reducing the rate to some items

The agreed areas for negotiation are as listed below

Preliminaries

Omission of the following: -

- a. Item B.14 amounting Tshs. 3,000,000.00
- b. Item B.23 amounting Tshs. 2,000,000.00
- c. Item B.30 amounting Tshs. 3,000,000.00
- d. Item B.32 amounting Tshs. 1,000,000.00
- e. Item B.34 omitting Tshs. 500,000.00

Gate complex

Reducing the rate from Element No. Five: Roof structure; Item (f) from Tshs. 10,000.00 to Tshs. 2000.00

Car parking

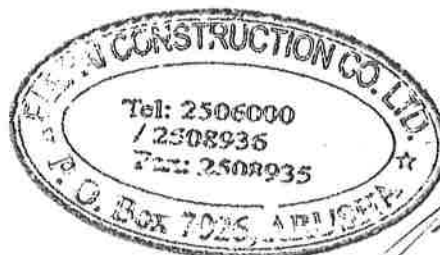
Omission of the following in preliminaries: -

- a. Item 2 amounting Tshs. 40,000,000.00
- b. Item 3 amounting Tshs. 10,000,000.00

Prime costs and Provisional Sums

- a. Reducing contingencies from Tshs. 45,000,000.00 to Tshs. 10,000,000.00
- b. Omitting item 2 amounting Tshs. 10,000,000.00
- c. Reducing the rate for item 3 from Tshs. 15,000,000.00 to Tshs. 5,000,000.00
- d. Omitting item 4 amounting Tshs. 15,000,000.00
- e. Omitting item 2 amounting Tshs. 10,000,000.00

By omitting some items and reducing the rate to some areas, the bid price has changed from Tshs. 2,306,320,065.00 to Tshs. 2,129,862,865.00 which is within the allocated budget



There is being no any other agenda to discuss and the Chairperson closed the meeting at 10:35hrs local time

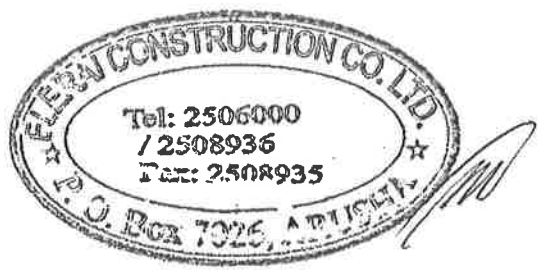
ON BEHALF OF CLIENT

DANIEL MALIMA
.....
.....

ON BEHALF OF CONTRACTOR

Anthony Kimani
.....
.....
03/12/2021

Date..... 03/12/2021





ELERAI CONSTRUCTION COMPANY LTD.

P. O. Box 7026 ARUSHA TANZANIA

Phone: +255 27 2506000 / 2508935

E-mail: info@ecc.co.tz

Website: www.ecc.co.tz

REF.NO.EL/TD/MKOMAZI/01/2021

02nd December, 2021

Tanzania National Parks
P.O BOX 3134,
ARUSHA.

Dear Sir,

**RE: TENDER NO. PA/037/TCRP/2021-2022/HQ/W/18 FOR
CONSTRUCTION OF GATE COMPLEX IN MKOMAZI NATIONAL PARK**

SUB: CONFIRMATION CORRECTION OF ERROR:

Reference is made to your letter with **Kumb. Na. AE.261/351/01** dated **01st December, 2021** concerning the above subject.

We accept the corrected figure due to error noted during evaluation which changes our quotation from **Tshs.2,188,072,737.00** to **Tshs.2,306,320,065.00**.

It is our hope that our acceptance will facilitate you to arrive to the proper decision and action.

Yours faithfully,

ELERAI CONSTRUCTION COMPANY LTD

SAMWEL .S.M. LEMA

MANAGING DIRECTOR

All correspondences to be addressed to the Managing Director



JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA MALIASILI NA UTALII
HIFADHI ZA TAIFA TANZANIA



Unapojibu tafadhali taja:

Kumb. Na.:AE.261/351/01

Tarehe:01.12.2021

**M/s ELERAI CONSTRUCTION LIMITED,
P.O.BOX 7026,
ARUSHA.**

**RE: TENDER NO. PA/037/TCRP/2021-2022/HQ/W/18 FOR CONSTRUCTION OF
GATE COMPLEX IN MKOMAZI NATIONAL PARK**

Sub: Correction of errors

Heading and sub-heading above is concerned.

Pursuant to the Provision of regulation 207 of GN No.446 and its amended of 2016, during detailed evaluation (arithmetic checking exercise) the tender price was corrected from Tshs. 2,188,072,737.00 to Tshs. 2,306,320,065.00 VAT Inclusive.

The error is as described below:


Construction of a Semidetached 4in1 staff house; summation errors superstructure element changing the sum from 19,441,150.00 to 19,444,150.00 and also a multiplication error in roof element, item 1 resulting to 9,065,000.00 instead of 9,066,400.00

Construction of 2Nos. toilets at entry/exit gate; Summation error occurred due to omission of page 71 of 89, Element No. 1: Substructure, Items 1 – 11. The sum for the substructure becomes 13,484,000.00 instead of 9,141,000.00

The above corrections affected the tender from 2,188,072,737.00 to 2,306,320,065.00

Please confirm receipt of this notification letter in writing and reply if you accept the corrected tender price for subsequent Tendering Procedures
Be guided

TANZANIA NATIONAL PARK


Emmanuel L. Kirway

For. CONSERVATION COMMISSIONER

Mwalimu J.K Nyerere Conservation Centre, Barabara ya Dodoma, S.L.P. 3134, Postikodi 23106 Arusha - Tanzania
Simu: +255 027 297 0404/0405 Simu ya Kamishna wa Uhifadhi: +255 027 297 0407
Barua pepe: cc@tanzaniaparks.go.tz Tovuti: www.tanzaniaparks.go.tz

"UHIFADHI ENDELEVU KWA MAENDELEO"

IV. SPECIAL CONDITIONS OF CONTRACT

Special Conditions of Contract (SCC)

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. Except where otherwise indicated, all Special Conditions of Contract should be filled in by the Employer prior to issuance of the Tendering Documents. Schedules and reports to be provided by Employer should be annexed.

SCC Clause	GCC Clause	Description
1	1.1	<p>A. General</p> <p>The Employer is: The Trustees of the Tanzania National Parks, P.O. Box 3134, Arusha.</p> <p>The Adjudicator is: National Construction Council</p> <p>The Defects Liability Period is: 180 days.</p> <p>The Project Manager is to be appointed</p> <p>The Works consist of:</p> <ol style="list-style-type: none"> 1. Road Works 2. Building Works: <p>The Start Date shall be within Fourteen (14) Days after Signing Project Execution Form.</p> <p>The Intended Completion Date for the whole of the Works shall be Six (6) Months after the start date</p> <p>The Site is located at Mkomazi National Park.</p>
2.	2.2	Indicate whether sectional completion is specified Not Specified
3.	2.3(10)	List other documents that form part of the contract if any: Project Execution Form
4.	4.1	The language of the Contract documents is English The law that applies to the Contract is "The Laws of Tanzania."
5	8.1	Address for communication Employer's Tanzania National Parks, P.O Box 3134 Arusha E-mail: cc@tanzaniaparks.go.tz , psm@tanzaniaparks.go.tz

		Contractor's ELERAI CONSTRUCTION CO. LTD OF P.O.BOX 7026, ARUSHA.
6.	12.1	Include the Schedule of Other Contractors, if any. Not Applicable
7.	13.1	Include the Schedule of Key Personnel. a) Project manager b) Site engineer c) Site foreman
8.	17.1	d) The minimum insurance covers shall be: e) f) loss of or damage to the Works, Plant, and Materials shall be 80% of the contract sum (a) loss of or damage to Equipment shall be 15% of the contract sum. (b) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract shall be 10% of the contract sum and (c) Personal injury or death shall be 15% of the contract sum.
9.	18.1	Site Investigation Reports available to the Tenderer are Not Applicable
	25.1	Unless otherwise, state tax payment status: Not Applicable
10.	26.4	The other measures include: a. Minimizing the number of migrant workers employed on the project and household in the site camp b. Providing access to voluntary counseling and testing (VCT) c. Providing psychological support and health care including prevention and treatment of opportunistic infections for workers infected and affected, as well as their families d. Providing condoms (male and female) to workers
11.	28.1	The Site Possession Date shall be within fourteen

		days (14days) after the contract has come into Effect.
12.	32.2	If either Party is dissatisfied with the Adjudicator's decision may, refer the dispute for arbitration within fourteen working days
13	31.1	Appointing Authority for the Adjudicator: National Construction Council
14.	32.3	Arbitration will take place at Arusha in accordance with rules and regulations published by National Construction Council using arbitration rules 2001 edition and National Construction Council adjudication procedural rules 2017.
15.	35.1	The responsible person for security of the site: - refer GCC 35
B. Time Control		
16.	36.1	The Contractor shall Submit a Programme for the Works within 14 days of delivery of the Letter of Acceptance.
17.	36.2	The period between Programme updates is 30 days.
18.	36.2	The amount to be withheld by the Project Manager in the case the contractor does not submit an updated programme is: Tshs. 100,000.00
C. Quality Control		
19.	44.1	The Defects Liability Period is 180 days.
D. Cost Control		
20	52.7	Minimum Amount of Interim Payment Certificate will be 10% of Contract price
21	54.1	The currency of payment shall be Tanzanian Shillings
22.	57	The contract is not subject to price adjustment.
23.	58.1	The amount of retention is 10% of value of works of Interim Payment Certificate'. Limit of retention will be 5% of Contract Price.
24.	59.1	The amount of liquidated damages 0.1% Of Contract Price Per Day

		The maximum amount of liquidated damages must be equivalent to the amount of the performance security 10% of the contract price
25.	60.1	The bonus for early completion is Zero per day.
26.	61.1	The amount of advance payment shall be (15%) fifteen per cent of the contract sum payable within 30 days from the date of submission of bank guarantee
		Monthly Recovery of Advance Payment shall be in three (3) installments: i.e., 30%, 30% and 40% of Advance Payment Respectively
27.	62.1	The Performance Security shall be: 10% of the contract price.
28	66.1	Contractor shall handover the site and the works to the Employer within 28 days after practical completion Certificate.
		E. Discharge of the Contract
29.	68.1	As built drawings shall be supplied by the contractor within 28 days after completion Operating manual shall be supplied by the contractor by Not Applicable
30.	68.2	The amount to be withheld by the Project Manager in the case the contractor does not submit as built drawings is: Tshs. 500,000.00 The amount to be withheld by the Project Manager in the case the contractor does not submit operating manual is: Not Applicable
31.	69.2 (i)	Number of days for which the maximum amount of liquidated damages can be paid is 100 days
32.	70.1	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is 0.1 percent.

V. GENERAL CONDITIONS OF CONTRACT

1. Definition

The following words and expressions shall have the meanings hereby assigned to them:

The **Adjudicator** is the person appointed by the appointing Authority specified in the Special Conditions of Contract (SCC), to resolve contractual disputes in the first instance, and as provided for in GCC 31 and 32 hereunder.

The **Arbitrator** is the person appointed to resolve contractual disputes, and as provided for in GCC 32 hereunder.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation Events are those events provided for in GCC 55.

The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 21.1

The **Commencement Date** is the date when the Contractor shall commence execution of the Works as specified in the Notice of Contract Commencement. The Commencement Date may be revised by the Project Manager in consultation with the employer by issuing an extension of time.

The **Contract** is the Contract entered between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below.

The **Contractor** is a person whether natural or legal whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed tendering document submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **Months** are calendar

months.

Dayworks are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.

The **Defects Liability Period** is the period named in the SCC and calculated from the Completion Date.

Drawings means the drawings of the works, as included in the contract and any additional or modified drawings issued by (or on behalf of) the Employer in accordance with the contract.

Effective Contract date is the date shown in the notice of Contract Commencement issued by the Employer upon fulfillment of the conditions precedent stipulated in Clause 3 of the GCC.

The **Employer** is the person named as employer in the SCC and the legal successors in title to this person.

Equipment is the Contractor's machinery and vehicles brought to the Site to execute the Works.

Force Majeure means an unforeseeable event which is beyond reasonable control of either Party and which makes a Party's performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party, and which makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered

impossible in the circumstances; and includes, but is not limited to, war, riots, civil disorder, earthquake,

fire, explosion, storm, flood, epidemics, or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent), confiscation.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the SCC. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.

Materials are all supplies, including consumables, used by the Contractor for execution of the Works.

Plant is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

The **Project Manager** is the person named in the SCC (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

The **Site** is the area where works are to be executed as specified in the SCC.

Site Investigation Reports are factual and interpretative reports about the surface and subsurface conditions at the Site that were included in the Tendering documents as indicated in the SCC.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

The **Start Date** is given in the SCC. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person whether natural or

		legal who has a Contract with the Contractor to carry out a part of the work in the Contract, which
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	<p>includes work on the Site.</p> <p>Temporary Works are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.</p> <p>A Variation is an instruction given by the Project Manager in consultation with the Employer, that varies the Works.</p> <p>The Works are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the SCC.</p>
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<p>2. Interpretation</p>	<p>2.1 In interpreting these Conditions of Contract headings and marginal notes are used for convenience only and shall not affect their interpretations unless specifically stated; references to singular include the plural and vice versa; and masculine include the feminine. Words have their ordinary meaning under the language of the Contract unless specifically defined.</p> <p>2.2 If sectional completion is specified in the SCC, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).</p> <p>2.3 The documents forming the Contract shall be interpreted in the following order of priority:</p> <ol style="list-style-type: none">(1) Form of Contract,(2) Special Conditions of Contract,(3) General Conditions of Contract,(4) Letter of Acceptance,(5) Certificate of Contract Commencement,(6) Specifications,(7) Drawings,(8) Bill of Quantities,(9) Contractor's Tender, and(10) Any other document listed in the Special Conditions of Contract as forming part of the Contract.
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<p>3. Conditions Precedent</p>	<p>3.1 Having signed the Contract, it shall come into effect on the date on which the following conditions have been satisfied:-</p> <ul style="list-style-type: none"> a) Submission of performance Security in the form specified in the SCC; and b) Furnishing of Unconditional Advance Payment Guarantee. <p>3.2 If the Conditions precedent stipulated on GCC 3.1 is not met by the date specified in the SCC this contract shall not come into effect;</p> <p>3.3 If the Employer is satisfied that each of the conditions precedent in this contract has been satisfied (except to the extent waved by him, but subject to such conditions as he shall impose in respect of such waiver) he shall promptly issue to the contractor a certificate of Contract commencement, which shall confirm the start date.</p>
<p>4. Language and Law</p>	<p>4.1 The language of the Contract and the law governing the Contract are stated in the SCC.</p>
<p>5. Confidentiality</p>	<p>5.1 The Service Providers, their Subcontractors, and the Personnel of either of them shall not disclose any proprietary or confidential information relating to the Project, the Services, this Contract, or the Employer's business or operations without the prior written consent of the Employer.</p>
<p>6. Project Manager's role</p>	<p>6.1 Except where otherwise specifically stated, the Project Manager will supervise execution of the contract between the Employer and the Contractor. The Project Manager shall have no authority to amend the contract.</p>
<p>7. Delegation</p>	<p>7.1 The Project Manager may upon prior consent of the employer and after notifying the contractor, delegate any of his duties and responsibilities to other people except to the Adjudicator, and may cancel any delegation after notifying the Contractor.</p>

8. Communications		8.1 Communications between the Parties to the Contract shall be effective only when in writing whether in hard or electronic form that provides record of the content of the communication. A notice shall be effective only when it is delivered at the address specified in the SCC.
9. Subcontracting		9.1 The Contractor may subcontract with the approval of the Project Manager, subject to consultation with the Employer. Subcontracting shall not alter the Contractor's obligations.
10. Assignment		10.1 The Contractor shall not assign, transfer, pledge or make other disposition of this Contract or any part thereof, or any of the Contractor's rights, claims or obligations under this Contract except with the prior written consent of the Employer.
11. Liability of Joint Venture		<p>11.1 If the Contractor constitutes a joint venture, consortium or other unincorporated grouping of two or more persons:</p> <ul style="list-style-type: none"> (a) These persons shall be jointly and severally liable to the Employer for the performance of the Contract; (b) These person shall notify the Employer of their leader who shall have the authority to bind the Contractor and each of these persons; and (c) The Contractor shall not alter its composition or legal status without the prior consent of the Employer.
12. Other Contractors		12.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the SCC. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification

<p>13. Personnel</p>		<p>13.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel, as referred to in the SCC, to carry out the functions stated in the Schedule or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Schedule.</p> <p>13.2 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 for, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.</p>
<p>14. Employer's and Contractor's Risks</p>		<p>14.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.</p>

<p>15. Employer's Risks</p>	<p>15.1 From the Start Date until the Defects Correction Certificate has been issued, the following are Employer's risks:</p> <ul style="list-style-type: none"> (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 <ul style="list-style-type: none"> (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 Employer or by any person employed by or contracted to him except the Contractor. (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, <p>15.2 From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to</p> <ul style="list-style-type: none"> (i) a Defect which existed on the Completion Date, (ii) an event occurring before the Completion Date, which was not itself an Employer's risk, or (iii) the activities of the Contractor on the Site after the Completion Date.
<p>16. Contractor's Risks</p>	<p>16.1 From the Starting Date until the Defects Correction Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.</p>

<p>17. Insurance</p>	<p>17.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the SCC for the following events which are due to the Contractor's risks:</p> <ul style="list-style-type: none"> (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. <p>17.2 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.</p> <p>17.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.</p> <p>17.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager.</p> <p>17.5 Both parties shall comply with any conditions of the insurance policies.</p>
<p>18. Site Investigation Reports</p>	<p>18.1 The Contractor shall, in executing the contract, rely on Site Investigation Reports referred to in the SCC and any supplemented information available to the Contractor.</p>
<p>19. Queries about Implementation of Contract</p>	<p>19.1 The Project Manager will clarify queries on all contractual matters.</p>

20. Contractor to execute the Works		20.1 The Contractor shall execute and install the Works in accordance with the Terms and Conditions of Contract.
21. Commencement and Completion of the Works		21.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Works Programme submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.
22. Approval by the Project Manager		<p>22.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings.</p> <p>22.2 The Contractor shall be responsible for design of Temporary Works.</p> <p>22.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.</p> <p>22.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.</p> <p>22.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before their use.</p>
23. Protection of the Environment		23.1 The Contractor shall take all reasonable steps to protect the environment and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.
		23.2 The Contractor shall ensure that emissions, surface discharges and effluent from his activities shall not exceed limits prescribed in relevant environmental laws.

24. Labour Laws	<p>24.1 The Contractor shall comply with all the relevant labour laws applicable in the Country, including laws relating to workers employment, working hours, health, safety, welfare, immigration and shall allow them all their legal rights.</p> <p>24.2 The Contractor shall require his employees to obey all applicable laws, including those concerning safety at work.</p>
25. Taxes and Duties	25.1 The Contractor, Sub-contractors and Personnel shall pay such taxes, duties, fees and other impositions as may be levied under the Laws of Tanzania unless otherwise stated in the SCC.
26 Health and Safety	<p>26.1 The Contractor shall at all times take all reasonable precautions to maintain the health and safety of his personnel and the public as per the governing occupational, health and safety laws.</p> <p>26.2 The Contractor shall ensure that first aid facilities are available at all times at the site and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.</p> <p>26.3 The Contractor shall notify the Employer details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety, and welfare of persons, and damage to the property, as the Employer may reasonably require.</p> <p>26.4 The Contractor shall conduct an HIV-Aids awareness programme, and shall take other such measures as specified in the SCC to reduce the risk of transfer of HIV virus between and among Contractor personnel, the Employers Staff and the surrounding community.</p>
27 Discoveries	27.1 Anything of historical or other interest or of significant value unexpectedly discovered on, in, or under the land at the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

<p>28 Possession of the Site</p>	<p>28.1 The Employer may give possession of whole or parts of the Site to the Contractor as stated in the SCC. If possession is not given by the date stated in the SCC, the Employer will be deemed to have delayed the start of the relevant activities, and this may be a Compensation Event.</p>
<p>29 Access to the Site</p>	<p>29.1 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.</p>
<p>30 Instructions, Inspections and Audits</p>	<p>30.1 The contractor shall comply with instructions given by the Project Manager in writing on any matter related to the contract which comply with the applicable laws where the Site is located.</p> <p>30.2 The Contractor shall permit the Government of the United Republic of Tanzania to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Government of the United Republic of Tanzania, if so required by the Government of the United Republic of Tanzania</p>
<p>31 Disputes Resolution</p>	<p>31. 1 In the event of any dispute arising out of this contract, either party shall issue a notice of dispute to settle the dispute amicably. The parties hereto shall, within twenty eight (28) days from the notice date, use their best efforts to settle the dispute amicably through mutual consultations and negotiation. Any unsolved dispute may be referred by either party to an adjudicator nominated by the appointing Authority specified in SCC.</p>

<p>32 Procedure for disputes</p>	<p>32.1 After the dispute has been referred to the adjudicator, within 30 days, or within such other period as may be proposed by the Parties, the Adjudicator shall give its decision. The rendered decision shall be binding to the Parties.</p> <p>32.2 If either Party is dissatisfied with the Adjudicator's decision may, within days specified in the SCC refer the dispute for arbitration. If either party within the period mentioned in the SCC has not referred the matter for arbitration the decision shall become final and binding to the Parties.</p>
	<p>32.3 The arbitration shall be conducted in accordance with the arbitration procedure published by the institution named and in the place shown in the SCC.</p>
<p>33 Fees and Costs of Adjudicator</p>	<p>33.1 The rate of the Adjudicator's fee and administrative costs of adjudication shall be borne equally by the Parties. The rates and costs shall be in accordance with the rules of the Appointing Authority. In conducting adjudication to its finality each party shall bear its incurred costs and expenses.</p>
<p>34 Replacement of Adjudicator</p>	<p>34.1 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract; a new Adjudicator will be appointed by the Appointing Authority.</p>

35 Security of the Site		<p>35.1 Unless otherwise stated in the SCC,</p> <p>(a) the Contractor shall be responsible for keeping unauthorised persons off the site, and</p> <p>(b) authorised persons shall be limited to the Contractor's and Employer's personnel, and to any other personnel and other Contractor notified to the Contractor by the Project Manager or Employer.</p>
		B. Time Control
36 Programme		<p>36.1 Within the time stated in the SCC, the Contractor shall submit to the Project Manager for approval of a Work Programme showing the method(s), arrangements, order, and timing for all the activities of the Works.</p>
		<p>36.2 The Contractor shall submit to the Project Manager for approval an updated Works Program at intervals not longer than the period stated in the SCC. If the Contractor does not submit an updated Works Program 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 Program has been submitted.</p>
		<p>36.3 An update of the Works Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.</p>
		<p>36.4 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</p>

37 Extension of the Intended Completion Date		<p>37.1 The Employer may 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.</p>
		<p>37.2 The Employer shall, within twenty one (21) days of receipt of application for extension of the Intended Completion Date by the Contractor, decide whether or not to grant the extension. The application by the Contractor shall be granted only when supported by full information of a compensation event(s) or variation.</p>
		<p>37.3 In the event the Contractor has not issued an early warning notice of a delay or has failed to cooperate in dealing with a delay, such a delay or failure may be a ground for not granting the extension of the Intended Completion Date</p>
38 Acceleration		<p>38.1 When the Employer wants the Contractor to finish the works before the Intended Completion Date, the Project Manager will obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts the said proposals, the Intended Completion Date will be adjusted accordingly and confirmed by both the Employer and the Contractor.</p> <p>38.2 In the event that the Contractor's priced proposals for an acceleration of the Works are accepted by the Employer, they shall be incorporated in the Contract Price and treated as a Variation.</p>

<p>39 Delays Ordered by the Project Manager</p>	<p>39.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works</p> <p>39.2 During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.</p> <p>39.3 The Project Manager may also notify the cause for the suspension.</p>
<p>40 Management Meetings</p>	<p>40.1 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.</p> <p>40.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.</p>
<p>41 Early Warning Notice</p>	<p>41.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future event(s) or circumstance(s) that may adversely affect the quality of the Works, increase the Contract Price or delay the execution of the Works. Upon receipt of the said Notice, the Project Manager may require the Contractor to provide an estimate of the expected effect of the future event(s) or circumstance(s) on the Contract Price and Intended Completion Date or Completion Date as the case may be. The estimate shall be provided by the Contractor as soon as reasonably possible.</p> <p>41.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event(s) or circumstance(s) can be avoided or reduced by anyone involved in the Works and in carrying out any resulting Instruction of the Project Manager.</p>

	C. Quality Control
42 Identifying Defects	<p>42.1 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.</p> <p>42.2 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.</p>
43 Tests	<p>43.1 The Project Manager may instruct the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and in the event the test shows that it does, the Contractor shall pay for the test and any samples thereof. If there is no Defect, the test shall be a Compensation Event.</p>
44 Correction of Defects	<p>44.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period stated in the SCC, which begins from the Completion date.</p> <p>44.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defects within the period of time specified in the Project Manager's notice.</p> <p>44.3 If the Contractor has not corrected a defect within the time specified in the Employer's notice, a penalty for lack of performance will be paid by the Contractor. The amount to be paid will be calculated as a percentage of the cost of having the defect correct, assessed as described in GCC 46.1.</p>
45 Extension of Defect Liability Period	<p>45.1 The Defects Liability Period may be extended by the Project Manager for as long as Defects remain to be corrected.</p>
46 Uncorrected Defects	<p>46.1 In the event the Contractor has not corrected a Defect(s) within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the Defect corrected, including any other related cost(s) and the Contractor will pay the said cost.</p>

		D. Cost Control
47	Bill of Quantities	<p>47.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.</p> <p>47.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor shall be paid for the quantity of the work done at the rate in the Bill of Quantities for each item.</p>
48	Changes in the Quantities	<p>48.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.</p> <p>48.2 The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.</p> <p>48.3 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.</p>
49	Variations	<p>49.1 All Variations shall be included in updated Work Programmes produced by the Contractor.</p>

<p>50 Payments for Variations</p>	<p>50.1 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.</p> <p>50.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work is above the limit stated in Sub-Clause 48.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.</p> <p>50.3 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.</p> <p>50.4 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.</p> <p>50.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning Notice.</p>
<p>51 Cash Flow Forecasts</p>	<p>51.1 When the Works Programme is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.</p>

<p>52 Payment Certificates</p>	<p>52.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.</p> <p>52.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within twenty eight (28) days of receipt of the certificate from the contractor.</p> <p>52.3 The value of work executed shall be determined by the Project Manager.</p> <p>52.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.</p> <p>52.5 The value of work executed shall include the valuation of Variations and Compensation Events.</p> <p>52.6 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.</p> <p>52.7 The Project Manager shall not be bound to certify any payment, if the net amount, after all retentions and deductions would be less than minimum amount of Interim Payment Certificate stated in the SCC.</p>
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<p>53 Payments</p>	<p>53.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest issued by the Bank of Tanzania on the date of Contract signature for each of the currencies in which payments are made.</p> <p>53.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.</p> <p>53.3 Unless otherwise stated, all payments and deductions will be paid or charged in the proportions of currencies comprising the Contract Price.</p> <p>53.4 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.</p>
<p>54 Currencies</p>	<p>54.1 The currency of payment shall be stated in the SCC.</p> <p>54.2 Where payments are to be made in currencies other than the Tanzania Shillings, the exchange rates to be used for calculating such amounts shall be the Bank of Tanzania exchange rate prevailing on the date of contract signature</p>

55 Compensation Events

55.1 The following shall be Compensation Events:

- (a) The Employer does not give access to a part of the Site by the Site Possession Date as per GCC 28.1.
- (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.
- (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
- (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- (e) The Project Manager unreasonably does not approve a subcontract to be let.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to tenderers (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effects on the Contractor of any of the Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.
- (l) Other Compensation Events described in the

		Contract or determined by the Project Manager shall apply.
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	<p>55.2 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, upon consultation with Employer, 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.</p> <p>55.3 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, if agreed by the Employer, the Contract Price may be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager in consultation with Employer shall adjust the Contract Price based on the Project Manager's own forecast.</p> <p>55.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.</p>
<p>56 Effect of Changes in Tax Laws</p>	<p>56.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of tenders for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 50.</p> <p>56.2 In the event that the Laws Governing Taxes, Duties and other levies have changed between the signature date and the last completion certificate thereby affecting the Contract Price, the Employer and the Contractor, shall mutually adjust the contract price accordingly.</p>

57 Price Adjustment	<p>57.1 If applicable and stated in SCC, the amounts payable to the Contractor, pursuant to GCC 53.1 may be adjusted in respect of the rise or fall in the cost of labor, Contractor's Equipment, Plant, materials, and other inputs to the Works, by applying to such amounts the formulae prescribed in this clause.</p>
	<p>57.2 To the extent that full compensation for any rise in costs to the Contractor is not covered by the provisions of this or other clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise of costs.</p>
	<p>57.3 The adjustment to be applied to amount payable to the Contractor as certified in Payment Certificates shall be determined formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be as follows;</p> $P_n = a + b \frac{L_n - L_o}{L_o} + c \frac{M_n - M_o}{M_o} + d \frac{E_n - E_o}{E_o} + \text{etc.}$
	<p>where;</p> <p>P_n is a price adjustment factor to be applied to the amount in each specific currency for the payment of the work carried out in the subject month, where such variations and daywork are not otherwise subject to adjustment;</p>

	<p>a is a constant, specified in the Appendix to Tender representing the nonadjustable portion in contractual payments;</p> <p>b, c, d, etc., are weightings or coefficients representing the estimated proportion of each cost element (labor, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, as specified in the Appendix to Tender; the sum of a, b, c, d, etc., shall be one;</p> <p>Ln, Mn, En, etc., are the current cost indices or reference prices of the cost elements in the specific currency of origin for month "n," determined pursuant to Sub-Clause 57.5, applicable to each cost element; and</p> <p>Lo, Mo, Eo, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 57.5</p>
	<p>The value of net work done, certified by the Project Manager, in any monthly Interim or Final Certificate as payable by the Employer to the Contractor before deduction of any retention money shall be increased or decreased by an amount of 'F'.</p>

	<p>where;</p> <p>The effective value P_c of work done which is to be subjected to increase or decrease shall be the difference between:</p> <p>(i) the amount which, in the opinion of the Project Manager, is due to the Contractor under Clause 45 (before deduction of retention money and before deducting sum previously paid on account) less:</p> <ul style="list-style-type: none"> • any amount for payment or repayment of any advance payment; • any amount for materials on site (if any); • any amounts for nominated sub-contractors (if any) • any amounts for any other items based on actual cost or current prices; or • any sums for increase or decreases in the Contract Price paid under this Sub-Clause <p style="text-align: center;">and</p> <p>(ii) the amount calculated in accordance with (i) above of this Sub-clause and included in the last preceding statement.</p>
	<p>57.4 The sources of indices shall be those listed in the Appendix to Tender, as approved by the Engineer. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract Price and expected foreign currency requirements shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his tender the tabulation of Weightings and Source of Indices in the Appendix to Tender, which shall be subject to approval by the Engineer.</p>

		<p>57.5 The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of tenders. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.</p>
		<p>57.6 If the Contractor fails to complete the Works within the time for completion prescribed under GCC 21.1 adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favorable to the Employer, provided that if an extension of time is granted pursuant to GCC 37.1 the above provision shall apply only to adjustments made after the expiry of such extension of time.</p>
		<p>57.7 The weightings for each of the factors of cost given in the Appendix to Tender shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work already executed or instructed under GCC 49 or for any other reason.</p>

58 Retention	<p>58.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the SCC. The total amount of retention shall not exceed the amount specified in the SCC.</p> <p>58.2 On completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the other half when the Defect 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.</p> <p>58.3 On completion of the whole Works, the Contractor may substitute retention money with an "on demand" or unconditional Bank guarantee.</p>
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<p>59 Liquidated Damages</p>	<p>59.1 The Contractor shall pay liquidated damages to the Employer 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 maximum amount of performance security specified in the SCC. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.</p> <p>59.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC 53.1</p> <p>59.3 Where the Project Manager, after assessment of work progress, upon satisfaction that the Contractor will not complete the works within the contract period, may issue a notice to the Contractor requiring the payment of liquidated damages pursuant to GCC 59.1</p> <p>59.4 If the Contractor has not corrected a defects within the time specified in the Employer's notice, the Employer will assess the cost of having the defect corrected, the Contractor will pay this amount, and a penalty for lack of performance calculated as described in GCC 46.1</p>
<p>60 Bonus</p>	<p>60.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in the SCC for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.</p>

<p>61 Advance Payment</p>	<p>61.1 The Employer 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 Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.</p> <p>61.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.</p> <p>61.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.</p>
<p>62 Performance Securities</p>	<p>62.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount stated in the SCC and form and by a bank or surety acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Completion Certificate in the case of a Performance Bond.</p>

		62.2 Where circumstances necessitate the amendment of the contract after signature, and such amendment effected, the Employer shall require the Contractor to provide additional Performance Security to cover for any cumulative increase of more than ten percent of the Initial Contract Price.
63 Dayworks		63.1 If applicable, the Dayworks rates in the Contractor's Tender shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way. 63.2 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. 63.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.
64 Cost of Repairs		64.1 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.
		E. Discharge of the Contract
65 Completion Certificate		65.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager will so issue upon satisfaction that the work is completed.
66 Site Hand Over		66.1 When the Certificate of Completion is issued by the Project Manager, the Contractor shall handover the site and the works to the Employer within time specified in the SCC

<p>67 Final Account</p>		<p>67.1 Upon the expiry of the defect liability period, the Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract. The Project Manager shall, within fifty six (56) days, verify the account and, upon satisfaction, certify any final payment due to the Contractor and thereafter issue a defect liability certificate.</p> <p>67.2 In the event the Project Manager is not satisfied with the Account submitted by the Contractor pursuant to sub-Clause 67.1, shall within 56 days issue a schedule of correction. If the final account remains unsatisfactory after it has been re-submitted, the Project Manager shall, upon consultation with the Employer, decide on the amount payable to the Contractor and issue a payment certificate.</p>
<p>68 Operating and Maintenance Manuals</p>		<p>68.1 The Contractor shall supply to the Employer the "as built" Drawings and/or operating and maintenance manuals and any other related documents by the handover period stipulated in the SCC pursuant to GCC 66</p> <p>68.2 If the Contractor does not supply the Drawings and/or manuals stated in GCC 68.1 by the dates specified pursuant to clause 66 of the GCC, or 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.</p>
<p>69 Termination</p>		<p>69.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.</p>

69.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

- (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Works Programme and the stoppage has not been authorized by the Project Manager;
- (b) the Project Manager instructs the Contractor in writing to delay the Works progress, and the instruction is not withdrawn in writing within 28 days;
- (c) contractor's failure to submit performance security within the time stipulated in the SCC;
- (d) the Employer or the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (e) a payment certified by the Project Manager is not paid by the Employer to the Contractor after 84 days from the date of the Project Manager's certificate;
- (f) Failure of the Contractor to correct the defect after lapse of time specified in the notice to correct defects issued by the Project Manager.;
- (g) where the Contractor fails to furnish and maintain the required Site Security pursuant to GCC 35; and
- (h) The contractor does not maintain security which is required; and
- (i) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the SCC.
- (j) if the Employer determines, based on the reasonable evidence, that the Contractor

has engaged in corrupt, coercive,
collusive,

obstructive or fraudulent practices competing for or in executing the Contract.

For the purpose of this paragraph:

"corrupt practice means the offering, giving, receiving or soliciting of anything of value to influence the action of a public officer in the procurement process or contract execution;

"coercive practice" means impairing or harming, or threatening to impair or harm directly or indirectly, any party or the property of the party for the purpose of influencing improperly the action or that party in connection with public procurement or in furtherance of corrupt practice or fraudulent practice;

"collusive practices" means impairing or harming, or threatening to impair or harm directly or indirectly, any part or the property of the Party for the purpose of influencing improperly the action or a part or in connection with public procurement or government contracting or in furtherance of a corrupt practice or a Fraudulent Practice

"fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer and includes collusive practices among tenderers, prior to or after submission designed to establish tender prices at artificial non-competitive levels and to deprive the employer of the benefits of free and open competition;

"obstructive practice" means acts intended to materially impede access to required information in exercising a duty under this Contract;

69.3 When either party to the Contract gives notice of a Fundamental breach of Contract to the other Party for a cause other than those listed

under Sub-Clause 69.2 above, the Project Manager shall decide whether the said breach is

		<p>fundamental or not.</p> <p>69.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.</p> <p>69.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.</p>
70 Payment upon Termination		<p>70.1 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 specified in the SCC. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.</p>
		<p>70.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.</p>
71 Property		<p>71.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the contract is terminated for fundamental breach by the Contractor,</p>

<p>72 Suspension of Financing</p>	<p>72.1 In the event that the source of financing is suspended to the Employer, from which part of the payments to the Contractor are being made:</p> <p>(a) The Employer shall notify the Contractor of such suspension within seven (7) days of having received the financing agency's suspension notice.</p> <p>(b) After the Notice has been issued and within fourteen (14) days, the Parties shall mutually agree on the future events of the Contract</p>
<p>73 Force Majeure</p>	<p>73.1 Neither Party shall have any liability or be deemed to be in breach of the Contract for any delay or other failure in performance of its obligations under the Contract, if such delay or failure is a result of an event of Force Majeure.</p> <p>73.2 For purpose of this clause, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party, and which makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood, epidemics, or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent</p> <p>73.3 If a Party (hereinafter referred to as "the Affected Party") is or will be prevented from performing its substantial obligation under the contract by Force Majeure, it shall give a Notice to the other Party giving full particulars of the event and circumstance of Force Majeure and the reasons for the event of Force Majeure preventing the Affected Party from, or delay the Affected Party</p>

		<p>from performing its obligations under the Contract. The Notice shall be given within fourteen days after the Affected Party becomes aware, or should have become aware, of the relevant event or circumstances constituting Force Majeure;</p> <p>73.4 The Affected Party shall use reasonable efforts to mitigate the effects of the event of Force Majeure and shall endeavour to minimise any delay in the performance of the contract as a result of Force Majeure;</p> <p>73.5 The Affected Party shall give Notice to the other Party when it ceases to be affected by the Force Majeure; and</p> <p>73.6 Upon completion of the event of Force Majeure and issuance Notice pursuant to GCC 73.3 the Affected Party must, as soon as reasonably practicable recommends the performance of its obligations under the contract. Where the Affected Party is the Contractor, the Contractor must provide a revised Work Program rescheduling the Works to minimise the effect of the prevention or delay caused by the event of Force Majeure.</p>
<p>74 Release from Performance</p>		<p>74.1 In the event the Affected Party have used all reasonable efforts to mitigate the effect of the event of force Majeure and minimize any delay in the performance of the contract as result of force Majeure, but the effect of force Majeure still subsist, the Project Manager upon written consent of the employer shall certify that the Contract has been frustrated.</p> <p>Upon certification by the Project Manager pursuant to GCC 74.1 the Contractor shall make the site safe and stop work as quickly as possible after receiving the certificate and shall be paid for all Works carried out.</p>

VI. SPECIFICATIONS

GENERALLY

LIST OF CLAUSES

- A.1 Standard of materials
- A.2 Alterations or qualifications
- A.3 Contract to check
- A.4 Details to be Private and Confidential
- A.5 Method of Measurement and Notes
- A.6 Standard Measurements
- A.7 Dimensions and Details
- A.8 Drawings
- A.9 Shop Drawings
- A.10 Preambles to sections
- A.11 Pricing
- A.12 Examination of Rates and Prices
- A.13 Abbreviations etc.
- A.14 Queries during tendering
- A.15 Preparation of Tender
- A.16 Payment for daywork
- A.17 Bills of Quantities not to be used for ordering
- A.18 List of Contract Drawings – See Section (viii)

Specification
Generally

(2/A/1)

GENERALLY

A.1 Standard of materials

Throughout this document, products, materials and workmanship have been Specified to be in accordance with relative British standard Specifications or British Standard Codes or Practice.

If products or materials which comply with these standards are no longer locally available or not imported and the tenderer, if awarded this contract, intends to use other materials which do not comply with these standards, then tenderers must prove that the alternative is equal as the wanted materials.

In the event of the tenderer allowing in his prices for using alternative standards of materials to those specified, his tender must be qualified by listing the various alternatives to be used. The successful tenderer must then subsequently submit samples of the alternative materials to the Engineer as soon as practicable after the award of the contract, and must obtain his written approval before purchasing the particular materials.

Where alternative materials are not listed with the tender, the tenderer will be deemed to have allowed in his prices for the standard of materials specified.

A.2 Alterations or qualifications

No alteration addition or qualification of any kind whatsoever may be made by the Tenderer to the text of the Bills of Quantities.

If any alteration addition or qualification is made by him will be ignored and the text as prepared by the Quantity Surveyor will be rigidly adhered to.

Tenderers must tender strictly on the basis of the terms and conditions of contract specified in this document. Tenderers wishing to put forward alternative conditions may only do so by submitting an alternative tender under the terms and conditions which they wish to substitute for the conditions given in this document. Tenderers submitting an alternative tender must however also tender on the conditions given in this document, otherwise their tender will be automatically disqualified.

Specification
Generally

(2/A/2)

A.3

Contractor to Check

The Contractor is required to check the page numbers of the Bills of Quantities and should any be found missing or in duplicate or other figures or writing indistinct, the Contractor must notify the Quantity Surveyors at once and have the matter rectified before the Tender is submitted. No liability whatsoever will be entertained in respect of any claim for errors in the Contractor's tender resulting from failure to comply with the foregoing.

A.4

Details to be Private and Confidential

The Drawings, Bills of Quantities and contract Documents applicable to this Contract are restricted by copyright.

The Contractor shall treat the details of this Contract as Private and Confidential for his own information only and shall not publish or disclose the details of the Contract in any trade or technical paper or elsewhere (except as necessary for the purpose hereof) without the previous consent in writing of the Employer.

A.5

Method of Measurement and Notes

The whole of the work contained in these Bills of Quantities is measured in accordance with the Standard Method of Measurement of Building works for East Africa metric edition October 1970 published by the Architectural Association of Kenya, Chapter of Quantity Surveyors, and such measurement and descriptions contained in these Bills shall be deemed to be full and sufficient for the purpose of this Contract, subject to the correction of omissions and errors in accordance with Clause 12 (2) of the Conditions.

Notwithstanding the provision of S.M.M. Clause A.6 (a), (b) and (c) fractions for a unit or of a kilogramme less than half which would cause an entire item to be eliminated, have been regarded as whole units or whole kilogrammes.

Figures used in descriptions shall be deemed to be millimeters unless qualified by a unit of measurement or by a work or phrase indicating a reference e.g. BS, type, grade.

Specification Generally

(2/A/3)

The following abbreviations have been used:-

Number No
Metre M
Lineal metres LM
Square metres SM
Cubic metres CM
Kilogrammes KG
Millimetre mm
Centimetre cm

A.6

Standard Measurement

All units of weights and measurement shall have the meaning ascribed to them by the Weights and Measures Ordinance, Cap. 426

A.7

Dimensions and Details

Figured dimension on the drawings shall be followed in preference to scaled dimensions and drawings to a large scale shall be followed in preference to those of a smaller scale except for reinforced concrete drawings and details in which case only figured dimensions shall be followed.

A.8

Drawings

Before tendering the contractor should examine the drawings which may be seen at the offices of the Procurement management Unit during normal office hours, and shall satisfy himself regarding their detail as no claim by reason of ignorance in this connection will be entertained.

A.9

Shop Drawings

Shop drawings of all fabricated work to be done by the Contractor shall be submitted to the Engineer for approval, and no work shall be fabricated by the Contractor, save at his own risk, until approval has been given. These shop drawings shall be submitted in quadruple.

Specification Generally

(2/A/4)

The Contractor shall submit 4 copies of shop drawings sufficiently in advance of requirements to afford the Engineer ample time to checking them; including time for correcting, resubmission and rechecking if necessary, and no claim for extension of the Contract period will be granted to the Contractor by reason of his failure in this respect. Two final corrected, certified copies shall be filed with the Engineer.

All shop drawings submitted must bear the stamp of approval of the contractor as evidence that the drawings have been checked by the Contractor. Any drawing submitted without this stamp of approval will not be considered and will be returned to the Contractors for proper resubmission.

If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if accepted, suitable action may be taken for proper adjustment, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though such shop drawings have been approved.

Where a shop drawing as submitted by the Contractor indicates a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the Employer not involving a change in the Contract sum or extension of time, the Engineer may approve the drawing.

The approval of shop drawings will be general and shall not relieve the Contractor from the responsibility for adherence to the Contract, nor shall it relieve him of the responsibility for any error which may exist.

A.10 Preambles to Sections

To avoid long description and repetition, certain description of measured items refer to the preambles by quoting the clause prefix or by using the words "as described". Whether so referred to or not all instructions and information contained in the preambles clauses shall be deemed to have been taken into consideration in pricing the whole of these bills.

Specification
Generally

(2/A/5)

A.11

Pricing

A price or rate is to be entered against each item where provision is made in the Bills of Quantities whether quantities are stated or not. Items against which no rate or price is entered shall be deemed to be covered by other prices or rates in the Bills and no other adjustment will be made in respect of such omission.

A.12

Examination of rates and Prices

The priced Bills of Quantities will be examined prior to the appointment of the Contractor and the signing of the Contract in order to ascertain that the quantities are correctly extended and that the summations are in order.

In the event of any error found in the computation of the tender Sum, such error will be notified to the tenderer, who will then have the opportunity of confirming or withdrawing his tender. If the tender as submitted is confirmed, all rates and prices (excluding preliminary items, contingencies, prime cost sums and any profit and attendance added thereto by the tenderer and Insurance and Surety costs) inserted therein are to be considered reduced or increased in the same proportion as the corrected total of priced items exceeds or falls short of the original total of such items.

A.13

Abbreviations etc.

Words importing the singular only also include the plural and vice versa where the context requires.

The term "and the like" used in these bills shall mean analogous work to that described in accordance with the groupings indicated in the Standard Method of Measurement.

The term "the works" shall mean the whole of the works envisaged by this Contract, including, unless expressly stated otherwise, the works of Nominated Sub-Contractors, Nominated Suppliers, Local Authorities and Public Undertaking.

Specification
Generally

(2/A/6)

The following abbreviations have been used in the description of items in these bills:-

B.S. British Standard Specification
B.S.C.P. British Standard Code of Practice
SMM Standard Method of Measurement of Building Works for East Africa (First Edition) Metric October 1970.
Cl Preamble clause number
P.C. Prime Cost
(m.s.) (measured separately)

A.14

Queries during tendering

Any doubt or obscurity as to the meaning or intention of the Contract Document, or any question arising, shall be taken up in writing, before the Tender is submitted, with the Engineer who will upon request, set out the intent and meaning of any Part.

A.15

Preparation of Tender

No claim will be allowed for traveling or other expenses which may be incurred by the Contractor in visiting the site or preparing the Tender for the works.

A.16

Payment for daywork

The Contractor shall give notice to the Engineer or Clerk of works of the commencement and completion of any work for which he intends to submit vouchers in accordance with clause 11 (4) (c) of the Condition of contractor.

Endorsement of such vouchers by them shall not bind the Quantity Surveyor to value the work as daywork.

Payment for daywork performed by the Contractors and agreed by the Quantity Surveyor to be valued as such shall be valued in accordance with the following "Definition of Prime Cost of Daywork carried out under a Building Contract".

Specification Generally

(2/A/7)

This Definition applies solely to daywork carried out under and incidental to a building contract. It does not cover:-

- (i) jobbing or any other work carried out as a main or separate contract or
- (ii) daywork ordered by the Architect to be carried out after the date of commencement of the Defects Liability Period, which may be the subject of separate agreement.

Section (1) Labour

- (i) The amount of wages actually paid at the standard time rates applicable when the dayworks are carried out.
- (ii) The time of principals, foremen, and gangers at the wages actually paid for the trades practiced when actually working with their hands, unless previously otherwise authorized.
- (iii) The cost of overtime, where specifically ordered or subsequently sanctioned in writing by the Architect to be worked on daywork.

Section (2) Materials

- (i) The cost of materials, including delivery to the site.
- (ii) Materials supplied from the Contractor's stock at current prices plus justifiable charges for handling and delivery to the site.

Section (3) Plant

- (i) Use of mechanically operated plant and transport for the item engaged in dayworks.
- (ii) Use of scaffolding, staging, trestles, tarpaulins and other non mechanical plant, excluding hand tools, specially provided for daywork operation for such time as the Architect considers reasonable.

Specification Generally

(2/A/8)

The items of plant and the rates applicable thereto shall be inserted by the Contractor in the space provided below. The rates shall include for all fuels, oils and consumable stores.

Standing time in addition to working time will be paid only on the express orders of the Engineer.

The rates will apply to plant in good running order and no allowance will be made for the time lost owing to breakdown. Time taken for transporting plant about the site will be allowed as standing time for items of plant which are not self moving and in addition the net running time of the necessary lorry or tractor will be allowed. For self moving plant the net time taken in moving to and from the scene of operation will be allowed as working time.

Item of plant per 8 hour day	Working Time	Standing
Time	Shs.	Time
		Shs.

Section (4) Overheads

Where the above Definition of Prime Cost is used, Overheads as defined below and Profit may be dealt with by means of percentages on the totals of Prime Cost in each of the Section (1) (2) and (3) above at the rates stated hereafter.

- (i) Head office charges.
- (ii) Site - Supervision and site staff.
- (iii) Overtime other than that allowed under section (1) (iv).
- (iv) Time lost due to inclement weather.
- (v) Bonuses and all other incentive payments.
- (vi) Apprentices' study time.
- (vii) Employer's Contribution to any of the Social Security Fund, Training Levy and Housing Levy and other compulsory statutory charge.
- (viii) Trading Licenses and Registration Fees.
- (ix) Contributions for annual and public holidays.
- (x) Fares and time allowances for traveling.
- (xi) Subsistence and periodic leave allowance.

Specification
Generally

(2/A/9)

- (xii) Safety and Welfare facilities.
- (xiii) Third party and employer's liability insurances.
- (xiv) Sick pay or insurance in respect thereof.
- (xv) Obligations for Redundancy payments.
- (xvi) Tool allowances.
- (xvii) Use, repair and sharpening of small tools.
- (xviii) All non-mechanically operated plant, erected scaffolding and staging and trestles, protective clothing, artificial lighting, storage facilities and the like that may be in general use on the site.
- (xix) All other liabilities and obligations whatsoever.

To the above defined prime costs shall be added the following percentage additions (to be inserted by the Tenderer) to cover overheads and profit as set out in section (4) above.

- (a) labour per cent
- (b) materials Per cent
- (c) plant Per cent

Payment for daywork agreed as aforesaid and performed by a nominated sub-Contractor shall be made in accordance with the first mentioned. Definition of Prime Cost of Daywork, etc. unless the nominated sub-contractor has otherwise stipulated in his quotation. The Contractor shall be paid as profit on daywork performed by a nominated sub-contractor such sum as bears the same ratio to the amounts so payable in respect of the subcontracted work as the amount (if any added by the Contractor to the prime cost sum relating to that work bears to such prime cost sum.

A.17

Bills of Quantities not to be used for ordering

The Quantities stated, in these Bills of Quantities shall not be used for the ordering of materials.

Specification
Generally

(2/A/10)

EXCAVATION AND EARTHWORK

LIST OF CLAUSES

DEFINITIONS

- D.1 Removing trees, hedges or the like
- D.2 Surface level
- D.3 Clearing site
- D.4 Rock
- GENERALLY
- D.5 Levels
- D.6 Bore holes and nature of the soil
- D.7 Unauthorized excavations
- D.8 Borrow pits

MATERIALS

- D.9 Blinding
- D.10 Hardcore
- D.11 Approved filling for filling under floors
- D.12 Soil for backfilling around foundations

WORKMANSHIP

- D.13 Generally

Specification
Excavation and Earthwork

(2/D/1)

- D.14 Removal of obstructions
- D.15 Bottoms of excavations to be approved
- D.16 Disposal of excavated material
- D.17 Excavation below required levels
- D.18 Timbering, planking and strutting, etc.
- D.19 Timbering, planking and strutting etc, left in
- D.20 Filling
- D.21 Consolidation of hardcore
- D.22 Existing services
- D.23 Protection
- D.24 Anti termite treatment
- D.25 Method of measurement

Specification
Excavation and Earthwork

(2/D/2)

EXCAVATION AND EARTHWORK

DEFINITIONS

- D.1 Removing trees, hedges and the like
The removal from site of trees, stumps and roots, hedges, bushes, scrub, undergrowth and the like shall be deemed to be included with the items for cutting down and grubbing up roots.
- D.2 Surface level
The term "Surface level" shall mean the ground level after clearing site.
- D.3 Clearing site
The description of clearing site shall be deemed to include clearing and removing from the site of all loose debris and rubbish, bushes, scrub, undergrowth, vegetation and small trees (i.e. not exceeding 600mm girth) and grubbing up their roots.
- D.4 Rock
The term 'rock' shall mean any natural material which cannot be dislodged by a pick and which can only be removed by the use of compressors or by blasting or wedging. This classification does not include materials such as loose rock, concrete or other materials that can be removed by means other than drilling and blasting or drilling and wedging, but which for reasons of economy in excavating, the contractor prefers to remove by drilling and wedging.
- Unless specifically stated hereafter, the contractor must assume that permission to use explosive to remove rock will be refused and he must therefore price for removing rock by compressors etc. only.

Specification
Excavation and Earthwork

(2/D/3)

GENERALLY

D.5 Levels

The levels shown on the various drawings relate to the ground floor finished floor levels.

The Contractor shall be responsible for setting up and maintaining a site datum level accurately ascertained from this work. Immediately following the issue of the order to Commence, the Contractor shall carry out and record a check level grid of the site which shall be agreed between the Architect and the Contractor within one week of the above order being given; no alteration of levels shall be undertaken until agreement has been reached and the Architect's instructions have been received.

D.6 Bore holes and nature of the soil

It will be deemed that the Contractor has inspected the drawings and site and has consulted all available information concerning subsoil conditions before submitting the Tender. In making information available on subsoil conditions, the Employer does not in any way absolve the Contractor from his responsibilities, nor is it guaranteed that similar conditions apply to any specific part of the site.

D.7 Unauthorized excavations

The contractor is prohibited from making excavations other than those approved by the Engineer as necessary for the works.

D.8 Borrow pits

No borrow pits will be allowed to be opened on the site.

Specification
Excavation and Earthwork

(2/D/4)

MATERIALS

D.9

Blinding

Blinding shall be of the same material as the hardcore bed, crushed and graded from 4mm upwards, free from clay, chemical or other pollution, pests, weed roots and rubbish.

D.10

Hardcore

Hardcore shall be good, clean, hard, broken stone broken before placing to pass a 100mm ring and free from all rubbish.

D.11

Approved filling for filling under floors

Approved filling for filling floors shall be clean, dry pit or river sand excavated material or subsoil free from clay, roots and any impurities.

D.12

Soil for backfilling around foundations

Soil for backfilling around foundations shall be dry, clean subsoil free from clay, vegetable soil, roots and rubbish.

WORKMANSHIP

D.13

Generally

The Contractor shall control the grading the building so as to prevent water running into excavated areas or into completed sections of the works.

D.14

Removal of obstructions

In the event of any derelict foundations, walls, slabs, kerbs, etc. being discovered upon the site of the work, they shall, if below new foundation be completely removed to a level of 150mm below the level of the excavation indicated on the drawings. For graded or planted areas any such obstruction shall be removed to a depth of 600mm below the finished grade.

Specification
Excavation and Earthwork

(2/D/5)

Filling voids caused by removal of such obstructions shall be executed in accordance with Clause D.20 herein.

D.15

Bottoms of excavating to be approved

The Contractor shall give the Engineer at least 48 hours notice when the excavation will be ready for inspection. The bottom of every excavation will be inspected by the Engineer and the level thereof agreed between the Engineer and the Contractor. If a good bearing bottom is not obtained at the level shown the Engineer is to be informed. No concrete is to be laid until the bottom has been approved and the level thereof taken. Any concrete work or other work done before such approval, shall, if so directed be removed and new work substituted after excavations have been approved, all at the Contractors expense. Notwithstanding such approval, any bottom which becomes waterlogged or otherwise spoilt after approval, shall be cleaned out and reformed to the Engineer's approval before any concrete is placed.

D.16

Disposal of excavated material

Vegetable soil shall be spread and leveled where directed by the Engineer on site. Surplus excavated material where directed or required shall be removed from the site to a tip, the location of which shall first be approved by the Engineer in writing. All fees and charges in connection there with shall be deemed to be included in the Contract sum.

D.17

Excavating below required levels

Should any excavation be taken below the required levels or the depths necessary to obtain a suitable bottom, the contractor will be required to fill in the excavation to the proper level with concrete of the same specification for the foundations at his own expense.

D.18

timbering, planking and strutting, etc

The Contractor shall provide all necessary timbering, planking and strutting, etc. to uphold the faces of excavations, which shall only be removed when it is safe to do so.

Specification
Excavation and Earthwork

(2/D/6)

D.19

Timbering, planking, strutting, etc. left in

Where the Engineer instructs or agrees that it is necessary for the safety of the works to leave in certain timbering, planking and strutting, etc. such timber shall be measured and agreed before covering up.

D.20

Filling

Return filling around foundations and filling to make up levels under floors and paving shall not be deposited until the formation level has been approved by the Engineer. In no case shall fill be deposited on a muddy formation. Filling shall be deposited in layers not exceeding 250mm in depth before compaction and shall be compacted by rolling, pneumatic tamping or other approved means over the whole of the area. If necessary the filling shall be allowed to dry or be moistened to the correct moisture content before compaction. The finished surface shall be approved by the Engineer prior to further construction work thereon.

The Contractor shall afford every assistance to the specialist executing site sterilization to enable each layer to be treated separately.

Filling around foundation in layers shall not proceed without each layer being so treated.

No excavation or foundation work shall be filled in or covered up until all measurement necessary for the adjustment of variations have been made. Walling shall not be built upon the foundations until four days after depositing of concrete.

D.21

Consolidation of hardcore

Hardcore shall be consolidated with a roller, vibrating roller, or mechanical punner to a compaction equivalent to that obtained with a 2.5 to 3 tonne roller, care being taken that no damage is done to the foundations walls.

Hardcore shall be blinded and have the interstices filled to receive concrete beds and the like with blinding as described herein. Before placing concrete hardcore beds shall be well watered through a sprinkler rose, and rolled, to prevent water absorption from the concrete.

Specification

Excavation and Earthwork

(2/D/7)

Where described as blinded to receive building paper or polythene or any other membrane the blinding shall be finished and compacted with fine material which will not cause the membrane to puncture under wheel or foot traffic or by the placing of concrete thereon.

D.22

Existing services

Active existing services shall be adequately protected from damage. Where active services are encountered but not shown on the drawings, the Engineer shall be advised, and subsequent protection, support or relocation shall be as directed by him.

Where inactive services are encountered upon the site of the works, they shall be removed or sealed off in accordance with the direction of the Engineer.

D.23

Protection

The Contractor shall protect all graded and filled areas from the actions of the elements. Any settlement or washing that occurs prior to acceptance of the works shall be repaired and grades re-established to the required elevation and slopes.

D.24

Anti termite treatment

Anti termite treatment shall be carried out using 'Gammalin 20EC' or other chemical approved by the Engineer in writing, diluted to a water emulsion containing a minimum of 0.50% of the chemical.

The treatment shall be applied to the whole area of the hardcore bed immediately prior to the placing of the concrete floor slab at the rate of 7 litres per square metre, and to the backfilling on both sides of all perimeter walls at the rate of 80 litres per cubic metre of backfilling. Each compacted layer of backfilling shall be separately treated.

Treatment shall not be applied whilst it is raining or to surface of backfilling which are wet.

Specification

Excavation and Earthwork

(2/D/8)

The Contractor's attention is drawn to the fact that 'Gammain 20EC' is toxic to animal and human life, and he shall prevent contamination of water supply systems, shall cover up and protect treated areas immediately after treatment and post written notices informing of the treatment at prominent points on the site of the building.

Immediately following treatment, the Contractor shall provide to the Engineer for onward transmission to the Employer, a written five year guarantee which guarantees:

- (a) that the chemical used complies with this specification and has been used in the concentration stated herein.
- (b) that the guarantee shall be continuous for a period of five years from the date of treatment.
- (c) That should infestation by any termites appear before the end of the five year period, the Contractor will return and retreat as necessary to eliminate the infestation entirely and at his own cost on each occasion that infestation appears within the five years period.

The Contractor shall carry out annual inspections commencing three months after treatment and continuing to the end of the guarantee period to ascertain the presence of termites, and should any presence be found, the contractor shall retreat as necessary to eliminate any infestation entirely and at his own cost on each occasion that infestation is found.

D.25

Method of measurement

The prices throughout this Document are to include for digging in any type of ground including loose or compacted hardcore, rubble debris and the like, roots, or normal obstructions, with the exception of rock as defined herein and excluding any existing foundations, walls and similar hard substances. The Contractor must give notification to the Engineer or his representatives as soon as he considers rock as defined herein or existing foundations are encountered so that its extent can be agreed with the Engineer, Clerk of works, or Quantity Surveyor before the work is carried out or covered up. Payment for such excavation will not be allowed unless this procedure is followed.

Specification
Excavation and Earthwork

(2/D/9)

The formation and removal of temporary spoil heaps and multiple handling or excavated material shall be deemed to be included in the prices for returning excavated material around foundations, earth filling and removing surplus excavated material from site.

Excavation for plain concrete foundations has been measured to the net sizes required by concrete dimensions. Formwork has been measured to the sides of all reinforced concrete foundations or bases, together with the necessary working space allowance required under the provisions of S.M.M. Clause D5 (f). Should the Architect direct or approve the pouring of concrete to reinforced foundations or bases against the face of excavations, such adjustment will be measured and valued in accordance with the Conditions of Contract.

Rates for excavation shall be deemed to include for leveling, trimming and compacting bottoms and any additional excavation required for planking and strutting.

Specification
Excavation and Earthwork

(2/D/10)

CONCRETE WORK

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QUALIFICATIONS OF THE RULES OF THE S.M.M.

- F.1 Beds or the like laid in bays
- F.2 Steel bar reinforcement
- F.3 Wrought formwork
- F.4 Formwork to grooves, chases, chamfers and mouldings
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DEFINITIONS

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Specification
Concrete Work

(2/F/2)

CONCRETE WORK

QUALIFICATIONS OF THE RULES OF THE S.M.M

- F.32 Formwork
- F.33 Tolerances
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- F.35 Column plinths
- F.36 Blinding concrete
- F.37 Waterproof concrete
- F.38 Construction joints
- F.39 Striking times
- F.40 Curing
- F.41 Holes and chases and casting in
- F.42 Tests of completed structural members
- F.43 Protection
- F.44 Precast concrete
- F.45 Surface finishes
- F.46 Method of measurement
- F.1 Beds or the like laid in bays
Notwithstanding the provisions of S.M.M. Clause F.5 (c), the descriptions of work laid in bays shall be deemed to include formwork between the bays.
- F.2 Steel bar reinforcement
Notwithstanding the provisions of S.M.M. Clauses F.16 (b) and F.17 (a), the descriptions of steel bar and fabric reinforcement shall be deemed to include bends, hooks, tying wire, distance blocks and ordinary spacers, unless otherwise described.
- F.3 Wrought formwork
Notwithstanding the nomenclature of S.M.M. Clause F.19 (f), formwork required to produce fair concrete surfaces is herein qualified by a description of the finish required.
- F.4 Formwork to grooves, chases, chamfers and moldings
Notwithstanding the provisions of S.M.M. Clause F.23 (b), the descriptions of formwork shall be deemed to include forming chamfers not exceeding 50 mm wide and forming splayed internal angles not exceeding 25mm wide.
- F.5 Making good
Notwithstanding the provisions of S.M.M. Clause F.50 the descriptions of holes and mortices shall be deemed to include making good concrete.

Specification
Concrete Work

(2/F3)

Specification
Concrete Work

(2/F4)

DEFINITIONS

F.6

Designations of concrete mixes

The various mixes of concrete are designated in the subsequent measured items by the following criteria:-

Nominal mixes: By the weight proportions of whole bags of ordinary Portland cement to fine and coarse aggregates and by the maximum size of coarse aggregate. The Contractor shall regularly submit details giving specific gravities and moisture content of aggregate.

F.7

Tamping

The term "tamping" as used herein in conjunction with the phrase "treating surfaces of unset concrete" shall mean the final compaction and surface finish to be applied to unset concrete beds, or the like, with a steel shod beam tamper, either manually or mechanically operated unless otherwise stated. The resulting surface finish shall have a slightly ribbed appearance.

F.8

Keying

The term "keying" as used herein in conjunction with the phrase "treating surfaces of unset concrete" shall mean the preparation of beds, or the like, to receive insitu pavings by raking with a standard horticultural rake whilst the concrete is still green and when the concrete is set and cured, protecting the raked surfaces with a layer of clean sand and removing the sand immediately before the insitu paving is laid.

F.9

Precast concrete units

Unless otherwise described in the measured items, Precast concrete units are deemed to be basically rectangular in cross section and rough on exposed faces. Reinforcement bars shall have hooked ends. Bedding and pointing mortar shall be either cement-sand or cement-line mortar, as appropriate, and units shall be deemed to be fixed by hoisting, bedding and building in unless otherwise described.

Specification
Concrete Work

(2/F/5)

Nominally non-reinforced units shall contain any reinforcement the Contractor may wish to introduce for handling purposes.

GENERALLY

F.10

Standards

The whole of the concrete works and testing thereof shall comply with B.S 8110 parts 1, 2 & 3 and with the subsequent clauses of this Document and shall be carried out in strict accordance with the working drawings and instructions of the Consultant Structural Engineer and or the Architect.

A competent person shall be employed whose first duty it will be to supervise all stages in the preparation and placing of the concrete. All cubes should be made and site tests carried out under his direct supervision. This person shall also be responsible for keeping an accurate record of the dates on which concrete is poured.

F.11

Bar bending schedules

The Consultant Structural Engineer will prepare and provide all necessary bar bending schedules and explanatory details.

MATERIALS

F.12

Samples

Samples of all materials are to be submitted for approval of the Architect at least one week before it is desired to commence deliveries. All condemned materials are to be removed from the site within 24 hours.

F.13

Cement

Cement shall comply with British Standards as follows:-

Portland cement	B.S. 12
Rapid hardening cement	B.S. 12

Except as regards the addition of colourant to BS 1014 which should not exceed 5% of cement by weight.

Specification
Concrete Work

(2/F/6)

Sulphate resisting Portland cement shall comply with BS 4027.

Rapid hardening cement may be used in lieu of ordinary Portland cement only with the prior approval of the Architect or Engineer provided that all conditions applying to its use are strictly observed. Any additional expenses in connection with the use of such cement shall be borne by the Contractor.

The use of high alumina cement will not be permitted. All cement shall be delivered to the site in sealed bags bearing the mark of the manufacturer. Rebagged cement, cement in plain bags and cement in torn bags will not be allowed on the site.

Each consignment of cement shall be accompanied by the manufacturer's certificate showing that a representative sample of the consignment has been tested and complies with the appropriate specification. From time to time as requested by the Engineer, copies of the cement manufacturer's test certificates shall be delivered to the Architect/Engineer or his Engineer from representative on site promptly, but such documents shall not preclude the rejecting any cement which does not in every way comply with the specification.

Any cement which has failed to pass the tests or has been damaged by water or contaminated in any way on site shall immediately be put into bags and removed from the site.

F.14

Aggregates

Aggregate shall comply with British Standard as follows:-

Fine	B.S. 882 Table 2 Zones 1 to 3 only
Coarse	B.S. 882 Table 1
"All in"	B.S. 882 Table 3

Each type of aggregate shall be obtained from one approved source, capable of maintaining adequate supplies of consistently graded material throughout the Contract. Aggregates for exposed concrete shall be free from all impurities likely to cause discolouration and shall be on consistent colour throughout the work.

Specification
Concrete Work

(2/F/7)

Fine aggregates and sand shall be clean, sharp, coarse, hard material and equal at all times to the samples which shall be deposited with and approved by the Engineer. The caustic soda test for organic impurities shall show a colour not deeper than that of the standard solution. The settling test for natural sand shall be made and after being allowed to settle for three hours the layer of silt deposit on the coarse material shall not exceed 10%.

The Contractor shall supply all necessary equipment for the testing of fine aggregates and sand for the use of Engineer.

Coarse aggregates shall be hard, clean gravel or broken stone from approved quarries and shall be free from earth, decomposed stone, and extraneous matter. They shall conform to B.S. 882 Table 1 and shall be "Graded Aggregate" 19mm to 5mm. Thin, elongated, friable, flaky or laminated pieces, mica or shale shall only be present in such small quantities as not to effect adversely the strength and durability of the concrete. The amount of fine particles occurring in free state or as loose adherent shall not exceed 1% when determined by the laboratory sedimentation test. After twenty-four hours in water, a previously dried sample shall not gain more than 10% in weight.

Each grade of aggregate shall be stored in the works in separate heaps so that there shall be no possibility of any inter-mixing. Any materials which have become inter-mixed shall be removed from the site forthwith by the Contractor.

If, in the opinion of the Engineer, the aggregate is dirty or adulterated in any manner, it shall be washed and/or screened by the Contractor to the satisfaction of the Engineer.

Graded samples of all types of aggregate each weighing 10kg, shall, after approval, be kept on site behind glass for visual checking of subsequent deliveries for gradings, shape, and where applicable colour.

F.15

Reinforcement

Reinforcement shall comply with the following standards:-

Specification
Concrete Work

(2/F/8)

a. Mild steel rod reinforcement shall be hot rolled grade 250 complying with B.S. 4449

F.19

Water

- b. (i) Hot rolled deformed high tensile bars having a guaranteed minimum yield stress of 410 Newton's/sq mm and other physical properties complying with BS 4449 or
(ii) Cold worked steel bars complying with BS 4461

F.20

Storage of materials

- c. Welded steel fabric reinforcement shall comply with E.S. 4483.

All reinforcement shall be in the "diameter" and metric range and the substitution of "square twisted" or imperial range shall be allowed but only at no extra cost to the Employer.

The Contractor will be required to submit at his own expense certified test data of the following characteristics, ultimate tensile stress, yield point stress, elongation, cold bend test. Should such certificates not be submitted by the manufacturer, the Contractor shall have the requisite tests made at his own expense at an independent testing laboratory.

F.16

Expansion joint materials

Expansion joint material shall be "Flex cell" or other approved bitumen impregnated fibreboard.

F.17

Expansion joint sealer

Expansion joint sealer shall be "Sealastik" or other approved cold, gun or knife applied mastic, or "Plastijoint" or "Plastic" grade 88 applied hot. All manufactured by Expandite Ltd. All sealers shall be applied strictly in accordance with the manufacturer's instructions.

F.18

Wall ties

Where block walls about columns or solid concrete walls two 6 mm diameter steel reinforcement bar ties are to be cast into the concrete at vertical intervals of 400mm. Ties to be 300mm long and project 150 mm into blockwork.

Specification
Concrete Work

(2/F/9)

Water shall be from the mains and kept free of any impurities, and acid or alkaline substances in suspension or in solution, and shall be stored in proper storage tanks to the approval of the Engineer.

Cement shall be kept dry and used in rotation of deliveries. If delivered in bags these shall be stored off the ground in a well ventilated and weatherproof shed used exclusively for this purpose.

The shed is to be sufficiently large to contain a working stock and provided with partitions or such other means as may be necessary, to ensure the effectual separation of the various consignments and type of cement. Stacking of cement in bags over a height of ten bags will not be permitted. Cement may be delivered in bulk containers provided additional suitable arrangements are made for bulk storage on site to the approval of the Engineer.

Aggregates shall be stored at mixer positions on drained concrete paved areas, with stout divicing walls between different sizes and types of aggregates. It shall be allowed to stand for at least 24 hours before being used.

Reinforcement shall be stored by type, size and length, either off the ground or on clean surfaced areas, and shall be kept free from rust.

F.21

Proportion of concrete mix

The quantity of cement shall be measured by weight and each batch of concrete is to use one or more whole bags. The quantity of fine aggregate and coarse aggregate shall be measured separately by weight batching plant. Volume mixing will not be permitted.

Specification
Concrete Work

(2/F/10)

For grading tests the Contractor shall supply and deliver at his own cost to the Nominated Testing Authority, samples of the aggregates which the Contractor proposes to use, consisting of not less than 50 kilograms weight in coarse aggregate and not less than 25 kilograms weighting fine aggregate.

It is the Contractor's responsibility to ensure that the subsequent deliveries of aggregate conform to the grading analysis of the approved samples.

The proportions of materials to be used for the preliminary cube tests, and subsequent batching, shall be ascertained by calculation from the results for the aggregate grading tests carried out by the Nominated Testing Authority.

Preliminary concrete cubes shall be made by the Contractor on site, as required by the Engineer, and tested by the Nominated Testing Authority. As a result of these tests definite weights of each material for batching shall be ascertained and agreed with the Engineer. Thereafter these proportions shall be adhered to throughout the works and may be varied only by instructions given by the Engineer.

The weights of damp aggregates must be adjusted to take into account the weight of water in the aggregates, and this in turn will affect the amount of water to be added to the mix.

Throughout the carrying out of the Contract, "Works Cube Tests" are to be made from concrete drawn from newly laid concrete or concrete about to be placed in position, such cubes being made when directed by the Engineer and in his presence. Such cubes shall be made in 150mm cube steel or cast iron moulds and shall be marked and cured strictly in accordance with the Appendices of the Code of Practice, and shall be forwarded carriage paid in time for testing at the required age to a testing laboratory to be nominated by the Engineer.

Four cubes shall be made on each occasion, concrete for each cube being from a different batch. Two cubes shall be forwarded in time for testing at the age of seven days from casting and two cubes in time for testing in twenty eight days. Each cube shall be marked with the date of casting and a distinctive reference number in accordance with a system agreed by the Engineer.

Specification
Concrete Work

(2/F/11)

A record shall be kept of the position from which the concrete for each set of cubes was drawn, or to which it was about to be placed.

At least three sets of cubes shall be cast during each week concrete is being cast including sets of cubes for each quality of concrete used during the period.

Concrete is required to have the properties and give the strength in Newtons per square millimeter as follows:-

Class	Quality	Max. size of coarse aggregate	Max water cement ratio by weight	Min crushing strength of works Test Cubes	7 days	
					28 days	28 days
31.5/20	1:1:2	20mm	0.45	23	31.5	
26.5/20	1:1:5:3	20mm	0.50	19	26.5	
21/20	1:2:4	20mm	0.58	15.5	21	
21/13	1:2:4	13mm	0.58	15.5	21	
13.5/25	1:3:6	25mm	0.60	9	13.50	
1:4:8	1:4:8	40mm	0.60			
1:10	1:10	"All - in" aggregate				

The above properties and crushing strengths are to be considered as the minimum standard that will be accepted in the finish at works. The average crushing strengths should be at least 15% higher than the minimum permissible values given in the above table.

Specification
Concrete Work

(2/F/12)

If the strengths required in the table are not attained and maintained throughout the carrying out of the contract, the contractor will be required to increase the proportion of cement or substitute better aggregates at his own cost so as to give concrete which does comply with the requirements of this clause. The contractor may be required to remove and replace at his own cost any concrete which fails to attain the required strength as ascertained by the Works Cube Tests.

F.22

Testing of materials generally.

The contractor shall include in his Tender prices for the execution of his part of operations specified for testing herein and for supply of the requisite equipment. After initial testing and approval of materials, it is the Contractor's responsibility to ensure and to demonstrate by the submission of further similar samples when so required that subsequent deliveries conform to the quality, grading and (where applicable), colour of the approved samples.

F.23

Testing of cement

Before work commences and when subsequently directed, the Contractor shall take 6 kg samples, in accordance with B.S. 12 procedure, of cement and deliver these in tins approved by the Engineer to an approved Testing Laboratory for testing.

Each consignment of cement to the site, which shall be accompanied by the manufacturer's advice note and forwarded without delay to the Engineer, shall be delivered to the site at least 7 days before it is intended to be used in the works so that the required tests may be carried out without retarding the progress of the works.

F.24

Testing of aggregate

Before work commences and when subsequently instructed, the Contractor shall take site samples, by methods given in B.S. 812 and deliver these to the nominated Testing Authority for testing.

Such samples shall be submitted for approval at least 7 days before they are intended to be used in the works.

Specification
Concrete Work

(2/F/13)

F.25

Testing of reinforcement

Should the Engineer require reinforcement to be tested, it shall be tested at the Contractor's expense and representative test pieces of such reinforcement to be used in the works are to be sent to an approved laboratory for testing.

Manufacturer's test reports of reinforcement shall be supplied to the Engineer for all reinforcement to be used in the works.

If such tests reveal the steel not meeting the specified standards, the Contractor will carry out the rectifications in the reinforcement to the direction of the Engineer at his own expense.

F.26

Testing of concrete in the field

(i) Trial mixture

Prior to the commencement of the actual concreting work, a trial mix of the required concrete, as described herein shall be made by the Contractor and tested by an approved laboratory at the Contractor's expense, in order to check and establish the actual working crushing strength of the required concrete mix.

(ii) Workability

The total water content in the mixture determines its consistency and once a consistency of a trial mix has been approved it must remain constant throughout the Contract.

In order to help the concrete maintain the desired consistency the slump of an approved trial mix shall be measured, thereafter all mixes must give the slump as the approved trial mix. The slump shall be determined by test as described in B.S. 1881 Parts 102-104, 106,107 and DD 83 Part 2. In general the approved slump shall be in the order of 75mm for hand compacted concrete and 35mm for vibrated concrete.

Specification
Concrete Work

(2/F/14)

The slump test shall be made on concrete actually being placed in the works at the commencement of each period of concrete placing and at such other times as instructed.

(iii) Testing specimens

The moulds for test cubes shall be of metal and true to shape to give a 150mm cube and shall be well oiled before filling. The mould shall be filled with concrete taken from that actually placed in the works, the concrete being selected by the Engineer from a point as near as possible to the position of placing. The filling of the moulds shall be done immediately after the selection of the sample concrete and in such a way that the concrete in the moulds be truly representative of that in the works.

The concrete shall be placed in the moulds in three layers of equal thickness, each layer being rammed with 25 strokes of a steel bar 40mm diameter, (or equivalent), weighing 2 kg. If the concrete in the works be consolidated by mechanical vibration, the test cube moulds shall be likewise vibrated after filling. Each cube shall be inscribed with the date of manufacture and identification mark.

A record shall be kept for each batch of cubes showing the position in the works which the concrete represents, the date of the manufacture, the mixture and slump of the concrete, particulars of the cement and aggregate used, a statement of whether or not the cubes are vibrated and other information relating to the subsequent history of the cubes.

The moulds containing the test cubes shall be stored for 24 hours on the site in a damp place free from vibration. At the end of this period the cubes shall be taken from the moulds and stored in damp sand for 20 days if they are to be tested at 28 days, or for 4 days if they are to be tested at 7 days.

The Contractor shall be instructed about the dispatch of the cubes to an approved laboratory and will pay all costs relating to the tests. A set of four cubes will be required for not more than every 60 cubic metres of concrete placed in the works.

Specification
Concrete Work

(2/F/15)

(iv)

Quality of specimens

The test specimens shall have the compressive strength specified for each quality of cement at the appropriate age as given herein.

If the required strength is not obtained at 28 days, the Contractor will be required to cut out and reconstruct all work represented by the test specimen at his own expense with all dispatch, always provided that the Engineer may first permit further tests, at the Contractor's expense, to prove the quality of the deposited concrete.

In the case of seven day Works Cube Tests proving unsatisfactory, the work may be stopped, but shall not be liable to rejection until the result of the twenty eight day test is known.

In the event of the results of the twenty eight day Works Cube Tests proving unsatisfactory, the work represented shall be immediately liable to rejection. The Contractor may, however, be given the option of cutting three specimens from the completed work subject to the direction of the Engineer, and preparing there from test cubes or cores which shall be sent to the Testing Laboratory for testing as for Works Cube Tests.

Should the average strength of these specimens attain the specified minimum twenty eight day strength, the work will, subject to the Engineer's discretion, be accepted. Alternatively, the Engineer may instruct the Contractor to make a loading test as described hereinafter. The Cost of all cutting, preparation of specimens, testing and making good the portion of the structure affected shall be borne by the Contractor. The cost of all delays on site due to concrete not attaining the desired strength, or caused by investigation of defects, cutting away and making good, shall be entirely the Contractor's responsibility.

F.27

Damaged or unsatisfactory materials

All materials which have been damaged, contaminated or have deteriorated, or which do not comply in any way with the requirements of the specification, shall be rejected and shall be immediately removed from the site.

Specification
Concrete Work

(2/F/16)

No materials shall be stored or stacked on suspended floors without the Engineer's prior approval.

Should any of the samples tested be found, in the opinion of the Engineer, in any respect unsatisfactory or likely to produce unsound work, the whole parcel, consignment or load from which samples were taken will be rejected, and the Contractor shall forthwith remove it from the site. Notwithstanding that any sample of the material may have passed the test, the Engineer may later reject such parcels, consignments or loads if he shall decide that the quality has deteriorated.

The Contractor at his own expense shall remove from the site, without delay, all rejected material. Any delay caused by such rejection will not in any way relieve the Contractor from his responsibility with regard to the completion within the time limit(s) specified. Any bag of cement that is opened shall be used on the same day or be discarded from the work.

WORKMANSHIP

F.28

Plant and method

Before the commencement of any work, the Contractor shall submit the following for the Engineer's written approval:-

- (i) The concreting method, including the size and type of machines for weighing and mixing concrete and the methods of transporting, placing and compacting.
- (ii) Details of formwork proposals, clearly indicating the general method of construction and assembly, the methods of achieving surface finishes required herein, including linings, fixing of linings together with positions of joints and the make and type of mould oil proposed.
- (iii) The proposed position and type of every construction joint not already shown on the Engineer's drawings.

Specification
Concrete Work

(2/F/17)

Such approval by the Engineer shall not be deemed to relieve the Contractor of his obligations to comply with any of the provisions herein.

Concrete mixing and discharge from mixers shall be under permanent cover to the Engineer's approval.

Measurement and mixing

F.29

All cement is to be measured by weight, the 50 kg bag of cement being used as a unit.

The amount of water shall be the minimum required to produce a dense cohesive concrete of adequate workability, to be determined by trial mixes. This amount shall be accurately gauged and adjusted from time to time to compensate for variations in moisture content of the aggregate by an approved method.

All concrete shall be mixed in a batch type mechanical mixer of approved type having a drum rotating about a horizontal or inclined axis. The speed of the drum is to be not more than twenty and not less than fourteen revolutions per minute.

Each mixer is to be fitted with a water measuring device capable of accurate measurement to five litres for one cubic meter mixers and pro rata for smaller sizes and so arranged that the accuracy is not affected by variations in the pressure of the water supply line. The fine and coarse aggregate and the cement shall be mixed for at least four turns, after which the required amount of water shall be added gradually while the mixer is in motion and the concrete mixed for not less than one and an half minutes to uniform and consistency.

The volume of concrete mixed in any one batch is not to exceed the rated capacity of the mixer.

The whole of the mixed batch is to be removed before materials for a fresh batch enter the drum.

Specification
Concrete Work

(2/F/18)

Concrete as mixed in accordance with the foregoing shall not be modified by the addition of further water or in any other manner. On the cessation of work, including all stoppages exceeding twenty minutes, or any change of type of cement used in the mix, the mixers and all handling plant shall be washed out with clean water.

At least one slump test shall be made each day concreting is in progress, under the supervision of the Engineer.

F.30

Reinforcement

Reinforcement shall be free from all loose mill scale, loose rust, oil, grease or similar defects, immediately before placing the concrete. It shall be bent cold exactly to detail using an approved bending machine. Hooks, bobs, bends, etc. where not specifically detailed, are to be in accordance with B.S. 4466. Each bundle of bent bars shall be clearly tagged with the Contractor's bar list number.

Reinforcement shall be placed in the exact position shown on drawings with all inter-sections tack welded or securely tied with 16 gauge soft iron tying wire. The designated cover shall be maintained by approved spacers, chairs, bolsters or ties fixed to the reinforcement. These shall be dense concrete left with a wire brushed surface or the dipped in grout before fixing. These blocks are particularly important where the surface of the concrete is exposed to the weather or dampness. The Contractor must ensure that the bars are securely fixed so as to maintain their indicated positions during the progress of pouring, tamping or vibration of concrete. Six chairs are to be provided around each column to hold top steel in position and chairs are to be made up of mild steel bars of adequate diameter. The cost of providing and fixing these steel chairs must be allowed for by the Contractor in his rates for reinforcement generally. No laps splices in bars shall be made except those detailed on the drawings without prior approval of the Engineer.

The size and position of the reinforcing bars of mesh shall be approved by the Engineer before concreting commences. The insertion of reinforcement into concrete already placed, the lengthening of bars by welding and the rebending of incorrectly bent bars will not be permitted.

Specification
Concrete Work

(2/F/19)

For concrete having exposed surfaces, reinforcement shall be assembled and placed in such a manner as to avoid any damage to formwork faces.

Where reinforced concrete slabs or walls are constructed against tanking, care shall be taken in positioning reinforcement to avoid damage to tanking.

Unless otherwise shown upon the Engineer's drawings, or specified in BS 8110, the reinforcement bars shall be given the following cover to concrete.

In floor slabs, walls and similar thin paneling, a cover of 20mm, or the size of the bar, whichever is the greater. In beams and other such members, a cover of concrete of 25mm to the main reinforcement, or the size of the bar, whichever is greater.

In columns, a cover of concrete of 40mm to main reinforcement, or the size of the bar, whichever is greater.

In foundations and column bases, a cover of 50mm to main reinforcement, or the size of the bar, whichever is greater.

F.31

Inspection of reinforcement

When the placing of the reinforcement for a particular section of the works is completed and before concreting commences, the reinforcement will be inspected by the Engineer and no concrete shall be placed until the Engineer's approval has been given. The Contractor shall give the Engineer 48 hour notice of the time when the reinforcement will be ready for inspection.

F.32

Formwork

Formwork shall be true to line, level, face and profile and be of robust construction adequately framed, braced, strutted, cramped, tied and propped to restrict deformation due to constructional loads to not more than 3mm, and to entirely eliminate deformation of the form faces by warping or buckling. Wire ties will not be permitted. Formwork shall be grout-tight under all conditions including vibration when specified or used.

Specification
Concrete Work

(2/F/20)

Formwork shall be designed to allow prefabrication of conveniently sized elements to facilitate ease of handling and assembly, to permit striking without force shock or any damage whatever to the concrete member or formwork face and to permit the removal of sides without disturbing soffits and soffits without disturbing necessary props. Propping shall be carried down to an approved bearing, shall not be supported by timber floors and shall be arranged that formwork may be lowered smoothly.

Repropping will not be permitted. Provision shall be made for cleaning out and draining.

Formwork shall be constructed of material or lined with material as may be necessary to achieve the finishes specified herein and in such a manner as to eliminate screw or nail imperfections.

Before each use, form faces shall be treated with the minimum amount of an approved mould oil necessary to obtain a clean release. Mould oil shall not come into contact with the reinforcement.

The use of cement retarders will not be permitted except where a key for other finishes is required.

Before placing of the concrete, bolts and fixings shall be in position and cores and other devices used for forming openings, holes, pockets, recesses, ducts or other cavities shall be fixed to the shuttering.

Immediately, prior to concreting, formwork shall be thoroughly cleaned out and re-checked. No placing shall commence until the Engineer has inspected the formwork and given his consent for concreting to proceed, but such consent shall not relieve the Contractor of his responsibility for its sufficiency. After striking formwork shall be cleaned, stacked and protected and before re-use shall be serviced, made good or replaced with new as may be necessary to maintain the finish and standard specified.

F.33 Tolerances

The maximum tolerances within which concrete work shall be constructed are as follows:

Specification
Concrete Work

(2/F/21)

1. All setting out dimension, and dimensions horizontally and vertically +/- 5mm
2. Sections of concrete members +/- 3mm
3. Levels of floor slabs, beams, lintels etc (top and bottom) +/- 5mm
4. Plumb of columns and walls in storey height +/- 5mm
5. Plumb of columns and walls in full building height +/- 10mm
6. Inside faces of lift shafts in storey height +/- 5mm
7. Inside faces of lift shafts in full building height +/- 15mm
8. Concrete cover to reinforcement +/- 3mm

No surface intended to be horizontal or vertical shall slope more than 2 mm in 1 metre.

Any rectification of work not constructed within the tolerance set out above, shall be entirely at the responsibility and expense of the Contractor.

F.34 Placing and compaction

No traffic whatsoever, wheeled or foot, shall take place over reinforcement or placed concrete and the Contractor shall provide all necessary stools, walkways, platforms and barrow runs. Concrete shall be placed in its final position as rapidly as practicable by methods which preclude segregation or loss of ingredients and in any case, within 30 minutes from the time that water is added to the mix; compaction shall be completed before initial set commences. Partially set concrete shall not be re-worked or used. "Flowing" in formwork shall be avoided by placing and compacting in shallow layers in quick succession.

Specification
Concrete Work

(2/F/22)

Concrete shall be placed into the forms as less a height as possible and shall in no case be dropped from a height of more than 1500mm except with the approval of the Engineer.

When chuting is used, the inclination of the chute must be such as to allow the concrete to flow without the use of excessive water and without segregation or loss of the ingredients. Details of any proposed chuting plant must be approved by the Engineer before the plant is delivered to the site.

If the Contractor wishes to distribute concrete by means of pumps, full details of the system must be made available to the Engineer for approval.

Concrete shall be thoroughly compacted and carefully worked, with suitable tools, into formwork and round reinforcement and fixtures so as to avoid displacement. A competent steel fixer shall attend throughout concreting to correct any unavoidable displacement.

Compaction shall be by means of vibrators, these shall be of an approved pattern, of the immersion type, clamp-on external vibrators in adequate numbers shall be used only where the density of reinforcement precludes immersion.

Attachment to reinforcement is expressly forbidden and accidental contact with reinforcement shall be avoided. Vibration shall be executed by a competent operative and shall not be carried out to the detriment of adjacent partly hardened concrete.

An accurate record is to be kept by the Contractor showing dates and times when various portions of the work were concreted. The Concrete foreman must not vary the approved mix or water content without the permission of the representative of the Engineer. It may occasionally be found that in constricted structural members or where the proportion of reinforcement to concrete is high, the workability of the concrete must be increased locally in order to effect full compaction. Such increase in workability shall be achieved by an increase in the mortar content of not more than 10% of the concrete by weight in any single batch and must be made only with the approval of the representative of the Engineer.

Specification
Concrete Work

(2/F/23)

The workability of the concrete must never be altered by the use of additional water or sand alone.

Foundation shall be placed their full depth in one operation and the top surface carefully leveled. Concrete placed in timbered excavations shall be well rammed close against the excavation face as the timber is withdrawn.

Where the design of the work demands the placing of reinforced concrete against the sides of excavations without the use of formwork, the earth face in such locations shall be prevented from crumbling or washing into the concrete during placing and compaction by any efficient means, and care shall be taken to maintain the correct cover to the reinforcement.

All concreting shall be continuous to completion or to an approved construction joint.

Methods of placing and vibration generally are to comply with the specifications for vibrated concrete as laid down by the Cement and Concrete Association or the manufacturer of the vibrators used on the works.

During placing of all concrete a workman shall be in constant attendance with a hose pipe to wash off any cement slurry which appears on the face of any previously poured concrete immediately it occurs.

Concrete shall not be poured in forms to a depth exceeding 1500mm without the prior approval of the Engineer.

F.35
Column Plinths

Column kicker plinths not cast monolithically with the beam or slab will be allowed only at the discretion of the Engineer and special precautions must be taken if permission is granted especially in regard to the quality of the mix used, and the curing of the concrete.

Specification
Concrete Work

(2/F/24)

F.36

Blinding concrete

No casting of any concrete on the ground shall take place until the ground has been passed as satisfactory by the Engineer. All ground to carry reinforced concrete shall be covered with a blinding layer of concrete 1:10 of the thickness shown on the drawings, or if not so shown, a minimum of 50mm.

F.37

Waterproof concrete

Wherever waterproof concrete is shown on the drawings it shall be mix 1:1.5:3 nominal and it shall be compacted by mechanical vibration so that a dense and homogeneous mass of concrete is obtained throughout every pour of the structure.

The Contractor shall be allowed at his own cost to add an approved waterproofing additive to the mix using it strictly according to makers' instructions.

All permanent be the Contractor's joints shall be constructed in accordance with the drawings and specifications to achieve complete water tightness.

It shall be the Contractor's responsibility to ensure that all structures required to be constructed in waterproof concrete are completely watertight and any work found to be defective shall be made good to the Engineer's satisfaction at the Contractor's expense.

Where waterproof concrete forms a water retaining structure it is to be tested by filling with water for a period of not less than four days. Any percolation or porous concrete or leaking joint is to be made good at the Contractor's expense. Tanks and pools constructed below ground level are not to be backfilled prior to the satisfactory completion of this test.

F.38

Construction joints

All construction joints shall be straight, truly vertical or level, as the cast may be, of the profile shown and formed in the exact positions shown on drawings or if not shown on the drawings, with prior approval of the Engineer.

Vertical joints shall be formed against adequately secured rigid stop boards having splayed fillets, designed to pass the continuous steel reinforcement without temporary bending or displacement.

The rate and method of placing concrete and the arrangement of construction joint bulkheads shall be such that the concrete between construction joints shall be placed in a continuous operation.

Joints in reinforced slabs, joists and beams, shall be perpendicular to the axis or surfaces of the member jointed and at the center of the span. If an intersecting member occurs at that point, the joint shall be located at a point of minimum shear.

Construction joints in columns shall be as shown on the drawings. Whenever it becomes necessary to stop work, such stops shall be located at center of slabs and of beams or as directed by the Engineer.

An adequate and acceptable key for succeeding work shall be formed by using stop boards which shall be constructed tightly to prevent any grout leak. As early as possible boards shall be removed and the surface thoroughly hacked and brushed to remove all laitance. Any leakage past stop boards shall be hacked off as soon as the concrete has set. The surface shall be left clean and dry. Immediately prior to further concreting the joint face shall be soaked with water and covered with sand cement mortar of proportions identical to that in the concrete to be placed, punned into the body of the set concrete.

For exposed finishes, care shall be exercised to preserve an unbroken line at the exposed edge of the joint.

In no circumstances shall the concrete be allowed to finish at a break running down a rough slope. Such cases, if found, will be treated as contrary to the specification and the Contractor will be required to cut out the member and re-cast. In the case of horizontal joints, any excess water and laitance shall be removed from the surface after the concrete is deposited and before it has set.

Specification
Concrete Work

(2/F/25)

Specification
Concrete Work

(2/F/26)

Before casting slabs the haunching or seatings for the slab shall be thoroughly hacked, scoured and washed and covered with at least 5mm of mortar immediately before the slab is cast.

Any necessary construction joints in foundations shall be stepped and lapped 600mm. Joint faces shall be prepared and treated as described above.

F.39

Striking times

It shall be the Contractor's responsibility that no distortion, damage, overloading or undue deflection is caused to the structure by the striking of formwork, but the Engineer reserves the right to delay the time of striking in the interest of the work. Formwork shall not be struck until the concrete has sufficiently hardened. Approval of the Engineer shall not relieve the Contractor of his liability to make good any concrete damaged by premature removal or collapse of forms. In no circumstances shall forms be struck until the concrete reaches a cube strength of at least twice the stress to which the concrete may be subjected at the time of striking. The following striking times given in (24 hours) are the absolute minimum that will be permitted.

Forms		Ordinary	
Rapid		Portland	
Hardening		Cement	
Portland			
Cement			

Wall	)	2	
Columns (unloaded)	)		2
Beam sides)		
Slabs - props left under	)	4	2

Specification
Concrete Work

(2/F/27)

Beam soffits -	)	7	5
Props left under)		
Slabs - props	)	10	5
Beams - props	)	18	8

The time for removal of forms as set out shall not apply to slabs and beams spanning more than 10 metres. For such spans appropriate times shall be recommended or advised by the Engineer.

F.40

Curing

The curing of the concrete must receive particularly careful attention. The concrete shall be covered with a layer of sacking, canvas hessian or suitable absorbent material, and concrete, formwork and covering kept constantly wet for the first seven days after casting.

F.41

Holes and chases and casting in

No holes or chases shall be cut in reinforced concrete works. The Contractor shall ensure that all necessary holes and chases, including fixing holes for railing and balustrades etc., are carefully formed in the correct position by requisite measures prior to the placing of concrete.

All conduits, pipes, tubes and the like shall unless otherwise detailed, be run on top of the bottom reinforcement of the concrete work. It shall be the Contractor's responsibility to ensure full co-ordination with Sub-Contractors in the setting out for this purpose.

Generally conduits, pipes and special fixtures shall be concreted in where required and in the exact positions demanded.

Concrete fixing blocks shall not affect the strength or cover of the structure nor effect finished work due to movement of other cause.

Details of the positions of all holes, chases and fixing blocks shall be submitted to the Engineer for his approval prior to putting the work in hand.

Specification
Concrete Work

(2/F/28)

F.42

Tests of completed structural members

The Engineer shall instruct that a loading test be made on the works, or any part thereof, if in his opinion such a test be deemed necessary for one or more of the following reasons:-

- (a) the site-made concrete test cubes failing to attain the specified strength.
- (b) The shuttering being prematurely removed.
- (c) Overloading during construction of the works, or part thereof
- (d) Concrete improperly cured.
- (e) Any other circumstances attributable to alleged negligence on the part of the Contractor which, in the opinion of the Engineer, may result in the works, or part thereof, being less than the required strength.

If the loading test be instructed to be made solely, or in part, for one or more of the reasons mentioned above, the test shall be made at the Contractor's own cost. If a test be instructed to be made for any other reason than specifically stated above, the Contractor shall make the test and shall be reimbursed for all costs relating thereto.

If the result of the loading test be not satisfactory, the Engineer shall instruct that the part of the works concerned shall be taken down or removed and reconstructed to comply with this specification, or that such other remedial measures shall be taken as to make the works secure.

If the test be instructed to be made for one or more of the reasons (a) to (e) inclusive as hereinbefore specified, the Contractor shall take down or remove and reconstruct the defective work, or shall take the remedial measure instructed, all at his own cost.

F.43

Protection

All insitu and precast concrete shall be protected from rain and during hot, dry and windy weather approved hessian covering kept constantly damp shall be used to prevent premature drying out.

Specification
Concrete Work

(2/F/29)

All insitu and precast concrete shall be protected from damage by disturbance, shock vibrations, early loading or overloading. In addition, all exposed finishes shall be constantly protected from mechanical damage to arrises or face and damage due to dropping, splashing and staining from any source including rusty scaffolding or reinforcement.

No materials or equipment of any kind shall be stored or stacked on suspended floors without the Engineer's prior approval.

F.44

Precast Concrete

Concrete shall all be cast in properly made strong moulds to form shapes required. For work described as "finished fair" the mould shall be lined with sheet iron or other approved material.

The coarse aggregate for precast concrete shall be of the sizes described.

The Concrete shall be of the mixes described and shall be thoroughly tamped in the moulds and shall be not removed from them until seven days after placing the concrete, but the sides may be removed after three days providing the moulds are such that the sides are easily removable without damaging the concrete.

The precast work shall be cast under sheds and shall remain under same for seven days in the moulds and a further seven days after removal from the moulds. During the whole of this period the concrete shall be removed sacking or other approved material kept wet. It shall then be removed from the sheds and stacked in the open for at least seven days to season.

Precast units shall be true and smooth on all faces (except where a key is required for applied finishes) all arrises shall be true and clean with no broken edges.

All units shall be marked during manufacture to indicate.

- (a) the date of casting
- (b) identification lettering in accordance with the drawings
- (c) where necessary, the way up for building in

Specification
Concrete Work

(2/F/30)

Ends of bar reinforcement shall be 25mm from internal faces and 40mm from external faces. Nominally non reinforced units may contain reinforcement at the Contractors option for handling purposes, the cost of which shall be deemed to be included in the Contract Sum.

F.45

Surface finishes

After removal of shuttering, unless instructed to the contrary, the face of exposed concrete is to be rubbed down immediately to remove fins or other irregularities. In the event of parts of the concrete being honeycombed, such portions are to be cut to a depth and shape required by the Engineer and made up with fine concrete for which shuttering is not provided, other than slabs are to be smoothed with a wooden float to give a finish equal to that of the rubbed-down surface where shuttering is provided.

The top face of a slab which it is not intended to cover with other materials is to be leveled and floated before setting to a smooth finish at the levels or falls shown on the drawings or elsewhere. The floating must be carried out in such a way as will prevent an excess of mortar being brought to the surface of the concrete. The top of a slab intended to be surfaced with mortar, Granolithic, or similar materials is to be brushed with a stiff broom while still green to remove any laitance and to provide a roughened surface.

(a) Samples

Before the execution of any specified finish, the Contractor shall prepared 1200mm square samples for the Architect's approval. No concreting in finish shall be attempted until the approval of a sample. Approved samples shall be retained until the completion of all such work and closely adhered to throughout the work. Rejected samples shall be demolished and removed.

(b) Rendered or plastered surface

Concrete faced to be rendered or plastered shall be thoroughly hacked to form a good key.

Specification
Concrete Work

(2/F/31)

(c)

Fair faced surfaces

Fair faced surfaces shall be free from honeycombing, stains, fins, lippings, nail hole or excessive air holes and shall be of a uniform colour and texture. This surface shall be obtained by the use of:-

- (i) forms lined with hardboard or plywood or other approved material or (ii) smooth steel forms

All imperfections shall be cut out, made good in cement mortar and rubbed down with carborundum stone and finally bag rubbed with cement slurry to finish to a high standard without trace of shuttering marks, joints or other disfigurements.

(d)

Board marked finish

Where so described or measured, faces of concrete shall be finished fair by means of 100mm or 150mm (nominal) width tongued and grooved boarding of 25mm (minimum) thickness. The edges to all boards shall have a nominal 2mm chamfer to form controlled fins.

Such formwork to column faces shall be continuous length boards between construction joints.

End joints will be permitted to beam faces, etc. and shall be tongued, staggered and well distributed.

All imperfections shall be cut out and made good in concrete of equal quality.

The resulting concrete shall clearly show grain and individual board marks, be free from honey-combing and excessive air holes, of uniform colour and to the entire satisfaction of the Architects.

F.46

Method of measurement

Prices are to include for working concrete around pipes and electric conduits or cable, including provision for support of same while concrete is placed.

Specification
Concrete Work

(2/F/32)

The prices for insitu work are to include for filling into, or on to, formwork where necessary, and where concrete is described as reinforced for well tamping around reinforcement. Unless otherwise described, all formwork and reinforcement are measured separately.

Prices for precast concrete work, including items described as precast or insitu, shall include for all mould, for hoisting and for placing in position, bedding, jointing or building in with cement mortar.

All reinforcing bars are of round section unless otherwise stated and no allowance has, or will be, made for rolling margin.

Prices for holes shall include for them being on rake where so required and shall include the necessary holes through formwork.

The cost of all construction joints as described herein and not specifically shown on the drawings and measured separately in this Document, shall be deemed to be included in the rates set against the other items in this Document.

The cost of providing all sample described herein shall be deemed to be included in the Construct Sum.

The cost of performing all tests described herein shall be deemed to be included in the Construct Sum except the net invoiced cost of testing items or samples at authorized testing laboratories as instructed by the Engineer, which costs will be reimbursed from the Provision Sum included elsewhere in this document.

Timber purchased for the fabrication of formwork will be regarded as construction plant and will not be paid for as materials on site.

Specification
Concrete Work

(2/F/33)

WALLING

LIST OF CLAUSES

GENERALLY

- G. 1 Testing
- G. 2 Samples and sample panels

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- G. 3 Cement
- G. 4 Fine aggregate
- G. 5 Coarse aggregate
- G. 6 Limes
- G. 7 Sand for mortar
- G. 8 Concrete blocks
- G. 9 Load bearing hollow concrete blocks
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- G. 11 Clay bricks
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WORKMANSHIP

- G. 15 Storage of materials
- G. 16 Wetting blocks and bricks
- G. 17 Bonding walling
- G. 18 Generally
- G. 19 Wall reinforcement
- G. 20 Mortar mixing
- G. 21 Bedding and pointing
- G. 22 Laying louver or screen blocks
- G. 23 Filling of blockwork cavities
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- G. 27 Chases
- G. 28 Method of measurement

Specification
Walling

(2/G/1)

Specification
Walling

(2/G/2)

WALLING

GENERALLY

G.1

Testing

The Contractor shall, as and when required by the Engineer, submit and deliver samples of any materials for testing in accordance with the relevant current B.S. Specification. Samples of mortars, when required, are to be delivered in water tight boxes provide by the Contractor.

G.2

Samples and sample panels

Samples of all types of blocks, bricks and stone required for the works shall be produced to the Engineer for his prior written approval before any orders are placed. After approval of samples, the Contractor shall erect a 1200mm x 1200mm sample panel of any brickwork, stone work or fair face block work required by the Architect. No work shall be commenced until written approval has been given to sample panels, which shall be maintained for the duration of the execution of the works to which the sample applies. The work executed shall not be inferior in any respect to the approved sample. Inferior works shall be taken down and removed if required by the Engineer. The cost of providing samples and sample panels shall be deemed to be included in the Contract Sum.

MATERIALS

G.3

Cement

Cement shall be as described in Concrete work.

G.4

Fine aggregate

Fine Aggregate for concrete blocks shall be as described in Concrete Work.

Specification Walling

(2/G/3)

G.5

Coarse aggregate

Coarse Aggregate for concrete blocks shall be good, hard, clean aggregate from approved quarries. It shall be free from all decomposed materials and shall be graded up to 10mm and all as described for coarse aggregate in Concrete Work.

G.6

Limes

Hydrated limes for cement/lime mortar shall comply with B.S. 890, semi hydraulic type 3 calcium limes.

G.7

Sand for mortar

Lime for lime/sand mortar shall comply with B.S. 890 and shall be eminently hydraulic.

G.8

Concrete blocks

Concrete blocks for walling shall be provided by the Contractor complying with B.S. 6073 Type A, and made in approved block making machines of a composition as follows:-

Portland cement

1 cubic metre

Fine Aggregate (grand up to 5 mm)

3 cubic metres

Coarse aggregate (graded up to 10mm)

6 cubic metres

Blocks shall be solid or hollow two-hole type as specified and are to be made under sheds erected by the Contractor to the directions and approval of the Engineer. Samples shall be approved by the Engineer before any walling work is commenced.

The compressive strength of Type A blocks (non loading bearing) shall be not less than:-

Average of 10 blocks

3.5 N/sq mm gross area

Lowest individual block

2.8 N/sq mm gross area

Specification Walling

(2/G/4)

When load bearing, the compressive strength of blocks shall be:-

Average of 10 blocks

7.0 N/sq mm gross area

Lowest individual block

5.6 N/sq mm gross area

All testing shall be in accordance with B.S. 6073

The concrete is to be put into the machine's moulds in thin layers and all properly tamped therein. On removal from the machines the blocks are to be carefully deposited on racks under sheds erected by the Contractor to the direction and approval of the Engineer and there left for three days and kept thoroughly wet the whole time, after which they shall be put out in the open on racks and protected with approved matting, sacking or straw and kept wet for a further five days, then kept in the same position and under same mat cover, but without wetting, for a further two days and then left in the open without matting or wetting for a further seven days to season.

The blocks must be left with good sharp edges. The blocks for use in the works shall be of dimension 190 x 190 x 290, 90 x 190 x 290 and 140 x 190 x 290mm and no variation above or below these lengths will be allowed except where required to form proper bonding at corners, around openings, sills, lintels, beams, etc. and the like positions and the Contractor must make or cut blocks to all the varying sizes required for these purpose and include this in his price.

Blocks to be subsequently covered with an insitu finishing may be slightly rough, in texture. Fair face blocks shall be perfectly smooth.

G.9

Load bearing hollow concrete blocks

Load-bearing hollow concrete blocks shall be of the two hole type of approved manufacture. The blocks are to have a minimum resistance to crushing at twenty eight days of 4 newtons per square millimeter on their net area.

The volume of the cavities shall be not less than 45% and not more than 50% of the gross volume, and the dimensions of the cavities arranged so that each cavity is vertically continuous when the blocks are bonded.

Specification
Walling

(2/G/5)

G.10

Precast concrete louver or screen blocks

Precast concrete louver or screen blocks shall comply in all respects with the specification for precast items contained in the preambles to 'Concrete Work', and shall be constructed to the dimensions and form shown in the drawings.

G.11

Clay Bricks

All clay bricks shall be obtained from a manufacturing source specified by the Engineer in writing, or where not so specified, approved by him in writing and complying with BS 3921.

All bricks incorporated into the work shall be properly burnt, clean, hard, of well defined arris, uniform in shape and as near uniform in colour as possible. Bricks to be used for face work shall be selected to the Architect's approval.

G.12

Hollow clay screen blocks

Hollow clay screen blocks shall be from an approved manufacturer to the pattern and dimensions described, free from flaws, chips etc. with completely clean arrises when incorporated into the finished work.

G.13

Stone for pitching

Stone for pitching shall be hard clean and sound local stone from an approved quarry to the approval of the Engineer.

G.15

WORKMANSHIP
Storage of materials

Cements and limes shall be stored off the ground, under cover and away from damp, and in such manner to enable them to be used in rotation in order of delivery.

Sands shall be stored separately according to type on clean, hard dry standing and protected from contamination.

Specification
Walling

(2/G/6)

Sands for pointing shall be stored separately, away from other sands and shall be obtained in sufficient quantity at one time to enable materials of the approved colour to be used for the whole of the work.

Precast concrete blocks and louver or grille blocks and clay bricks and blocks shall be open stacked to permit ventilation and protected from the sun, rain and rising damp.

G.16 Wetting blocks and bricks

Concrete blocks and louver or grille blocks and clay bricks and blocks shall be wetted as necessary before and after laying. Walls shall be kept wetted for three days after building.

G.17 Bonding walling

The blocks shall be properly bonded together and in such manner that no vertical joint in any one course shall be within 115mm of a similar joint in the courses immediately above or below. Sufficient through bonders shall be provided as directed by the Architect. Alternative courses of walling at all angles and intersections shall be carried through the full thickness of the adjoining walls. All walling shall be built up entirely solid in blocks, without voids, allowance being made for joints 10mm thick only. All perpends, reveals and other angles of the walling shall be built strictly true and square.

G.18 Generally

The Contractor shall provide all setting out rods.

All surfaces on which blockwork or brickwork is to be built shall be clean. All blockwork and brickwork shall be built uniform, true and level, with all perpends vertical and in line. No work shall rise more than 1 metre above adjoining works and all such risings are to be properly racked back in long steps to prevent cracks arising, and all walls shall be leveled around at each floor.

Joints generally are not to exceed 10mm in thickness. Cutting of blockwork against concrete soffits, etc. shall include for cutting to give normal 10mm joints and complete filling thereof with mortar.

Specification
Walling

(2/G/7)

All walls built in hollow concrete blocks, where finishing with an open top edge, (i.e. not against ceiling, beam, etc.), or at the underside of sills, shall be finished with a solid concrete block top course.

Where walling is to be fair faced in blocks, the blocks shall be selected and shall all have clean arrises.

G.19 Wall reinforcement

Where so specified hollow block walls shall be reinforced vertically with 10mm diameter mild steel bars or 6mm square twisted bars at 450mm centers unless otherwise specified, the bars being tied in with the reinforcement of the floors at the top and bottom in an approved manner. All bars shall be lapped 400mm.

No scheduled for steel in walls will be provided.

Mortar mixing

All materials shall be accurately gauged by gauge boxes and mechanically mixed and used within 30 minutes of first mixing. Proportions shall be cement and sand (1:4) by volume.

Retempering of mortar will not be permitted. Gauge boxes and mixers shall be kept clean.

G.21 Bedding and pointing

All blocks shall be bedded on a solid bed of mortar, vertical faces of all blocks shall be well buttered before being laid and the whole well grouted at each course. Joints to blockwork to be plastered shall be roughly raked out to form a key. Joints to fair face blockwork shall be either finished flush or finished recessed 6mm as hereafter specified.

G.22 Laying louver or screen blocks

Louvre or screen blocks shall be built in mortar with all joints flushed up, surplus mortar wiped from the face of the blocks and finished fair.

Specification
Walling

(2/G/8)

G.23

Filling of blockwork cavities

All cavities where specified and shown above ground and all cavities below ground level shall be filled in solid with concrete of the mix described and placed and consolidated in sections not exceeding 1125mm in height.

G.28

Method of measurement

Prices for holes and chases shall include for cutting or leaving such holes or chases as may be required and the prices shall include for holes being on rate where necessary.

G.24

Stone pitching

The ground to receive pitching shall be well compacted and the stone, which shall be flat bedded and not less than 230mm either way along the bearing surface, shall be punned to the required falls and inclinations so that neither wedges nor spalls are required to keep the pitching rigidly in place. The joints shall be no more than 13mm thick solidity filled with 1:3 cement mortar and pointed.

G.25

Stone walling

The stone shall be well bonded with a minimum of one good bond or through stone evenly spaced to each square metre. All cavities and joints in stonework are to be filled in and flushed up solid with mortar. Jointing and pointing is as detailed or instructed.

G.26

Putlog holes

Putlog holes shall be carefully, properly and completely filled up on completion of walling work.

G.27

Chases

Where walling is cut, holed or chased for conduits, pipes or the like, all such chases shall be filled in solid with cement mortar mix (1:4) prior to the application of finishes. In no case shall the vertical chase be deeper than one third the thickness of the wall and in no case shall the horizontal chase be deeper than one sixth the thickness of the wall.

Specification
Walling

(2/G/9)

Specification
Walling

(2/G/10)

ROOFING

LIST OF CLAUSES

TILE ROOFING

- K.1 Bituminous felt underlay
- K.2 Mbezi interlocking tiles
- K.3 Examine roof coverings

CORRUGATED OR TROUGHED SHEET ROOFING

- K.4 Sheet roofing generally
- K.5 Profiled aluminium sheet roofing

BITUMINOUS FELT ROOFING

- K.6 Approved Subcontractor

- K.7 Guarantee

- K.8 Samples

- K.9 Preparation of surfaces

- K.10 Pipes to be laid before hand

- K.11 Built-in roofing

- K.12 Air pockets and stains

- K.13 Test for falls

- K.14 Protection

Specification
Roofing

(2/K/1)

ROOFING

TILE ROOFING

- K.1 Bituminous felt underlay

Bituminous felt underlay to ridges etc, to be self finished felt weighing not less than 14 kgs. Per 10 square metres with 600mm laps at joints and nailed with galvanized steel nails as above.

- K.2 Mbezi interlocking tiles

To be 420 x 330mm double Roman concrete interlocking tiles obtained from Universal Electronics & Hardware Ltd, Plot No 108, Mbezi Industrial Area, Dar es Salaam and laid and fixed in accordance with their printed instructions.

Tiles are to be in colours selected by the Architect and all ridges and other special tiles must be from the same manufacturer and must match the tiles with which they are laid.

All tiles are to be laid to the correct gauge on treated sawn timber battens, each slope of the roof being set out to take an exact number of whole tiles without any cutting at ends and with straight joints true from top to bottom.

The top and bottom courses, every fifth course and verge tiles to be nailed using 50mm galvanized nails.

At verges special left hand verge tiles are to be used.

Ridge and hip tiles are to be bedded in cement mortar (1:4) and visible joints pointed in matching coloured compound obtained from the tile manufacturer.

Any cutting on tiles and specials shall be accurately executed with a power driven masonry saw and any exposed raw edges coloured with compound as before described.

Specification
Roofing

(2/K/2)

No cracked, chipped or otherwise broken tiles will be allowed in the works and all tiles discoloured or defaced by mortar droppings are to be replaced at the Contractor's expense.

K.3

Examine roof coverings

Before delivering up the Works, examine the roof coverings and leave the roofs clean, watertight and drop dry.

K.4

CORRUGATED OR TROUGHED SHEET ROOFING

Sheet roofing generally

All sheet coverings shall be laid away from the prevailing weather i.e. the exposed edge of the top most sheet to be on its leeward side.

K.5

Profiled aluminium sheet roofing

(i) Profiled aluminium sheets are to comply with BS 4868 and are to be colour coated by the manufacturer after formation and of the gauges specified, laid with one and a half corrugation side laps and 150mm end laps. Sheets are to be properly stacked on battens and if kept in the open are to be stacked inclined to facilitate run-off of rainwater.

(ii)

Fixing corrugated steel sheeting is to be by means of 14 gauge drive screws in the case of a timber roof supporting structure, and 6mm galvanized hook bolts in the case of a steel supporting structure.

Both types of fixing to incorporate a bituminous felt washer backed by a cranked diamond shaped aluminium washer immediately below the screw head or nut whichever the case may be.

Each sheet is to have a minimum of two fixings and the holes for the bolts or screws are to be drilled through the crown of the corrugation and be of such size so as to give a 0.80mm clearance on the bolt or screw.

Specification Roofing

(2/K/3)

(iii)

Colour coated roofing sheets are to be finished to an approved colour by spraying and oven curing at the manufacturer's works. Care is to be taken to avoid damage to the finish and small scratches and blemishes are to be touched up on site with paint scratches are to be returned to the supplier for refinishing or are to be replaced.

(iv)

Accessories are to be obtained from the same supplier as the roof sheeting and are to properly match the colour of the roof sheeting.

BITUMINOUS FELT ROOFING

Approved Subcontractor

K.6

The Contractor is required to arrange for the work to be executed complete and to the entire satisfaction of the Architect by an approved Subcontractor.

K.7

Guarantee

The Contractor shall obtain from the approved Subcontractor for roofing work and deposit with the Architect, a written guarantee and undertaking to the effect that during a period of twelve calendar months from and after the certified date of completion of the whole of the works such Subcontractor shall at his own expense make good satisfaction of the to the Architect all and any defects in the work which shall be attributed to improper materials or faulty workmanship and shall bear the cost of any consequential damage as shall be provided for in such guarantee.

K.8

Samples

The Contractor shall, when required by the Architect, submit samples of any materials for testing.

K.9

Preparation of surfaces

All surfaces to receive roofing are to be dry, rough and finished to the requirements and to the entire satisfaction of the Subcontractor from whom the Contractor shall obtain, for submission to the Architect, a signed statement that such finish is satisfactory.

Specification Roofing

(2/K/4)

K.10

Pipes to be laid beforehand

The Contractor must ensure that all necessary plumbing, outless, etc. and pipes passing through roofs are fixed in position before laying is commenced.

K.11

Built-up roofing

- (i) The built-up felt roofing shall be in accordance with B.S. 747 applied to a screeded base and shall comprise the following applications laid strictly in accordance with the manufacturer's printed instructions and the Code of Practice 144 of 1961.
- (ii) Rolls must be transported and stored on end one roll high and adequately protected from the sun.
- (iii) One layer finish
 - (a) Priming Prime screed with P.F.4 primer.
 - (b) First layer One layer of heavy duty self finished felt (Class 1C) weighing not less than 25 kgs. Per 10 S.M.
 - (c) Jointing One application of hot bituminous compound weighing not less than 30 kgs/per 10.S.M.

(iv)

Two layer finish

- (a) Priming Prime screed with P.F.4 primer.
- (b) First layer One layer of heavy duty self finished felt (Class 1B) weighing not less than 14 kgs per 10 S.M. Laid loose on prepared screed.

Specification
Roofing

(2/K/5)

- (c) Jointing One application of hot bituminous compound weighing not compound less than 30 kgs per 10 sm.
- (d) Second layer One layer of heavy duty self finished felt (Class 1C) weighing not less than 25 kgs per 10 S.M.

(v)

Three layer finish

- (a) Priming Prime screed with P.F.4 primer.
- (b) First Layer One Layer of heavy duty self finished felt weighing not less than 14 kgs per 10 sm. laid loose on prepared screed.
- (c) Jointing Compound One application of hot bituminous compound weighing not less than 30 kgs. Per 10 S.M.
- (d) Second Layer One layer of heavy duty self finished felt weighing not less than 14 kgs. Per 10 S.M.

(e)

Jointing Compound

As described in (c) above.

(f)

Third Layer

One layer of heavy duty self finished felt

weighing not less than 25 kgs. Per 10 S.M.

(v)

Stone chipping finish. The entire surface to be mopped with hot bituminous compound and left overnight and followed with a layer of 6 - 12mm white stone chippings bedded in mastic applied to the entire area and lightly rolled.

Specification
Roofing

(2/K/6)

(vi) Flashings, skirtings etc., are to be painted two coats bituminized aluminium paint on completion.

K.12 Air pockets and stains

Air pockets and stains will not be permitted and the finished work shall not ring hollow over any part of its surfaces.

K.13 Test for falls

To ensure that the finish has been truly laid to falls, (minimum 1:200), the Contractor shall arrange for the roof areas to be flushed with water in the presence of the Architect. Any defect or depressions shall be rectified and retested for approval.

K.14 Protection

The Contractor shall take all necessary precautions to ensure that no damage is caused to the roofing after completion of laying by further building operations, storage of heavy objects, traffic or any cause whatsoever.

Specification
Roofing
(2/K/7)

CARPENTRY AND JOINERY

LIST OF CLAUSES

QUALIFICATIONS OF THE RULES OF THE S.M.M.

- M.1 Holes in timber
- M.2 Fixing by bolting, etc.
- M.3 Fixing ironmongery

DEFINITIONS

- M.4 Plugging
- M.5 Finished sizes
- M.6 Selected
- M.7 Hardwood or the like

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- M.8 Terminology
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- M.11 Species of timber
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Carpentry and Joinery

(2/M/2)

- M.32 Lipping to block word
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IRONMONGERY

- M.38 Generally
- M.39 Reference
- M.40 Fixing
- M.41 Keys and labels
- M.42 Method of measurement

CARPENTRY AND JOINERY

QUALIFICATIONS OF THE RULES OF THE S.M.M.

- M.1 Holes in timber
Notwithstanding the provisions of S.M.M. Clause M.38 (a), where work is described as fixed with screws, holes in timber shall be deemed to be included.
- M.2 Fixing by bolting, etc
Notwithstanding the provisions of S.M.M. Clause A.3 (b) (iii), the term 'fixing up' used in conjunction with any method of fixing shall not be deemed to include any fixing materials but shall be interpreted as a definition of fixing method only.

Specification
Carpentry and Joinery

(2/M/3)

M.3

Fixing ironmongery

Notwithstanding the provision of S.M.M. Clause M.39 (a), fixing with bolts or other devices shall be deemed to be included where these are normally supplied with the ironmongery concerned.

DEFINITIONS

M.4 Plugging

The term 'plugging' shall mean the provision and fixing of approved proprietary plugs of the correct grade, hardwood plugs cut to twist, or dovetailed plugs morticed into the walls.

M.5 Finished sizes

All members shall be finished to the sizes or shown on the drawing. The prices inserted by the Contractor shall be deemed to include for the nominal sizes necessary to produce the finished sizes stated.

M.6 Selected

The term 'selected' shall be deemed to include keeping the material so described clean for staining, polishing, or any similar finish.

M.7 Hardwood or the like

The term 'hardwood or the like', which is used as a statement of background to which ironmongery is to be fixed, shall be deemed to include plywood and other manufactured materials, except where these materials are faced with meta, laminated plastics or the like.

MATERIALS

M.8 Terminology

All technical terms shall be as defined in the relevant timber ordinances.

Specification
Carpentry and Joinery

(2/M/4)

M.9

Timber generally

Timber shall be from an approved sawmill, be sound, well conditioned, properly seasoned to suit the particular use, straight grained, and free from defects or combination of defects rendering it unsuitable for the purpose intended, and containing not more than 15% moisture for joinery work or 18% moisture for carpentry work.

Structural timber is to be approved local softwood (pressure treated) or hardwood as specified of strength grade two supplied in long lengths, with a tolerance of 5mm on scantlings, but of uniform width and thickness. Boards and scantlings which are specified as 25mm or less in thickness are to hold up to the full size. Structural timber shall be deemed to be sawn on all faces unless otherwise stated as wrot.

Joinery timber shall be approved prime select grade local hardwood as specified and shall be held to be wrot by machine dressing unless otherwise stated.

All timber for the works is to be purchased immediately the Contract is signed and is to be open stacked for as long as possible before use for kiln drying.

All timber and assembled woodwork shall be protected from weather and store in such a way as to prevent attack by termites, insects or decayed fungi.

M.10

Approval

Any timber brought to the site and rejected by the Engineer, shall be removed from the site at the Contractor's expense.

Should any timber be found to contain disease, pest, borers, termites, or any other defect after incorporation in the work, and until the expiration of the maintenance period, notwithstanding that the timber may have been approved by the Engineer when brought to the site, such timber shall be removed and replaced, together with all works disturbed, at the Contractor's expense.

Specification
Carpentry and Joinery

(2/M/5)

No timber is to be incorporated in the building which has been used for formwork, planking, strutting, scaffolding, or any other form of plant.

M.11

Species of timber

The following timbers shall be used where specified and the common names used throughout this document correspond to the botanical names as follows:-

<u>Common Name</u>	<u>Botanical Name</u>
Pine	Pinus Patula
Cypress	Cypressus lusitana
Podocarpus	Podocarpus spp.
African Mahogany	Khaya nyasica
Mninga	Pterocarpus Angolensis
Mvule	Chlorophora excelsa

Species of timber

The following may also be used where "hardwood" or local hardwood" is specified, with the Architects prior written approval: Adina, East African Afromosia, East African Afzelia, Mgando, Banga Wanga, Muhuhu, Camphor and Burkea.

M.12

Plywood

The plywood shall be from a manufacturing source, imported and approved by the Architect and shall comply in all respect with the requirements of B.S. 6566.

Grade 1 veneer plywood shall be used visible surface is to be wax polished, varnished, plastic lacquered or left untreated.

Grade 2 veneer plywood shall be used where subsequent painting is intended.

All plywood shall be WBP bonded, and of marine quality when specified.

Specification
Carpentry and Joinery

(2/M/6)

Routine tests will be required from time to time to check the quality of plywood manufacture.

M.18 Screws, nails, bolts, etc.
Screws, shall comply with B.S. 1210 and nails with B.S. 1202. Bolts shall be generally cup square with large washers and nuts.

M.13 Chipboard
Chipboard shall comply with B.S. 5669

M.14 Blockboard
Blockboard shall be from a manufacturing source approved by the Architect and shall comply in all respects with B.S. 6566. The grade of the veneer shall be as described in the measured items.

M.15 Hardboard
Hardboard shall comply with B.S. 1142 Part 2 and be tempered.

M.16 Laminated plastic sheet
Laminated plastic sheet shall comply with B.S. 3794 Class 1; from an approved manufacturer. Prior to fixing laminated plastic sheet the Contractor shall obtain the Architects written approval to a sample.

M.17 Pressure impregnated treatment
All timber used in carpentry, grounds for fixing joinery, etc. is to be vacuum pressure impregnated with Tanalith C preservative to a dry salt net retention of 10 kg of Tanalith C per cubic metre of timber and stacked until the moisture content returns to 18% or 15% as above described.

M.22 Storage
Joinery shall be protected from the weather during transit and shall be stored under cover, clear off the ground, in clean, dry ventilated structures, before and after priming.

M.23 Priming
All joinery shall be delivered to the site unprimed and shall be primed, (as measured in Painting and Decorating), immediately after inspection, and before fixing.

M.21 Contractor to check discrepancies
The Contractor shall be responsible for ascertaining from the site and for checking all dimensions before the joinery is put in hand. Any discrepancies between site dimensions and those shown on the Architect's drawings shall be reported immediately to the Architect for rectification.

M.20 Generally
Workmanship shall comply with B.S. 1186 Part 2.

M.19 Adhesive
Adhesive shall be synthetic resin type complying with B.S. 1204. Part 1, type WBP.

WORKMANSHIP

Specification
Carpentry and Joinery

(2/M/7)

Specification
Carpentry and Joinery

(2/M/8)

M.24

Arrises

All arrises exposed in the finished work shall be rubbed down with glass paper.

M.29

Nailing and screwing

Where items are described as 'fixed with screws' they shall be brass screws of the appropriate gauge and length, countersunk and peltated where applicable. In all other instances wrot timber shall be fixed with oval brads, round lost heads of cut clasp nails punched and puttied; carcassing timber shall be spiked, well driven and clenched.

M.25

Fabrication

All joinery is to be purpose made and constructed to detail drawings, in a workmanlike manner, morticed and tenoned, dovetailed, tongued and grooved, glued, pinned, screwed, etc., as best suited to the particular part. All mortice and tenon joints are to be pinned with hardwood dowels or with brass pins in addition to wedging and gluing and no mortice holes be visible in joinery works. All joinery shall be put together with waterproof adhesive.

M.30

Joints in structural timbers

Structural timbers shall as far as is practicable be in single lengths. Where joints are unavoidable they shall be scarfed, spiked and bolted as required. Generally scarfs shall be 450mm long.

All carpenter's work shall be accurately set out in strict accordance with the drawings and shall be framed together and securely fixed in the best possible manner with properly made joints. All necessary brads, nails and screws, etc. shall be provided as directed and approved.

M.26

Fixing plywood, hardboard and chipboard

Unless otherwise specified fibreboard hardboard and chipboard, shall be pinned to its backing, heads punched below the surface and puttied flush.

M.27

Fixing laminated plastic

Laminated plastic shall be fixed with a waterproofed adhesive recommended by the manufacturers, and in accordance with their instructions.

M.28

Plugs

The Centres of fixing plugs shall not exceed 600mm and shall be closer if the work so requires.

Diameter of bolt	Minimum thickness of washer	Minimum size of square or diameter of washer
10 to 12 mm	3 mm	50 mm
16 to 22 mm	5 mm	65 mm
25 to 32 mm	6 mm	75 mm

M.31

Lipping to blockboard, chipboard or plywood

All exposed edges of board; including those to be covered with formica, shall be lipped with a hardwood lipping to the size specified for the full thickness of the board to match the veneer of the general face. Lippings shall be fixed with pins of the appropriate gauge and length, punched and puttied. Where described as 'tongued', the edge of the blockboard shall be grooved to receive the lipping which shall be rebated twice to form the tongue.

Specification
Carpentry and Joinery

(2/M/9)

Specification
Carpentry and Joinery

(2/M/10)

M.32

Fixing panels with beads

Where glass or other panels are fixed with beads, and may be required to be removed or replaced in the event of breakage, the beads shall, where fixed to one side only, be fixed with brass screws and cups, and where fixed to both sides, be bradded one side and fixed with brass screws and cups on the other side. Brass screws and cups shall only be used internally.

M.33

Flush doors

Flush doors shall be of the sizes and thickness indicated on the drawings and shall be imported.

The doors, unless otherwise described, shall be semi-solid cored having stiles, top and bottom rails, filled in with core slats at approximately 50mm centers, or slats to an egg crate pattern.

Doors intended for interior or exterior use shall be faced on both sides with 6 mm exterior marine quality plywood with the grade of veneer as specified in the measured items.

All flush doors shall have lipped edges. The members of all doors shall be bonded with the same adhesive as is required for the bonding of the plywood with which they are faced.

No flush doors shall be incorporated in the works without first obtaining Architect's approval.

M.34

Inspection and testing

The Engineer shall be given facilities for inspection of all works in progress whether in workshops or on site. All timber as it arrives on the site may be inspected by the Engineer and any timber brought on to the site and not approved by him must be removed forthwith, failing which he may arrange for the removal of the rejects and dispose of them as he may consider advisable at the Contractor's expense.

Specification
Carpentry and Joinery

(2/M/11)

Notwithstanding approval having been given as above, any timber incorporated in the works found to be in any way defective before the expiry of the maintenance period shall be removed and renewed at the Contractor's expense. The Contractor is to allow for testing of prototypes or special construction units and the Architect shall be at liberty to select any samples he may require for the purpose of testing, i.e. for moisture content, or identification of species, strength, etc. Where timbers need to be extended into a wall, they shall be thoroughly "brush treated" with "Tanalith" in addition to preservative treatment as already described above, and as much clear air space maintained around the timber where it adjoins the wall as possible.

M.35

Casings and Protection

All fixed joinery which is liable to become bruised or damaged in any way, shall be properly cased and protected by the Contractor until the completion of the Works.

M.36

Clearing up

The Contractor is to clear out and destroy or remove all cut ends shavings and other wood waste from all parts of the building and the site generally, as the work progresses and at the conclusion of the works.

M.37

Generally

The rates for ironmongery shall include the cost of all fixing screws.

M.38

References

Where items of ironmongery are not specified by manufacturers catalogue reference, the Contractor shall submit for the Architects approval within one month of the date of possession of site, specifications including manufacturers catalogue reference numbers of the items he proposes to purchase.

Prior to fixing any items of ironmongery, the Contractor shall obtain the Architects approval of a sample.

Specification
Carpentry and Joinery

(2/M/12)

M.39 Fixing

Joinery is to be countersunk for ironmongery and screws. Where woodwork is painted the ironmongery shall be fixed while the joinery is primed but before painting. All lock handles and the like shall be removed until after painting is complete when they will be fitted and adjusted and left in perfect working order.

M.40 Keys and labels

All locks are to be provided with two keys and no key is to pass the wards of any but its own lock. All keys are to be provided with a key ring and plastic tag on which is firmly written the position of the door.

M.41 Method of measurement

Fixing shall include all fitting, cutting, sinking, boring and morticing, easing and adjusting.

Specification
Carpentry and Joinery

(2/M/13)

STRUCTURAL STEELWORK

LIST OF CLAUSES

GENERALLY

- N.1 Standard of construction
- N.2 Fabrication by specialist firm
- N.3 Contractor to submit drawings
- N.4 Accuracy of drawings
- N.5 Erection scheme
- N.6 Dimensions to be verified
- N.7 Copies of orders
- N.8 Damage

MATERIALS

- N.9 Quality of steel
- N.10 Marking of steel
- N.11 Standard dimensions
- N.12 Weight of steel
- N.13 Condition of surfaces
- N.14 Tests and inspection
- N.15 Metallic coatings
- N.16 Paint

Specification
Carpentry and Joinery

(2/N/1)

WORKMANSHIP

- N.17 Generally
- N.18 Rejection
- N.19 Fabrication
- N.20 Cost of temporary erection, etc.
- N.21 Joints and connections
- N.22 Painting at works

Specification
Carpentry and Joinery

(2/N/2)

STRUCTURAL STEEL WORK

GENERALLY

- N.1 Standard of construction
The whole of the structural steelwork and testing shall comply with the relevant clause of B.S. 449 (Part 2) and B.S. 5950.
- N.2 Fabrication by specialist firm
The steelwork shall be fabricated by a specialist firm and, before an order is placed by the Contractor, such specialist firm shall be approved by the Architect.
- N.3 Contractor to submit drawings
The Contractor shall include for the preparation of all shop details from the drawings supplied by the Engineer. All such details shall be approved in writing by the Engineer before the work is put in hand. Every drawing shall show the number and sizes of all bolts, complete details of welds, type of electrodes, welding procedure, whether the welds are to be made in the shop or elsewhere and any other relevant information.
- N.4 Accuracy of drawings
The Contractor shall be responsible for the correctness of his shop details, for shop fittings and site connections.
- N.5 Erection scheme
The Contractor shall submit to the Engineer for approval, drawings showing the proposed erection scheme, together with all calculations for erection stresses, etc. The approval by the Engineer will not absolve the Contractor in any way from responsibility.

Specification
Carpentry and Joinery

(2/N/3)

N.6

Dimensions to be verified

The Contractor shall take the dimensions from the site or buildings and shall verify all dimensions given on the drawings before the work is put in hand.

N.7

Copies of orders

A copy of all orders for materials shall be supplied by the Contractor to the Architect at the time of ordering, for identification purpose.

N.8

Damage

Any damage to materials on the site due to inadequate precautions being taken during the erection of the steelwork shall be made good to the satisfaction of the Engineer at the Contractor's expense.

MATERIALS

N.9 Quality of steel

- (i) All structural mild steel shall comply with B.S. 449 and B.S. 4360 Part 2.
- (ii) All structural steel tubes shall comply with B.S. 6323 and B.S. 449 Part 2.
- (iii) Mild steel and medium tensile steel electrodes for metal-arc welding shall comply with the requirements of B.S. 639.
- (iv) High strength friction grip bolts and washers shall comply with B.S. 4395 Part 1.

N.10

Marking of steel

Each piece of steel shall be legibly marked with the maker's name or trade mark and with cast numbers or identification marks.

Specification
Carpentry and Joinery

(2/N/4)

N.11

Standard dimensions

The dimensions and allied requirements of all structural rolled sections shall comply with B.S. 4 Par 1 and B.S. 4848. The dimension, weight, tolerances, etc. of all bolts, nuts, studs, etc. shall conform to the following standards.

Black bolts, nuts, studs, lock nuts and washers shall comply with the requirement of B.S. 916 for dimension and screw threads, or with B.S. 1580 for unified black bolts, etc.

Turned bolts shall have the shank turned to the specified diameter allowing only a minus tolerance up to 0.13 mm.

N.12

Weight of steel

For the purpose of measurement, the weight of mild steel shall be as given in B.S. 648. The weights per metre given on the drawings do not include shelf angles affixed to webs, nor plates affixed to flanges of Universal beams or other sections.

N.13

Weight of steel

All surfaces of steelwork shall be clean, free from loose millscale and rust.

N.14

Tests and inspection

Manufacturer's Mill Test certificate for all structural steel shall be supplied to the Engineer as and when required. Where and when directed by the Engineer, the Contractor shall take and deliver samples of structural steel for testing to a testing facility nominated by the Engineer. Should the results of any test be unsatisfactory the whole consignment of steel which the sample represents shall be rejected and shall be replaced by other material of proper quality at the expense of the Contractor.

N.15

Metallic coatings

- (i) Galvanized steelwork shall comply with B.S. 729, entirely coated with zinc after fabrication by complete immersion in a zinc bath in one operation and excess carefully removed. The finished surfaces shall be clean and uniform.

Specification
Carpentry and Joinery

(2/N/5)

N.16

Paint

- (ii) Zinc sprayed steelwork shall comply with B.S. 2569, Part 1. The nominal thickness of zinc coating shall be not less than 0.102mm and at no point less than 0.070mm

Primer for steelwork shall be calcium plumbate priming paint complying with B.S. 3698, Type A. Bituminous paint shall be black bituminous paint complying with B.S. 3416, type 1.

WORKMANSHIP

N.17

Generally

The whole of the fabrication and erection of the steelwork shall be carried out in accordance with B.S. 449 Part 2.

The welding of steel to B.S. 4360 Part 2 must conform to:

B.S. 5135 - "General requirements for the metal-arc welding of mild steel" as applicable.

For welding any particular type of joint the Contractor shall provide evidence acceptable to the Engineer that the welder has satisfactorily completed the appropriate tests as described in B.S. 449, Par 2. Any welder's tests shall be made at the Contractor's expense and shall include the cost of any fees incurred by the Employer for witnessing of, or making such tests. The right is reserved to make non-destructive tests on the welding to determine if the welding conforms to the standards laid down in B.S. 5135 as applicable.

N.18

Rejection

Any portion of the work which, in the opinion of the Engineer is not in accordance with the drawings or specification shall be rejected whether before or after delivery and must be removed, from the site if delivered, within 24 hours from receipt of such notice of rejection at the Contractor's expense.

Specification
Carpentry and Joinery

(2/N/6)

Any delay caused by such rejection will not in any way relieve the Contractor from his responsibility with regard to the provisions of the Contract.

If any welding is found to be defective the cost of all remedial measures shall be borne by the Contractor, including the cost of re-testing. The Contractor is responsible for the good quality of all welding work and no exceptions will be made on the grounds that the Architect or his representative have inspected any part or parts of the work at some stage during production.

N.19 Fabrication

As much of the work of fabrications of the steelwork as is reasonably practicable shall be completed in the manufacturer's works. Field connections shall be made in accordance with the approved drawings. The Contractor shall give four days' clear notice of steelwork ready for inspection at the manufacturer's works, to facilitate inspection before delivery.

No.20 Cost of temporary erection, etc

Temporary erection of principal or other units may be called for at the discretion of the Engineer or his representative.

The cost of any necessary temporary erection, testing, packing, marking, carriage and delivery, is deemed to be included by the Contractor in the tender price.

N.21 Joints and connections

No variation of the number, type or position of the joints or connections shown on the drawings shall be made without the consent of the Engineer. If such consent is desired the Contractor shall submit detailed drawings of the proposed joints for the approval of the Engineer and no extra cost incurred by reason of such additions or alterations will be allowed to the Contractor.

N.22 Painting at works

Where described as primed at works, steelwork shall be freed of rust, millscale, welding slag and flux residue and shall be dry immediately prior to painting with primer.

For joints with high strength friction grip bolts the contact surfaces shall be left unpainted but special care shall be taken after assembly to paint all edges and corners near the joints together with bolt heads, nuts and washers to prevent the ingress of moisture. For joints made with other bolts the contact surfaces shall each be given a coat of priming paint and for shop connections the contact surface shall be brought together while the paint is still wet.

For welded connections where the contact surfaces are not completely sealed the contact surfaces shall be painted to within 50mm of the edges that are to be welded.

The primer shall be touched up with similar primer if damaged by subsequent handling.

Specification
Carpentry and Joinery

(2/N/7)

Specification
Carpentry and Joinery

(2/N/8)

METAL WORK

LIST OF CLAUSES

QUALIFICATIONS OF THE RULES OF THE S.M.M.

- P.1 Backgrounds
- P.2 Preparation for welding
- P.3 Fixing by bolting, etc.
- DEFINITIONS
- P.4 Holes for attachments
- P.5 Welding
- GENERALLY
- P.6 Shop drawings
- P.7 Standard of construction for structural work
- P.8 Fabrication of structural metalwork
- P.9 Shop details for structural work
- F.10 Accuracy of drawings
- F.11 Dimensions to be verified
- MATERIALS
- P.12 Steel for general metalwork
- P.13 Steel for structural metalwork
- P.14 Cast iron

Specification
Metalwork

(2/P/1)

- P.15 Galvanized work
- P.16 Bolts and nuts
- P.17 Aluminium
- WORKMANSHIP
- P.18 Smithing, etc
- P.19 Forging
- P.20 Welding
- P.21 Structural work generally
- P.22 Rejection
- P.23 Fabrication
- P.24 Joints and connections
- P.25 Painting at works
- P.26 Welded members to be galvanized
- P.27 Metalwork to be painted
- P.28 Fixing windows
- P.29 Method of measurement

Specification
Metalwork

(2/P/2)

METAL WORK

QUALIFICATION OF THE RULES OF THE S.M.M

- P.1 Backgrounds
Notwithstanding the provisions of S.M.M. Clause P.1 (a) (iii) the background or support to which metalwork is fixed shall be deemed to be any background compatible with the method of fixing given in the descriptions.
- P.2 Preparation for welding
Notwithstanding the provisions of S.M.M. Clause P.1 (d) (iii), description of work required to be welded and ground to smooth finish shall be deemed to include the preparation of the members.
- P.3 Fixing by bolting, etc.
Notwithstanding the provisions of S.M.M. Clause A.3 (b) (iii), the term 'fixing by' used in conjunction with any method of fixing shall not be deemed to include any fixing materials but shall be interpreted as a definition of fixing method only.

DEFINITIONS

- P.4 Holes for attachments
Where lugs or other subsidiary members are given in the description of main members of plates, bars, sections or tubes, holes required for the screws, bolts or rivets by which the subsidiary members are attached to the main members shall be deemed to be included.
- P.5 Welding
In the absence of specific requirements the techniques and materials employed in welding shall be selected with due regard to the character of the work and the metals being connected.

Specification
Metalwork

(2/P/3)

GENERALY

- P.6 Shop drawings
The Contractor shall submit complete shop drawings as and when required by the Engineer for his approval.
- P.7 Standard of construction for structural work
Structural metalwork and testing shall comply with the relevant clauses of B.S. 449.
- P.8 Fabrication of structural metalwork
Structural metalwork shall be fabricated by a specialist firms and, before an order is placed by the Contractor such specialist firm shall be approved in writing by the Engineer.
- P.9 Shop details for structural work
The Contractor shall include for the preparation of all shop details for structural work from the drawings supplied by the Engineer. All such details shall be approved in writing, by the Engineer before the work is put in hand. Every drawing shall show the number and sizes of all rivets and bolts, complete details of welds, type of electrodes, welding procedure, whether the welds are to be made in the shop or elsewhere and any other relevant information.
- P.10 Accuracy of drawings
The Contractor shall be responsible for the correctness of his shop details and for shop fittings and site connections.

P.11 Dimensions to be verified

The Contractor shall take the dimensions from the site or building and he shall verify all dimensions given on the drawings before the work is put in hand.

Specification
Metalwork

(2/P/4)

MATERIALS

- P.12 Steel for general metalwork
Mild steel shall comply with B.S. 4360 Grade 43A. Hot rolled sections shall comply with B.S. 4, Part 1. Hot rolled hollow sections shall comply with B.S. 4, Part 2. Tubes (other than circular hot rolled hollow sections) shall comply with B.S. 1775 and shall be of the type of steel and method of manufacture described.
- P.13 Steel for structural metalwork
(i) All structural and rivet mild steel shall comply with B.S. 449 and B.S. 4360; Part 2.,
(ii) All structural steel tubes shall comply with B.S. 6323 and B.S. 449 Part 2.
(iii) Mild steel and medium tensile steel electrodes for metal-arc welding shall comply with the requirements of B.S. 639.
(iv) All mild steel bolts and nuts shall have a tensile strength of not less than 432 N/per sq mm (28 tons per sq in) and a minimum elongation of 17 per cent as defined in Clause 2 of B.S. 916.
(v) All high tensile steel bolts, nuts and washers shall have a minimum tensile strength of 570 N/per sq mm (37 tons per sq in).
(vi) High strength friction grip bolts and washers shall comply with B.S. 4395 Part 1.
(vii) All plain washers shall be of steel. Tapered or other specially shaped washers shall be made of steel or malleable cast iron complying with B.S. 341C.
- P.14 Cast iron
Cast iron shall comply with B.S. 1452
- Specification Metalwork (2/P/5)
- P.15 Galvanized work
Iron and steel, where galvanized, shall comply with B.S. 729 entirely coated with zinc after fabrication by complete immersion in a zinc bath in one operation and all excess carefully removed. The finished surfaces shall be clean and uniform.
Zinc sprayed iron and steel shall comply with B.S. 2569. The nominal thickness of zinc coating shall be not less than 0.102mm and at no point less than 0.070mm.
- P.16 Bolts and nuts
Bolts and nuts shall comply with B.S. 1494 and 4190 and have whitworth threads.
- P.17 Aluminium
Wrought aluminium shall be of the alloys described and shall comply with the following:-
Plate, sheet and strip - B.S. 1470
Drawn tube - B.S. 1471
Extruded round tube and hollow sections; bars and rods - B.S. 1474
WORKMANSHIP
Smithing, etc
- P.18
All smithing and bending shall be soundly and neatly executed, care being taken not to overheat.
- P.19 Forging
All straps, bolts and similar work shall be forged neat and clean from the anvil.
- Specification Metalwork (2/P/6)

P.20

Welding

The work 'welded' is to be understood to include the normal trade methods of jointing metals using an oxyacetylene torch, rod and flux. The joints shall be made so that they will transmit the loads and resist the stresses to which they will be subjected. All excess metal is to be filed down and smoothed off to a workmanlike finish to the approval of the Architect. The materials employed in welding shall be selected with due regard to the character of the work and the metals being connected.

P.21

Structural work generally

The whole of the fabrication and erection of the structural metalwork shall be carried out in accordance with B.S. 4360 Part 2. The welding of steel to B.S. 4360 must conform to:-

B.S. 1140- "resistance spot welding of uncoated and coated low carbon steel".

or

B.S. 5135- "metal arc welding of carbon and carbon manganese steels" as applicable.

For welding any particular type of joints the Contractor shall provide evidence acceptable to the Engineer that the welder has satisfactorily completed the appropriate tests as described in B.S. 449, Part 2, Chapter 6. Any welder's tests shall be made at the Contractor's expenses and shall include the cost of any fees incurred by the Employer for witnessing of, or making such tests.

P.22

Rejection

Any portion of the work which, in the opinion of the Engineer is not in accordance with the drawings or specification shall be rejected whether before or after delivery and must be removed from the site if delivered, within 24 hours from receipt of such notice of rejection at the Contractor's expense. Any delay caused by such rejection will not in any way relieve the Contractor from his responsibility with regard to the provisions of the Contract.

Specification
Metalwork

(2/P/7)

P.23

Fabrication

As much of the work of fabrication of the structural metalwork as is reasonably practicable shall be completed in the manufacturer's works. Field connections shall be made in accordance with the approved drawings. The Contractor shall give four days' clear notice of structural metalwork ready for inspection at the manufacturer's works, to facilitate inspection before delivery.

P.24

Joints and connections

No variation of the number, type or position of the joints or connections shown on the drawings of structural metalwork shall be made without the consent of Engineer. If such consent is desired the Contractor shall submit detailed drawings of the proposed joints for the approval of the Engineer and no extra cost incurred by reason of such additions or alterations will be allowed to the Contractor.

P.25

Painting at works

Where described as primed at works, structural metalwork shall be freed of rust, millscale, welding slag and flux residue and shall be dry immediately prior to painting with primer.

For joints with high strength friction grip bolts the contact surface shall be left unpainted but special care shall be taken after assembly to paint all edges and corners near the joints together with bolt heads, nuts and washers to prevent the ingress of moisture. For joints made with other bolts and rivets the contact surfaces shall each be given a coat of priming paint and for shop connections the contact surfaces shall be brought together while the paint is still wet.

For welded connections where the contact surfaces are not completely sealed the contact surfaces shall be painted to within 50mm of the edges that are to be welded. The primer shall be touched up with similar primer if damaged by subsequent handling.

Specification
Metalwork

(2/P/8)

P.26 Welded members to be galvanized

All welded members which are to be galvanized shall be galvanized only after all fabrication and welding is complete.

P.27 Metalwork to be painted

All metalwork which is to be painted shall be painted with one coat of primer before fixing.

P.28 Fixing windows

Windows shall be fixed entirely in accordance with the manufacturer's instructions. They shall be properly stored at the site off the ground under weatherproof cover.

P.29 Method of measurement

Joints in the running length of members of balustrades, etc. required by the fabricator for ease of transporting and fixing shall be deemed to be included in the prices of such work.

Except where otherwise described, holes, bolts, and cutting and pinning have been measured separately.

Specification
Metalwork

(2/P/9)

PLUMBING INSTALLATIONS

LIST OF CLAUSES

QUALIFICATIONS OF THE RULES OF THE S.M.M.

- Q.1 Jointing pipes
- Q.2 Provision of holes

DEFINITIONS

- Q.3. Painting
- Q.4 Welding
- Q.5 Backgrounds requiring plugging
- Q.6 Plugging
- Q.7 Surface finishes
- Q.8 Pipe sizes

GENERAL

- Q.9 Execution of plumbing work

RAINWATER INSTALLATION

- Q.10 Plastic pipes and fittings
- Q.11 Galvanized steel tubes and fittings
- Q.12 Rainwater outlets
- Q.13 Testing

Specification
Plumbing Installations

(2/Q/1)

SANITARY INSTALLATION

- Q.14 Bye-Laws
- Q.15 Setting out
- Q.16 Spun cast iron pipes, cast iron fittings and accessories
- Q.17 Galvanized steel tubes and fittings
- Q.18 Plastic pipes and fittings
- Q.19 Sleeves
- Q.20 Brackets and hangers
- Q.21 Wire balloons
- Q.22 Appliances
- Q.23 Testing
- Q.24 Cleansing
- Q.25 Habitation certificate

HOT AND COLD WATER INSTALLATIONS

- Q.26 Galvanized steel tubes and fittings
- Q.27 Pipework generally
- Q.28 Sleeves
- Q.29 Pipework ancillaries
- Q.30 Tanks and cisterns
- Q.31 Testing

Specification
Plumbing Installations

(2/Q/2)

PLUMBING INSTALLATIONS

QUALIFICATIONS OF THE RULES OF THE S.M.M.

Q.1 Joining pipes

Notwithstanding the provisions of S.M.M. Clause Q.9 (b), the prices for all galvanized steel screwed pipes shall be deemed to include for joining with hemp and red lead or 'Boss' white unless otherwise described and the prices for all cast iron pipes be deemed to include for joining with a gasket of hemp and cold caulking compound unless otherwise described.

Q.2 Provision of holes

Notwithstanding the provisions of S.M.M. Clause Q.1 (g), the provision of holes shall be deemed to be included in the description of fixing.

DEFINITIONS

Q.3 Painting

The preparation of surfaces shall be deemed to be included with the description for painting. Specific requirements relating to the preparation of surface are given in the WORKMANSHIP section of these Preambles. In the absence of specific requirement surface shall be prepared in the manner recommended by the manufacturer of the paint being used.

Q.4 Welding

In the absence of specific requirements the techniques and material employed in welding shall be selected with due regard to the character of the work and the metals being connected.

Q.5 Backgrounds requiring plugging

The term 'backgrounds requiring plugging' shall mean any or all of the backgrounds described in S.M.M. Clause Q.1 (h) (iv), and shall be deemed to include the associated plugging.

Specification
Plumbing Installations

(2/Q/3)

Q.6 Plugging

The term 'plugging' shall mean provision and fixing of hardwood or approved proprietary plugs, or, at the Contractor's option, fixing by means of a cartridge operated rivet gun or other approved mechanical means.

Q.7 Surface finishes

In the absence of specific requirements, the treatment and finish of pipe fittings shall be appropriate to the finish of the pipes with which they are associated.

Q.8 Pipe sizes

The size of the pipe shall be the diameter of the bore.

GENERALLY

Q.9 Execution of plumbing work

All plumbing work shall be executed in accordance with the best principles of modern practice by a firm of fully qualified and registered plumbers. The Contractor shall obtain the engineers written approval to the firm he proposes to employ before the plumbing works are commenced.

The Contractor shall obtain the Engineers prior written approval to the position of all pipe runs, valve positions, control points, access points and the like for all plumbing installations.

At the time of practical completion the Contractor shall prepare and hand to the Engineer four copies of plans and diagrams showing the positions of all pipe runs, valve positions, control points, access points and the like for all plumbing installations. Such plans and diagrams shall be to the Engineers approval, and practical completion of the plumbing installation shall be deemed to have taken place only after receipt by the Engineer of such approved plans and diagrams.

Specification
Plumbing Installations

(2/Q/4)

All plumbing and drainage works shall be executed in accordance with the Regulations of the Local Authorities and Water Supply Companies. The Contractor shall give all notices and pay all fees required thereunder. The Amount of such fees shall be deemed to be included in the Contract Sum, unless they are expressly included in these documents by way of a Provisional Sum or PC Sum.

RAINWATER INSTALLATIONS

Q.10

Plastic pipes and fittings

Plastic pipes, fittings and accessories shall be obtained from a manufacturing source approved by the Engineer in writing to comply with B.S. 4514, uPVC, colour to be selected by the Engineer, fixed true to line with straps, supplied by the manufacturer screwed to hardwood plugs with galvanized screws, and jointed all in accordance with the manufacturer's instructions. Rubber sealing rings shall comply with B.S. 2494 type 2.

Q.11

Galvanized steel tubes and fittings

Galvanized steel tubes and fittings shall comply with B.S. 1387 with galvanized reinforced malleable cast iron fittings complying with B.S. 1130 and 1256, with B.S. 1256 threads.

Joining - Tubing and fittings shall be seam - jointed using hemp and red lead putty or 'Boss' white.

Fixing - Tubes shall be fixed clear off walls or soffits, with galvanized malleable iron brackets complying with B.S. 1494, (or with hangers or special fixing where so described), spaced at not more than 3 metre centers.

Q.12

Rainwater outlets

PVC rainwater outlets shall be manufactured to the sizes and profiles measured herein from heavy grade PVC, with a minimum 75mm wide flange all round the top for fixing to roof surfaces; fully bedded in hot bitumen and jointed to the PVC rainwater pipes.

Specification
Plumbing Installations

(2/Q/5)

Fulbora type coated, cast iron outlets, with grating, hook bolt and clamping device shall be cast into concrete or built into blockwork in the position and to the elevations shown on the drawings, and jointed with caulked lead to reinwater pipes.

Q.13

Testing

Rainwater installations shall be subjected to a water test and proved capable of withstanding a pressure of 1.05m head of water to the satisfaction of the engineer. Any defects are to be made good by the Contractor and the whole system left sound and perfect.

SANITARY INSTALLATION

Q.14

Bye-laws

All the work shall comply with the requirements of the Local Council Bye-laws and drainage regulations, and shall be executed to the satisfaction of the Engineer and the Local Authority.

Q.15

Setting - out

The position of all pipe runs, including joints and connections, holes and the like, shall be agreed with the Engineer before work is commenced.

Q.16

Spun cast iron pipes, cast iron fittings and accessories

Spun cast iron pipes and sand cast iron fittings shall comply with B.S. 416 for medium grade coated pipes and fittings. Sockets and spigots shall be type B on pipes and type A on fittings.

Access - doors shall be oval type with approved washers and manganese bronze bolts.

Joining - Pipes and fittings shall be jointed with a gasket of hemp and tightly caulked cold caulking compound.

Specification
Plumbing Installations

(2/Q/6)

Fixing - Except where adequately restrained and supported by being built in, all pipes and fittings shall be fixed with one holderbat to each socket. Pipes less than 75mm diameter shall be fixed 25mm clear of walls and those 75mm diameter and over, 40mm clear of walls. Holderbats shall comply with B.S. 416 Table 21.

Q.17 Galvanized steel tubes and fittings

Galvanized steel tubing shall comply with B.S. 1387 with galvanized reinforced malleable cast iron fittings complying with B.S. 143 and 1256, with B.S. 1256 threads.

Joining - Tubing and fittings shall be seam-jointed using hemp and red lead putty or 'Boss' white.

Fixing - Tubes shall be fixed clear off walls or soffits, with galvanized malleable iron brackets complying with B.S. 1494 Table 6a (or with hangers or special fixing where so described), spaced at not more than 3 metre centers.

Q.18 Plastic pipes and fittings

Soils, waste and ventilating pipes, fittings and accessories shall be obtained from a manufacturing source approved by the engineer in writing to comply with B.S. 4514 in unplasticised PVC, fixed with brackets or hangers supplied by the manufacturer screwed to hardwood plugs with galvanized screws and jointed in accordance with the manufacturer's instructions.

Waste and anti-syphonage pipes below 54mm in diameter shall comply with B.S. 5255.

Q.19 Sleeves

All drains passing through walls or foundations shall have sleeves of cast iron pipe of sufficient size to allow a 3mm clearance round the drain.

Specification
Plumbing Installations

(2/Q/7)

Q.20 Brackets and hangers

Brackets for supporting horizontal drains from walls or beams, shall be of 75mm x 75mm x 10mm coated steel tee with one end rounded up and of sufficient length for the other end to be built in for a depth of 225mm.

Hangers for suspending drains from soffits shall consist of a pair of forged 50 x 10mm coated steel half pipe saddles bolted together around the pipe and to a 20mm diameter coated steel bar of the required length with one end forged into an eye to receive the bolt. The top of the bar shall either be flanged for casting in, or shall be threaded with nut and plate washer. Where fixed through floors the projecting end of the bar shall be cut off flush with the nut.

Q.21 Wire balloons

Wire balloons shall be of copper; mosquito proofed and shall comply with B.S. 416 Table 22.

Q.22 Appliances

Appliances shall be as specified. In the event that the appliances specified are unavailable, the supply of alternatives which are at least equal in every respect in quality and specification to those specified will be permitted with the prior written approval of the Engineer. The Contractor shall order the appliances immediately on commencing of the works, with a copy of the order being provided to the Engineer.

Q.23 Testing

The Contractor shall, from time to time as required to suit the progress of the building, air-test the plumbing and internal drainage in sections, to the satisfaction of the Engineer, before any such work is covered. At the completion of the works all soil pipes and branches and waste pipes and other parts of the internal drainage works connected directly with any sewerage drain or sewerage drain ventilating pipe or soil pipes, shall be subjected to a water test and be proved capable of resisting a pressure of 1.5 metre head of water and the Engineer may also direct that a sample or any other test be applied to any other parts of the drainage or ventilating system as he thinks desirable, and everything necessary for these tests shall be supplied by the Contractor.

Specification
Plumbing Installations

(2/Q/8)

Q.24 Cleansing
 On completion of the work, immediately before handing over, the Contractor shall cleanse thoroughly the whole of the system and prove that it is functioning freely to the satisfaction of the Engineer.

Q.25 Habitation certificates
 On completion, the Contractor shall obtain a 'Habitation' certificate from the Local Council and forward it to the Engineer.

HOT AND COLD WATER INSTALLATIONS

Q.26 Galvanized steel tubes and fittings
 Galvanized steel tubes shall comply with B.S. 1387 heavy grade for rising mains and branches off rising mains, and medium grade for distributing pipes; except where the latter are in contact with the ground when they shall be heavy grade. Fittings shall be galvanized reinforced malleable cast iron fittings complying with B.S. 143 and 1256, with B.S. 1256 threads.

Joining - Tubes and fittings shall be screw-jointed using hemp and red lead putty or 'Boss' white. Connections to flushing cisterns, bib taps and the like, shall be made with copper connectors to facilitate removal.

Fixing - Unless described as being fixed in chases, tubes shall be fixed clear of walls and soffits with galvanized malleable iron brackets complying with B.S. 1494, Table 6a (or with hangers or special fixing where so described), spaced at not more than the distance in the following tables:-

Size of pipe	Maximum spacing in metres
13mm	2.00
19mm	2.50
25mm to 50mm	3.00
over 50mm	3.50

Q.27 Pipework generally
 Pipes shall be in the maximum lengths possible to avoid unnecessary jointing. Pipes shall be fixed to sufficient falls to prevent air locks and to enable the system to be drained.

Q.28 Sleeves
 Where sleeves are required for pipes passing through concrete, or blockwork, they shall be of galvanized steel tube of sufficient diameter to give at least 3mm clearance around the pipe.

Q.29 Pipework ancillaries
Drainage taps with loose keys shall comply with B.S. 2879.
Ball valves shall be 'Portsmouth' type complying with B.S. 1212 for high or low pressure as described fitted with a silencer tube drilled with a 6 mm hole above the level of the overflow warning pipe. Floats not exceeding 150mm diameter shall be plastic type complying with B.S. 2456, larger floats shall be copper type complying with B.S. 1968 Class C.
Bib-taps shall comply with B.S. 1010 and shall be of brass with fixed jumpers and where so described shall be chromium plated or shall have nozzle screwed for hose union and locking arm.
Stop valves shall comply with B.S. 1010 and shall be of brass with crutch handles or loose key where as described. Those in exposed positions shall have polished brass bodies.
Gate, check and globe valves shall comply with B.S. 5154 and shall be of copper alloy unless otherwise described. Cast iron gate valves shall be parallel slide pattern valves to comply with B.S. 5151.

Q.30 Tanks and cisterns
 Storage tanks shall be sectional pressed galvanized steel tanks of 4.5mm plate of approved manufacture complete with cover with inspection manhole. Tanks shall be assembled entirely in accordance with the manufacturer's written instructions.

Specification
Plumbing Installations (2/Q/9)

Specification
Plumbing Installations (2/Q/10)

Storage cisterns shall comply with B S. 417, Part 2, Grade A, galvanized with one piece galvanized covers.

Q.31

Testing

Clean out storage cisterns and tanks, including removal of all swarf, fill and test the whole of the hot and cold water installations, rectify all defects, drain and leave in a clean, serviceable condition.

Specification
Plumbing Installations

(2/Q/11)

FLOOR, WALL & CEILING FINISHINGS

LIST OF CLAUSES

PLASTERWORK

- S.1 Generally
- S.2 Cements
- S.3 Lime putty
- S.4 Sands
- S.5 Water
- S.6 Storage of materials
- S.7 Testing
- S.8 Preparation of surfaces
- S.9 Dubbing out
- S.10 Mixing of materials
- S.11 Period between coats
- S.12 Finish
- S.13 Junctions of wall and ceiling

BEDS AND BACKINGS

- S.14 Arrises
- S.15 Materials, storage, testing and mixing of materials
- S.16 Light weight roof screed

Specification
Floor, Wall & Ceiling Finishings

(2/S/1)

- S.17 Cement and sand proportions
 - S.18 Preparation of surfaces
 - S.19 Laying
 - S.20 Surfaces of beds and backings
- OTHER INSITU FINISHINGS
- S.21 Materials, storage, testing and mixing of materials
 - S.22 Waterproofers
 - S.23 Integral hardeners
 - S.24 Preparation of surfaces
 - S.25 Cement and sand paving
 - S.26 Granolithic paving
 - S.27 Insitu terrazzo paving
 - S.28 Washed terrazzo wall finish
 - S.29 Tyrolean finish

TILE, SLAB AND BLOCK FINISHINGS

- S.30 Mortar for bedding and pointing
- S.31 Preparation of surfaces
- S.32 Glazed ceramic wall tiles
- S.33 Concrete tiles
- S.34 Terrazzo tiles

Specification
Floor, Wall & Ceiling Finishings

(2/S/2)

S.35 Linoleum tiles

S.36 Wood block flooring

PLAIN SHEET FINISHINGS

S.37 Generally

S.38 Method of measurement

FLOOR, WALL & CEILING FINISHINGS

PLASTERWORK

S.1 Generally

Render, both internal and external shall be cement and sand in the proportion 1:4 finished to thickness specified.

Plaster shall consist of an undercoat of 1 part cement to 4 parts sand by volume and 5% lime putty, and a finishing coat of 1 part cement to 1 part sand to 5 parts lime putty. Each coat shall be finished to the thickness specified.

S.2 Cement

Cement shall be ordinary Portland cement and shall comply with B.S. 12. White and coloured cements shall comply with B.S. 12 and be obtained from an approved manufacturer.

S.3 Lime putty

Lime putty shall be prepared from hydrated lime complying with B.S. 890.

Hydrated lime shall be added to water, stirred to a creamy consistency and left to mature for at least 16 hours before use.

Alternatively, ready slaked lime may be obtained from an approved source.

The lime putty shall be protected from drying out.

S.4 Sands

Sand for cement and lime mixes shall comply with B.S. 1199. Table I.

Sand for use with white Portland cement shall be silver sand and that for use in coloured cement mixes shall be of a suitable colour.

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- S.5 Water
Water shall be clean and kept free from all impurities.
- S.6 Storage of materials
All plasters, lime and cement, shall be stored in a properly roofed, weatherproof, dry, well ventilated shed, used exclusively for this purpose, with a wood floor not less than 150mm clear above the ground. All sands shall be stored separately, according to type, on clean, hard, dry standing and shall be protected from contamination.
- S.7 Testing
Samples of all materials, as directed, shall be taken from time to time as required by the Engineer. All defective materials shall be removed from the site without delay, at the Contractor's expense.
- S.8 Preparation of surfaces
Surfaces to receive plastering shall be dry brushed to remove all loose particles, dust, laitance, efflorescence, etc., and any projecting fins on concrete surfaces shall be hacked off. All traces of mould oil shall be removed from concrete surfaces by scrubbing with water containing detergent and rinsing with fresh water.
- S.9 Dubbing out
Concrete surfaces shall be hacked over to provide adequate key.
Surfaces shall be wetted and re-wetted as required to equalize suction before the plaster coats are applied. In particular, dense hard concrete surfaces shall be wetted and re-wetted as required before bonding plaster is applied.
- S.10 Mixing of materials
All materials shall be thoroughly mixed in the proportions described. No mixes of plasters, other than those described, shall be used.
Bunkers and gauge boxes shall be thoroughly cleaned after each mix and due care and attention shall be given at all times to their cleanliness.
Cement - lime - sand plasters shall be used within two hours of the gauging with cement.
All tools shall be kept clean and fresh plaster shall not be contaminated with set plaster.
- S.11 Period between coats
Cement - lime - sand undercoats shall be allowed to dry out thoroughly before a further coat is applied.
- S.12 Finish
All undercoats shall be scratched to provide an adequate key for the next coat. Unless otherwise described, all rendering shall be finished with a wood float, as shall all undercoats. All finishing coats shall be finished with a steel trowel or wood trowel to further detailing.
- S.13 Junctions of wall and ceiling
A neat definite cut shall be made with the edge of the trowel through all coats of the wall plaster at the junctions with ceilings.
- S.14 Arrises
All arrises shall be pencil rounded unless otherwise specified.

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BEDS AND BACKINGS

- S.15 Materials, storage, testing and mixing of materials
Cement, sand, water, etc. storage, testing and mixing of materials shall be as described for plasterwork.
- S.16 Light weight roof screed
Light weight roof screed shall consist of one part cement to eight parts vermiculite aggregate, laid to falls as necessary and shall be covered with a minimum of 12mm cement and sand (1:4) screed finished to suit the requirements of the particular finishings.
All junctions between horizontal and vertical surfaces to roofs shall be finished with a triangular angle fillet of the sizes described.
Light weight roof screed shall be cured properly for 7 days, and shall be thoroughly and completely dry before any finishings are applied.
- S.17 Cement and sand proportions
Cement and sand shall be in the proportions of 1:3 or 1:4, as specified, by volume.
- S.18 Preparation of surfaces
Walls shall be prepared as described for 'Plasterwork'. Concrete floors or roofs to receive screeds or pavings shall be hacked where necessary to remove concrete mortar or plaster droppings and to expose the coarse aggregate and well brushed to remove all loose particles and dirt.
Concrete floors and roofs shall be wetted before screeds or pavings are laid, with a cement sand slurry (1:1) being scrubbed into the surface in front of the screed or paving laying.
- S.19 Laying
Beds and backings shall be laid in bays of suitable lengths and widths and to falls where so shown with proper screeds and shall be kept wet and protected until set hard.
- S.20 Surface of beds and backings
Screeded beds for insitu floor finishings or floor finishings bedded in mortar shall be left rough from the screeding board.
Floated beds for inflexible floor finishings bedded in mastic, shall be left with a plain untextured surface.
Trowelled beds for flexible finishings shall be finished smooth and free from score marks, grooves or depressions.
Screeded backing for insitu wall finishings or wall finishings bedded in mortar shall be scratched for key.
Floated backing for inflexible wall finishings fixed with adhesive shall be left with a plain surface.
Trowelled backings for flexible wall finishings shall be finished smooth and free from score marks or depressions.
- S.21 Materials, storage, testing and mixing of materials
Cement, sand, water, etc. storage, testing and mixing of materials, shall be as described for "Plasterwork".

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S.22 Waterproofers

Waterproofers shall be 'Sealocrete' double strength premix, or other approved integral waterproofer, used in accordance with the manufacturer's instructions.

S.23 Integral hardeners

Integral hardener shall be 'Febspeed Plus' or other approved, used in accordance with the manufacturer's instructions.

S.24 Preparation of surfaces

Concrete surfaces to receive paving without screeds, shall be prepared as described herein.

S.25 Cement and sand paving

Cement and sand paving shall be in the proportions and to the thicknesses described, and shall be finished with a steel trowel unless otherwise specified and shall be protected and kept wet until hard.

S.26 Granolithic paving

Granolithic paving shall consist of 1 volume of cement to 1 volume of sand mixed with 2.5 volumes of approved local stone aggregate laid to the thickness described.

The base shall be kept wet for 12 hours before laying granolithic unless the paving is being laid monolithically with the base.

Immediately after laying the granolithic shall be protected and kept damp until thoroughly hard. It shall then be ground and polished by machine. Any holes or pores which become apparent after grinding shall be filled with the same mix as the paving, well worked into the surface and left proud. The portions so treated shall be protected and kept damp until hard when they shall be polished.

S.27 In situ terrazzo paving

Terrazzo finishing shall be carried out by a firm approved by the Engineer in writing. It shall be composed of a screeded underbed of cement and sand (1:3) and the terrazzo which shall be a minimum of 16mm thick. Before terrazzo work is commenced, the contractor shall submit sample pieces to the Architect for approval.

The terrazzo shall consist of coloured cement and approved local marble aggregate free from dust in the proportions 1:2. The colour of the cement and the colour and grading of the aggregate shall be as selected by the Architect.

The terrazzo shall be laid while the underbed is still plastic and shall be well compacted and trowelled to produce a non-absorbent surface. It shall be divided into bays 1 metre by 1 metre or as other specified with 3mm aluminium strips for the full depth of the terrazzo and underbed. Immediately after laying the terrazzo shall be protected and kept damp until thoroughly hard. It shall then be ground and polished by machine. Any holes or pores which become apparent after grinding shall be filled with neat coloured cement well worked into the surface and left proud. The portions so treated shall be protected and kept damp until hard when they shall be polished. Dry polishing shall only be carried out with the agreement of the Contractor.

S.28 Washed terrazzo wall finishings

Washed terrazzo finish shall be carried out by a firm approved by the Engineer in writing and shall be guaranteed for six months from the date of completion of the work. It shall be composed of a screeded underbed of cement and sand (1:4), and terrazzo with both layers of the thicknesses specified.

The terrazzo shall consist of cement and local marble aggregate free from dust in the proportions 1:15. The colour and grading of the cement and aggregate shall be as selected by the Architect.

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The terrazzo shall be laid whilst the underbed is still plastic and shall be compacted and trowelled to produce a non-absorbent surface. Before the final set takes place the terrazzo surface shall be lightly brushed, with just a sufficient amount of water to expose the surface aggregate to produce an even appearance. Adjoining areas and finishings shall be protected from staining, and any stains produced shall be removed or remedied to the satisfaction of the Architect at the Contractor's expense. The whole surface when hard shall be covered with one coat of approved silicone solution.

S.29

Tyrolean finish

Tyrolean finish shall be applied by machine in accordance with the instructions issued by the Cement Marketing Company. The Colour of the cement shall be as selected by the Architect. If required to so by the Architect, the Contractor shall provide a sample panel or panels of Tyrolean finish the cost of which shall be deemed to be included in the Contract Sum. All adjoining areas and finishings shall be masked and protected so as to prevent staining whilst applying the Tyrolean finish.

S.30

TILE, SLAB AND BLOCK FINISHINGS

Mortar for bedding and pointing

All materials for mortar, their storage, testing and mixing shall be as described in 'Plasterwork'.

S.31

Preparation of surfaces

All surfaces to receive the finishings in this section shall be thoroughly cleaned; screeds to receive finishings bedded in mortar shall be well wetted before laying is commenced.

S.32

Glazed ceramic wall tiles

Glazed ceramic wall tiles comply with B.S. 6431 and shall be of the sizes and colours described, and having cushion edges.

The tiles shall be soaked in clean water for at least half an hour before fixing, stacked on edge tightly together and end tiles turned glaze outwards and fixed as soon as the surface water has gone. The tiles shall be bedded in cement and sand, (1:4), with straight joints 1.5mm wide pointed in white cement, after scratching the surface of the backing screed to form a key.

Alternatively, tiles shall be wiped clean and fixed dry with 'Richafix', or other approved adhesive, all in accordance with the manufacturer's recommendations with straight joints 3.5mm wide pointed in white cement/sand mix.

S.33

Concrete tiles

Concrete tiles shall comply with B.S. 368, shall be thoroughly soaked in water and allowed to drain before laying and shall be bedded and pointed in cement and sand (1:4), laid true and level or to even falls as specified.

S.34

Terrazzo tiles

Terrazzo tiles shall be laid by a specialist approved by the Engineer in writing, and shall be supplied from an approved source. The precast terrazzo shall consist of a backing of Portland cement and washed sand graded from coarse to fine in the proportions of 1:3 and a terrazzo finish not less than 12 mm thick consisting of coloured cement and marble aggregate free from dust in the proportions of 1:2. The colour of the cement and the colour and grading of the aggregated shall be as selected by the Architect. Tiles shall be hydraulically pressed during manufacture to produce a non - absorbent surface and shall be polished on the exposed surface.

Tiles shall be thoroughly soaked in water and drained off so that no free water remains on the surface before laying and shall be bedded in cement and sharp sand (1:3) with straight joints 3mm wide and pointed in coloured cement, to match the colour of the tile, and sand (1:2). The surface of the paving shall finish true and level. All cement stains shall be carefully removed. Sawdust shall not be used as a protection before joints are set.

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Floor, Wall & Ceiling Finishings

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Specification

Floor, Wall & Ceiling Finishings

(2/S/12)

S.35

Linoleum tiles

Linoleum tiles shall be of the types and sizes described and of a colour to be selected by the Architect. Samples of all tiles and sheet shall be submitted to the Architect for his approval. No flooring shall be laid until plastering and painting of walls and ceilings is complete. All linoleum tiles shall be laid by a firm or firms to be approved by the Architect in writing. The Contractor shall obtain from the flooring specialist before laying is commenced, and forward to the Architect,

- (a) a written statement to the effect that the trowelled bed is in all respects satisfactory to receive the flooring.
- (b) a guarantee that any defects due to faulty workmanship or materials occurring within six months of the certified date of completion of the whole of the works, will be made good by the Specialist at his own expense, and to the satisfaction of the Architect.

S.36

Wood block flooring

Wood block flooring shall be as manufactured by Italwood Ltd., P.O. Box 2599, Dar es Salaam or any other equal and approved and shall be of the timber and finish described. The flooring shall be laid by a specialist firm approved by the Architect in writing.

The Contractor shall provide the Architect with samples for his approval before any tiles are ordered or laid.

No flooring shall be laid until plastering of walls and ceilings is complete. The Contractor shall obtain from the flooring specialist before laying is commenced, and forward to the Architect:-

- (a) a written statement to the effect that the trowelled/floated bed is in all respects satisfactory to receive the flooring and,
- (b) a guarantee that any defects due to faulty workmanship or materials, occurring within six months of the certified date of completion of the whole of the works, will be rectified to the satisfaction of the Architect.

PLAIN SHEET FINISHINGS

S.37

Generally

Plywood, blockboard, chipboard, fibreboard etc. and their fixing shall be as described in Joinery.

S.38

Method of measurement

The work 'wall' in the descriptions of plasterwork shall include walls and partitions of concrete, concrete blockwork, brickwork or clay tile blockwork.

Prices for insitu finishings and beds or backings shall include hacking concrete or raking out blockwork or brickwork joints to form keys.

Prices for all finishings and beds and backings shall include for the following:-

- (1) working behind pipes, and around flush electrical boxes.
- (2) all dubbing out required on new work to reduce irregularities or cambers, and to form flat surfaces in the appropriate undercoat.
- (3) any formwork required.
- (4) trowel cuts between ceiling and wall plaster.
- (5) polishing of granolithic, terrazzo and screed flooring including laid tiles in same materials. Final finishes to floors shall be carried out as high gloss wax polished finished with machine brushing. 1 coat of wax polish to dry out before 2nd and 3rd coat is applied with thorough intermediate polishing.

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GLAZING

LIST OF CLAUSES

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T.2 Glass generally

T.3 Putty for glazing to wood

T.4 Putty for glazing to metal

T.5 Samples

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T.6 Glass to be kept free from moisture

T.7 Rebates and beads

T.8 Edges of glass

T.9 Bead glazing

T.10 Putty glazing

T.11 Wired glass

T.12 Method of measurement

Specification
Glazing

(2/T/1)

GLAZING

DEFINITIONS

T.1 Method of glazing

Notwithstanding reference in the descriptions of glazing method to glazing beads, or the like, with associated fixings, and insulating strips, such components will be measured separately in accordance with the appropriate rules of the S.M.M.

The provision of glazing compounds and putties and sprigs, clips and other sundry fixings, shall be deemed to be included with all items of glazing.

Distance pieces and setting blocks, in appropriate materials, shall be provided in accordance with good glazing practice and they shall be deemed to be included with all items of glazing.

MATERIALS

T.2 Glass generally

All glass shall comply in all respects with the appropriate section of B.S. 952. Plain sheet clear glass shall be O.Q.; plate glass shall be GG; float glass shall be as manufactured by Pilkington Brothers Limited. or the like. No glass from former Eastern European countries may be used.

T.3 Putty for glazing to wood

Putty for glazing to wood shall comply with B.S. 544.

T.4 Putty for glazing to metal

Putty for glazing to metal shall be approved mastic manufactured for that purpose, used in accordance with the manufacturer's instructions.

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Glazing

(2/T/2)

T.5	<p><u>Samples</u></p> <p>Samples not less than 150mm square are to be submitted to the Architect for approval before any glass is cut.</p> <p><u>WORKMANSHIP</u></p> <p><u>Glass to be kept free from moisture</u></p> <p>All glass surfaces shall be kept dry during transit and storage. Glass becoming moist from condensation or other causes, shall be thoroughly dried and aired.</p>	T.11	<p><u>Wired glass</u></p> <p>The wire in wired glass shall extend to the edges and be free from rust, and be parallel to the framing.</p>
T.6	<p><u>Rebates and beads</u></p> <p>All glazing beads in wood shall be primed, (as measured in Painting and Decorating), before glazing is commenced.</p>	T.12	<p><u>Method of measurement</u></p> <p>Beads and sealing strips have been measured separately. Prices for glazing with beads are to include for taking out and refixing beads as required, which shall be deemed to be bradded unless otherwise described.</p>
T.7	<p><u>Edges of glass</u></p> <p>All glass shall have clean cut edges. The edges of louvers shall be rounded and polished from factory.</p>		
T.8	<p><u>Bead glazing</u></p> <p>Glazing fixed by beads shall have both glass and beads bedded and back puttyed, and the putty trimmed off flush. Where sealing strip is used, it shall pass round both faces of the glass and be trimmed off flush on both sides. Metal surfaces to receive sealing strip shall be treated with mineral oil before glazing.</p>		
T.9	<p><u>Putty glazing</u></p> <p>Glazing in putty shall be executed in proper and back putties, springs, clips and splayed and mitred front putties. The back putties shall be trimmed off flush with the top of the rebate and the splayed front putties shall be finished 3mm back from site line to allow for sealing between glass and putty with paint.</p>		
	(2.T/3)		(2.T/4)
	<u>Specification Glazing</u>		<u>Specification Glazing</u>

PAINING AND DECORATING

LIST OF CLAUSES

MATERIALS

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U.2	Approval of brands	U.18	Primer for aluminium
U.3	Quality of products	U.19	Primer for bituminous surfaces
U.4	Delivery	U.20	Primer for iron and steel work
U.5	Same makers materials used for coating	U.21	Primer for zinc and galvanized steel
U.6	Information and facilities to suppliers	U.22	Creosote type preservative
U.7	Storage	U.23	Non creosote type preservative
U.8	Remedying defects due to defective materials	U.24	Primer for hardboard
U.9	Knotting	U.25	Primer for woodwork
U.10	Stopping	U.26	Oil paints
U.11	Linseed oil	U.27	Polyurethane lacquer
U.12	White spirit	U.28	Decorative wood stain
U.13	Size		<u>PREPARATION OF SURFACES</u>
U.14	Cement paint	U.29	Approval
U.15	Emulsion paint	U.30	Stopping
U.16	Black bituminous paint	U.31	Plastering, rendering, concrete, blockwork and brickwork
		U.32	Lead and copper
		U.33	Aluminium
		U.34	Iron and steel

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Specification
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- U.35 Zinc and galvanized surfaces
- U.36 Hardboard
- U.37 Fibreboard
- U.38 Plywood
- U.39 Woodwork to be painted
- U.40 Woodwork to receive clear finish

U.53 Cleanliness

U.54 Removal of ironmongery. Etc

U.55 Method of measurement

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- U.41 Standard of workmanship
- U.42 Stirring of materials
- U.43 Manufacturers instructions
- U.44 Brush work
- U.45 Priming of joinery
- U.46 Condition of priming
- U.47 Coatings to be dry
- U.48 Rubbing down
- U.49 Differing colours of undercoats
- U.50 Painting in unsuitable conditions
- U.51 Protection of wet surfaces
- U.52 Damage to adjoining surfaces

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Painting and Decorating

(2/U/3)

Specification
Painting and Decorating

(2/U/4)

PAINING AND DECORATING

MATERIALS

U.1

Colour range

Painting and decorative schemes shall be carried out in colours selected by the Architect from the approved range of colours.

U.2

Approval of brands

The Contractor shall seek, in writing, approval from the Architect for all brands of paint he wishes to use.

U.3

Quality of products

Where a type of paint is produced by the manufacturer in more than one quality, only paints and materials of the first or best quality shall be used in the works. The container label shall indicate clearly the quality of the paint being used.

Where it is not evident that the first or best quality of paint is being used, the Architect will order the removal of such materials from site and rectification of any work executed with those materials, all at the Contractor's expenses.

U.4

Delivery

All paints, laquers, distempers and other surface coatings shall be delivered in sound, sealed containers, labeled clearly by the manufacturer, the label or decorated container stating:-

- (a) the type of products
- (b) the brand name, if any
- (c) the use for which it is intended
- (d) the manufacturers batch number

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(e) the quality of the contents wheremore than one quality is available

The label shall be a printed label, typewritten labels will not be accepted.

The batch deliveries shall be dated and used strictly in order of delivery.

No paints, other than water paints and bituminous paint, shall be delivered in containers exceeding 5 litres capacity.

U.5

Same makers materials used for coatings

While materials for the works may be obtained from several makers, undercoats and finishing coats for a particular surface must be obtained from the same maker, (i.e. one maker's finishing coat must not be applied over another maker's undercoat).

U.6

Information and facilities to suppliers

The Contractors shall supply the paint manufacturer's with all relevant details of the materials required to comply with the descriptions in this Document and the manufactures shall be given every facility for inspecting the work during progress in order to ascertain that the materials are being used in accordance with their instructions, and they are to be allowed to take samples of their products from the site if they so desire.

U.7

Storage

All materials shall be kept in a dry, clean store, protected from the elements.

U.8

Remedying defects due to defective materials

All materials, which in the opinion of the Engineer are unsatisfactory, shall be immediately removed from the site, and any work executed with such defective materials shall be made good by the Contractor, at his own expenses, to the satisfaction of the Engineer.

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- U.9 Knottting
Knottting shall comply with B.S. 1336
- U.10 Stopping
Stopping for:-
(a) plasterwork shall be plaster based filler.
(b) Concrete, rendering or blockwork, shall be of similar materials to the background and shall be finished with a similar texture.
(c) Internal woodwork, hardboard, fibreboard and plywood, shall be putty complying with B.S. 544, and shall be tinted to match the colour of the undercoat.
(d) External woodwork, shall be white lead paste with or without the addition of red lead complying with B.S. 217, type 2, and gold size, and shall be tinted to match the colour of the undercoat.
(e) Clear finished woodwork, shall be a stopping tinted to match the surrounding woodwork
- U.11 Linseed oil
Refined linseed oil shall comply with B.S. 242.
Raw linseed oil shall comply with B.S. 243.
Boiled linseed oil shall comply with B.S. 242.
- U.12 White spirit
White spirit shall comply with B.S. 245.
- U.13 Size
Size shall comply with B.S. 3357.
- U.14 Cement paint
Cement paint shall be 'Snowcem', 'Cempexo', or other approved.
- U.15 Emulsion paint
Emulsion paint (interior and/or exterior), shall have a P.V.A. base and shall be of an approved brand. The first coat shall be thinned in accordance with the manufactures instructions. Where described as applied externally, the paint shall incorporate an approved fungicide to prevent fungus growth.
- U.16 Black bituminous paint
Black bituminous paint shall comply with B.S. 3416 Type 1 for general use, Type 2 for drinking water tanks.
- U.17 Primer for alkaline surfaces
Primer for alkaline surfaces shall be a special primer obtained from the maker of the undercoat and finishing coat.
- U.18 Primer for aluminium
Primer for new or weathered aluminium shall be zinc chromate priming paint in accordance with DEF 1039.
- U.19 Primer for bituminous surfaces
Primer for bituminous surfaces to be finished with oil paint shall contain leafing aluminium flake.
- U.20 Primer for iron and steelwork
Primer for iron and steelwork shall be:-
(a) lead based priming paint complying with B.S. 2523
(b) calcium plumbate priming paint complying with B.S. 3698 Type A

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- U.21 Primer for zinc or galvanized steel
Primer for weathered or new zinc and galvanized surfaces shall be calcium plumbate paint complying with B.S. 3698 Type A.
- U.22 Creosote type preservative
Creosote type preservative shall comply with B.S. 144 or 3051.
- U.23 Non creosote type preservative
Non creosote type preservative shall be "Brunophen No. 2", "Rentokil QD" or other approved.
- U.24 Primer for hardboard
Primer for hardboard, not factory primed or sealed, shall be a suitable primer obtained from the maker of the undercoat and finishing coat.
- U.25 Primer for woodwork
Primer for woodwork, other than the internal surfaces of external doors, windows and their frames and the backs of frames and linings, etc. in contact with masonry concrete or plaster, shall be leadless white or light grey priming paint not darker than colour 0.093 of B.S. 4800 which shall be compatible with the subsequent coats and obtained from the same maker.
Primer for external woodwork and the internal surfaces of external doors, windows and their frames, and the backs of all frames, linings, etc. in contact with masonry, concrete or plaster shall be lead based pink priming paint complying with B.S. 2523.
- U.26 Oil paints
Hard gloss, semi-gloss matt and flat oil paints, and respective undercoats, shall be of approved brands.
- U.27 Polyurethane lacquer
Polyurethane lacquer shall be an approved single or two pack lacquer as described of interior or exterior quality, as appropriate.
- U.28 Decorative wood stain
Decorative wood stain shall be GORI as manufactured by GORI A/S Denmark or other equal and approved.
- U.29 Approval
PREPARATION OF SURFACES
The preparation of all surfaces must be seen and approved by the Engineer before any coatings are applied.
- U.30 Stopping
Stopping referred to in the following clauses shall be the appropriate stopping hereinbefore described.
- U.31 Plaster, rendering, concrete, blockwork and brickwork
All plaster or mortar splashes, etc. shall be removed from plaster, rendering, concrete, blockwork and brickwork by careful scraping; all holes, cracks, etc. shall be stopped and the whole of the surfaces shall be brushed down to remove dust and loose materials. In addition, all traces of mould oil shall be removed from concrete surfaces by scrubbing with water and detergent and rinsing with clean water to remove all detergent.
When efflorescence has occurred, or is suspected, painting shall be deferred for a period as required by the Architect.
- U.32 Lead and copper
Lead and copper surfaces shall be washed with soap and water, roughed with abrasive paper and washed with white spirit.

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U.40 Woodwork to receive clear finish
 After priming and fixing, all nail holes and other imperfections shall be stopped and the whole surface shall be rubbed down and all dust brushed off.

All holes and other imperfections in surfaces to receive a clear finish shall be stopped and the whole surface shall be rubbed down and all dust brushed off.

WORKMANSHIP

Standard of workmanship
 U.41 Prior to the commencement of internal or external decoration, areas not exceeding 50 square metres in total area, and designated by the Engineer, shall be completely decorated, and after approval shall be used as a standard for the whole of the works. Any additional cost involved in carrying out such decoration in advance of the general work shall be deemed to be included in the Contract Sum. Such decorated surfaces shall be made good and touched up as necessary prior to the handing over of the works.

Stirring of materials
 U.42 The contents of all cans and containers of all materials must be properly and thoroughly stirred before and during use and shall be suitably strained as and when necessary.

Manufacturers instructions
 U.43 All materials shall be used strictly in accordance with instructions, issued by the manufacturers concerned. The addition of thinners, driers or other materials will only be permitted when specially required by the maker and the procedure approved by the Engineer.

U.33 Aluminium
 Aluminium surfaces shall be washed with white spirit and either carefully roughed with abrasive paper or treated with etching solution in accordance with the maker's instructions.

U.34 Iron or steel
 Before fixing, all rust and scale shall be removed from iron and steel surfaces by wire-brushing, scraping, hammering, flame cleaning etc.

U.35 Zinc and galvanized surfaces
 Zinc and galvanized surfaces shall be washed with white spirit.

U.36 Hardboard
 All dirt and grease shall be removed from hardboard surfaces. After priming, all nail holes and other imperfections shall be stopped.

U.37 Fibreboard
 All dust shall be brushed off from fibreboard surfaces, after priming, all nail holes and other imperfections shall be stopped.

U.38 Plywood
 Surfaces of plywood to be painted shall be filled as required with a plaster based filler for internal work, and a filler, as described in Clause U.10 (e), for external work, and then rubbed down and all dust and loose materials brushed off.
 After priming, all imperfections shall be stopped rubbed and brushed off.

U.39 Woodwork to be painted
 Before fixing woodwork, all surfaces which will be visible after fixing, shall be rubbed down and all knots and resin pockets shall be scorched back and coated with knotting.

Specification
Painting and Decorating (2/U/12)

Specification
Painting and Decorating (2/U/11)

- U.44 Brush work
 Unless otherwise described, all coatings shall be applied by brush. Written permission must be obtained from the Architect for the application of coatings by spray or roller where not so described, and if permission is granted, such application shall not result in extra cost to the Employer.
- U.45 Priming of joinery
 Joinery shall be delivered to the site unprimed and is to be protected from rain and damp during transit. It is to be stored in clean, dry, ventilated structures and no primer shall be applied while the timber is in any way damp. The stores and drying room shall be of adequate size to allow for proper coating and storage of primed work. Primers shall be applied as soon as possible after inspection and acceptance of the joinery by the Engineer.
- U.46 Condition of priming
 If, by the time that the work is to receive the first undercoat, the priming coat has in any way deteriorated, or has been damaged, the affected portions or the whole, if necessary, shall be rubbed down and re-primed.
- U.47 Coating to be dry
 In the case of articles primed at works, the priming shall be touched up where required with a similar primer.
- U.48 Rubbing down
 All undercoats for oil paints and clear finishes shall be rubbed down to a smooth surface with abrasive paper, and all dust removed before the succeeding coat is applied.
- U.49 Differing colours of undercoats
 Each succeeding coat of priming and undercoating paint shall be sufficiently different in colour as to be readily distinguishable.
- U.50 Painting in unsuitable conditions
 No coatings shall be applied to surfaces affected by wet, damp, or other unsuitable conditions, or to any surface damp with moisture.
- U.51 Protection of wet surfaces
 Adequate care must be taken to protect surfaces while still wet, by the use of screens and 'wet paint' signs, where necessary.
- U.52 Damage to adjoining surfaces
 Care must be taken when storing materials, preparing surfaces or painting, etc. not to damage or stain other work. The Contractor shall remove all such stains, make good, and touch up.
- U.53 Cleanliness
 All brushes, tools and equipment shall be kept in a clean condition and surfaces shall be clean and free from dust during painting.
- U.54 Removal of ironmongery, etc.
 Painting shall not be carried out in the vicinity of other operations which might cause dust.
- The Contractor shall provide a suitable moveable receptacle, into which are to be placed all the liquids, slop washings, etc., which are on no account to be thrown down any of the gullies, manholes, sinks, lavatories, W.C.'s or any other sanitary fittings. All solid refuse or inflammable residues must be removed from the site, or burned.
- All surface fixed ironmongery fittings, etc. except hinges, shall be removed before painting and refixed on completion.

Specification
Painting and Decorating

(2/U/13)

Specification
Painting and Decorating

(2/U/14)

U.55 Method of measurement

One coat of lead based pink primer has been measured to the backs of all timber frames, etc, which will ultimately be fixed in contact with concrete, blockwork, rendered or plastered surfaces.

Specification
Painting and Decorating

(2/1/15)

DRAINAGE

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- V.7 Spun cast iron drain pipes and cast iron fittings, gullies, e.c.
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- V.16 Plastic drains
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- V.19 Concrete beds, haunches and coverings
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Specification
Drainage

(2/V/1)

Specification
Drainage

(2/V/2)

DRAINAGE

GENERALLY

V.1 Preambles to other sections
The preambles contained in other sections of this Document shall apply equally hereto where applicable, so far as is consistent with the clauses following.

V.2 Notices
The Contractor shall give all requisite notices. Uncoloured plans will be supplied by the Architect at the Contractor's request.

V.3 Drainage Bye-laws
All of the works shall comply with the requirements of the drainage Bye-laws made by the Local Authority and shall be executed to the satisfaction of the Architect and the Local Authority.

V.4 Inspections
The Contractor shall give written notice to the Engineer for the purpose of inspection and measurement, whenever sections of:-

- (a) excavations are completed
 - (b) concrete beds are laid
 - (c) drains are completed
- and no further work shall be executed until each stage of the work has been inspected.

V.5 Levels of existing drains
The Contractors shall check the invert levels of existing drains, sewers, and manholes before laying new drains, and shall notify the Architect immediately if the declared invert levels are found to be inaccurate.

Specification
Drainage

(2N/3)

MATERIALS

V.6 Plastic pipes and fittings
Plastic pipes and fittings shall be obtained from a manufacturing source approved by the Architect in writing to comply with B.S. 5481 in unplasticized PVC with spigot and socket and/or loose socket joints. All bends are to be long radius easy bends. Branches shall be infection moulded. Fittings fabricated on site will not, under any circumstances, be permitted.

V.7 Spun cast iron drain pipes and cast iron fittings, gullies, etc.
Spun cast iron drain pipes shall be coated centrifugally cast (spun) iron pipes complying with B.S. 4622. Fittings, gullies, etc. shall be of coated cast iron and shall comply with B.S. 4622.

V.8 Concrete pipes and fittings
Concrete pipes and fittings shall comply with B.S. 556 Parts 1 to 3. They shall be reinforced, and of sulphate resisting cement if specified.

V.9 Manhole covers and road gratings
Manhole covers and road gratings and frames shall comply with B.S. 497.

V.10 Step irons
Step iron shall be galvanized malleable cast iron complying with B.S. 1247 type A.

WORKMANSHIP

V.11 Setting out
The Contractor shall set out all drains in accordance with the drawings, and provide all profiles, etc., necessary for the execution of the work.

Specification
Drainage

(2N/4)

V.12

Excavation

The bottoms of all excavations shall be trimmed and consolidated to the correct levels. Unauthorized excavations below the required levels shall be filled with concrete of the same composition as for drain beds, at the Contractor's expense.

Where the bottom is insufficiently firm, the Contractor shall excavate until, in the Engineer's opinion, a firm bottom is obtained and the level shall be made up with concrete of the same composition as for drain beds. Particulars of such additional work shall be agreed with the Engineer's representative before the work is covered up, otherwise no claim in this respect will be entertained.

V.13

Planking and strutting

Care shall be taken not to undermine the foundations of the building and if so directed by the Engineer, planking and strutting shall be left in, or other means adopted to protect the foundations. Details of such additional items shall be agreed with the Engineer's representative before the work is covered up, otherwise no claim in this respect will be entertained.

V.14

Backfilling

Trenches for plastic pipes shall first be filled with selected screened excavated material carefully hand-tamped between the pipe and sides of the trench, followed by 150mm -200mm of similar material before the general filling is carried out.

Trenches for concrete or cast iron drains shall first be filled to a depth of 300mm with selected fine material carefully hand-packed around the pipe. On no account shall materials be tipped into the trench until the first 300mm has been completed.

Filling shall be continued in layers not exceeding 300 mm thick well rammed and, if necessary, watered.

Specification
Drainage

(2N/5)

V.15

Laying drains

Drains shall be laid truly straight on line and gradient with sockets upstream and the full bore shall be unobstructed.

V.16

Plastic drains

Plastic drain pipes shall be laid and jointed with solvent welded joints entirely in accordance with the manufacturer's instructions.

Pipes shall be bedded in sand after all hard obstructions have been removed from trench bottoms.

V.17

Cast iron drains

Cast iron drains shall be laid on concrete beds where specified or shown on the drawings and shall be jointed with a gasket of hemp, well caulked, to a depth of 30mm for 100mm pipes and 40mm for larger pipes, and remainder of the socket shall be filled with molten lead or lead fibre solidly caulked.

Connection of iron to concrete drains shall be jointed as described for concrete drains.

Cast iron drains fixed to walls or beams shall be supported on brackets at 1,350mm centers.

Gullies, outlets, etc., on drains under concrete floors shall be set in position at correct levels before the floors are laid.

V.18

Concrete drains

Concrete drains shall be jointed with one turn of tarred gaskin, well caulked and the remainder of the socket filled with cement and sand, (1:3), finished with an angle filled around the pipe. All surplus mortar shall be removed from the inside of the pipe with a badger, where pipes are sulphate resisting, the jointing mortar shall contain sulphate resisting cement.

Specification
Drainage

(2N/6)

V.19	<u>Concrete beds, haunches and coverings</u> Where specified or shown on drawings, drains shall be laid on concrete, (13.5 N/sq mm 25 mm aggregate), beds 100mm thick, 400mm wide for 100mm diameter drains and 450mm wide for 150mm diameter drains. The concrete shall be haunched up both sides of the barrel to give lateral support. Where drains, other than cast iron drains, are laid under buildings or pavings carrying vehicular traffic, they shall be completely surrounded in concrete, (13.5N/sq mm 25mm aggregate) 150mm thick, (i.e. 400mm x 400mm overall for 100 mm pipes and 450 mm x 450mm overall for 150mm pipes). Where directed, drain beds shall be reinforced.	Drains shall be filled with water to a head of 1.50 metre and are to be tested in sections agreed with the Architect:- (i) after jointing (ii) after haunching and backfilling (iii) after completion of the works The Contractor shall provide all necessary testing apparatus and shall carry out such other tests as are required by the Engineer and the Local Authority.
V.20	<u>Sleeves</u> Gullies shall be bedded and surrounded in concrete 13.5N/sq mm – 25mm aggregate minimum 150mm all round.	V.24 <u>Clean and flush all drains</u> All drains, gullies, manholes, etc. shall be cored, cleaned and flushed on completion.
V.21	<u>Benching</u> All drains passing through walls or foundations shall have sleeves of cast iron pipe of sufficient size to allow a clearance round the drain.	V.25 <u>Method of measurement</u> Where not otherwise stated, the starting, level for trench and manhole excavation shall be:- (i) the formation level in areas where the site is excavated to reduce levels. (ii) Existing ground level in areas where no excavations is required, or where filling is required.
V.22	<u>Bedding and sealing covers and frames</u> Frames to manhole covers shall be bedded in cement mortar (1:3) and the covers in grease and sand.	The depths of all the trenches in the following description lie within the same 1.50metre stages as the average depths stated. Prices for excavating pipe trenches shall be deemed to include keeping them free from general water (i.e. all water except spring or running water).
V.23	<u>Testing</u> All drains and manholes shall be tested for water-tightness and straightness to the satisfaction, and in the presence of, the Engineer and the Local Authority.	

Specification
Drainage

(2/N/7)

Specification
Drainage

(2/N/8)

Notwithstanding the provisions of S.M.M. Clause V7 (a) to (c) the descriptions of excavating manholes, yard gullies, septic tanks and soakpits shall be deemed to include grading bottoms, planking and strutting, return filling and compacting, disposal of surplus soil and keeping excavations free from water.

Prices for building pipes into manholes shall include for building-in on rake where necessary.

Prices for concrete beds, benchings and coverings for pipes laid in trenches, shall be deemed to include for any necessary formwork. Formwork required for beds, etc. for pipes above ground, and for casing to vertical pipes, is referred to in the descriptions of such items.

Prices for all gullies shall be deemed to include for all necessary excavation, return filling, disposal of surplus excavated material, planking and strutting, and trimming and ramming bottoms.

Specification
Drainage

(2/1/19)

EXTERNAL WORKS

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- W.9 Macadam
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- W.11 Chippings
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Specification
External Works

(2/W/1)

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- W.30 First seal coat
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Specification
External Works

(2/W/2)

EXTERNAL WORKS

W.35 Laying pre-cast paving slabs

W.36 Grassing

GENERALLY

W.1 Preambles to other bills

Preambles contained in other sections of this Document shall apply equally to this section so far as is consistent with the following clauses.

W.2 Inspections

The Contractor shall give written notice to the Engineer for the purpose of inspection and measurement, whenever sections of:

- (a) excavations and preparation of sub-grade are completed
- (b) sub-grade drainage is complete
- (c) sub-base course is complete
- (d) base course is complete

MATERIALS

W.3 Soil for planted areas

Soil for planted areas shall be vegetable soil free from roots and rubbish and treated with weed killer to prevent the growth of weeds.

W.4 Sand for filling under footpaths

Sand for filling under footpaths shall be clean, dry pit or river sand, free from vegetable soil, roots and rubbish.

W.5 Granular materials for sub-base, base and surfacing

Base and Sub-base Base, Sub - base and Surfacing

Specification
External Works

(2/W/3)

Specification
External Works

(2/W/4)

B.S Sieve Percentage passing Size

Nominal maximum size		19mm	9.5mm	4.75mm
75 mm	38 mm			
75	mm	100	-	-
38	mm	80-100	100	-
19	mm	60-80	80-100	-
9.5	mm	30-65	40-75	80-100
4.75	mm	25-55	30-60	50-85
2.36	mm	20-45	25-50	35-70
0.425	mm	10-30	15-30	15-35
0.075	mm	5-15	5-15	5-15
	10-25	10-25		

The 9.5 mm and 4.75mm nominal size materials may have up to 35% of stones no larger than 38mm (1.5 in) provided that the materials passing the 4.75 mm (3/16 in) sieve is within the limits specified. Not less than 10% should be retained between each pair of successive sieves, excepting the largest pair.

Furthermore the materials shall fulfil the following requirements.

W.6 Base

The CBR value shall not be less than 80% when tested at B.S. Heavy Compaction (Soaked condition).

Specification
External Works

(2/W/5)

Plasticity index : 0 - 6%
Liquidity limit : 0 - 25%
Linear Shrinkage : 0 - 4%

W.7

Sub-base

The CBR value shall not be less than 25% when tested at B.S. Heavy Compaction (Soaked condition).

Plasticity index : 0 - 15%
Liquidity limit : 0 - 35%
Linear Shrinkage : 0 - 8%

W.8

Surfacing

Climate	Plasticity	Liquid
Linear	Index	Limit
Wet	4 - 9%	0 - 35%
Seasonal wet	6 - 15%	0 - 40%
		2 - 4%
		3 - 7%

This specification shall also apply to materials for shoulders.

In case the gravel surfacing is a temporary surface only, and the layer at a later stage shall constitute sub-base in a bitumen surfaced road, then the material shall meet the CBR requirement to sub-base material.

W.9

Macadam

The material shall consist of coarse and fine aggregate derived from crushed hard rock of approved quality.

The coarse aggregate for macadam shall comply with the 50mm or 40mm nominal sizes of B.S. 63. The fine aggregate shall all pass the 5 mm sieve.

Specification
External Works

(2/W/6)

The coarse aggregate shall be of approximately cubic shape, have at least one fractured face and with an insignificant amount of elongated or flaky particles.

The flakiness index must not exceed 40. The aggregate crushing value must not exceed 35%.

W.10 Aggregate for premix macadam surfacing

Aggregate for premix bitumen macadam surfacing shall consist of natural rock aggregate complying with B.S. 1621.

W.11 Chippings

Chippings for blinding 1st and 2nd seal-coat shall be single sized road stones conforming to B.S. 63 - single sized Road Stones and Chippings. Samples of all grades of stones and chipping shall be submitted to the Architect for approval before any is delivered to the site.

1st Wearing Coat : 14mm nominal size chippings

2nd Wearing Coat : 10mm nominal size chippings

W.12 Blinding

Blinding shall be 4mm gauge hard stone chippings, free from clay dust or other deleterious matter.

W.13 Prime coat

The prime coat for macadam paving shall be bitumen grade M.C.70. The temperature at application shall be 55 - 80°C.

W.14 Bitumen

Bitumen for first and second wearing coats shall be cutback bitumen grade M.C. 3000. The temperature at application shall be 120-140°C.

Bitumen for premix bitumen macadam shall be grade 80/100 bitumen.

Specification
External Works

(2/W/7)

WORKMANSHIP

W.15 Generally

The sub-grade, sub-base and base course for roads and parking areas shall be prepared and laid at a convenient time before completion of the contract, as shall be agreed between the Architect and the Contractor, together with their kerbs and foundations.

The wearing course shall be applied at a later date, and prior to laying, the base course shall be made good in accordance with the requirements specified herein. The Contractor shall make good at his own expense, any damage to kerbs.

W.16 Surveying

The Contractor shall verify all dimensions and levels prior to the commencement of the work.

All surveying necessary for the accomplishment of the work shall be done by the Contractor at his own expense, and he shall give notice of his intention to carry out such work in order that arrangements can be made for supervision and checking. The Contractor shall also provide without extra charge all necessary instruments, appliances, labour and any other materials required for checking the survey work.

The Contractor shall make all necessary surveys using given bench marks as reference points. These bench marks he shall carefully preserve.

The Contractor shall draft, in accordance with these surveys, all plans and drawings which are necessary for the completion of the work, and shall submit these plans and drawings to the Architect for approval in writing.

W.17 Levels, falls, crossfalls and cambers

The works shall be executed to the levels, falls, crossfalls and cambers shown on the drawings.

Specification
External Works

(2/W/8)

W.18

Tolerances

The finished sub-grade and shoulder levels shall at no place vary more than 15mm above or below the levels shown on the Drawings. Deviations shall not be one sided.

Sub-grade that does not conform to the above requirements shall be reshaped to conform to the specified tolerances and recompact, at the Contractor's expense.

Invert levels to ditches shall not vary more than 50mm from the levels shown on the drawings. The deviation from the gradient specified on the drawings shall not exceed 0.2 times the gradient specified.

On slopes irregularities shall not exceed 100mm.

The Contractor shall establish 25mm x 25mm x 100mm timber pegs outside the carriageway each 20m on both sides painted with the chainage, and giving the level to the finished road surface. The pegs shall be preserved until the Architect has approved the completion of the road.

The Contractor shall provide one accurate straight-edge. The straight edge shall be constructed of stout timber, angle iron or metal tubes so as to span 3 metres without deflection. If of timber, the edge shall be shod with steel plate in the width of the timber and at least 5mm thick.

W.19

Preparing ground surfaces under embankments

The Contractor shall ensure that the natural ground is cleared of vegetation rubbish and soft and wet materials unsuitable for embankment construction. All necessary work to drain the natural ground shall be executed. Slopes greater than 1 in 3 shall be formed into horizontal terraces not less than 2m wide.

W.20

Construction of embankments

Embankment material shall be placed in successive layers not exceeding 150mm after compaction unless the Contractor proves by testing to the Engineer's satisfaction that his compaction equipment is able to compact in greater layers.

Specification
External Works

(2/W/9)

Each layer shall extend over the full width of the embankment and shall be compacted according to requirements before the next layer is placed.

It is the Contractor's responsibility that only approved materials are incorporated in the embankments. If any unsuitable or oversize material or material is included it shall be removed and replaced with suitable material.

In forming embankments, the Contractor shall make due allowance in height and width for consolidations and shrinkage. On the completion of the Contract, the levels, widths and dimensions of the finished surface of the carriageway or embankment shall correspond to the levels and dimensions shown on the Drawings.

Where the CBR value of the fill material obtained from general excavation is less than 8% at B.S. Compaction after 48 hours soaking then the Engineer shall instruct the Contractor to provide selected fill in the upper layer or layers of the embankment. The thickness of the selected fill material shall be determined by the Architects Representative.

In cutting where the soaked CBR value of the sub-grade is lower than 8% the Architect shall similarly instruct the Contractor to replace the upper layer or layers with selected fill material.

The fill material shall preferably conform to the following requirement:-

Liquid Limited	:	0 - 45%
Plasticity Index	:	0 - 20%
Linear Shrinkage	:	0 - 10%

W.21

Compaction

All fill and sub-grade shall be compacted to at least 100% of the maximum dry density obtained in the B.S. Standard Compaction as follows:-

top 150mm of natural ground before filling
all fill in embankments

top 300mm of formation in both cut and fill

Specification
External Works

(2/W/10)

The Contractor shall when needed for proper compaction distribute and incorporate water in the layer of fill to be compacted. When the moisture content in some material is in excess of that for proper compaction the wet material shall be allowed to dry before compaction is commenced.

W.22

Diversion of water

Excavation and filling operations shall be carried out with side slopes so that water can run off the surface. The Contractor shall at his own expense maintain sufficient drainage of the works to prevent ponding and scour.

W.23

Testing

All testing shall comply with the requirements of B.S 1377.

The Contractor shall determine the dry density of compacted earthwork at the following minimum frequencies. The result of the Contractor's findings shall be submitted to the Architect who may approve or reject a volume of compacted earthwork on the evidence of the Contractor's tests or he may carry out tests himself in addition:

- (i) The top 150mm of the compacted original ground under embankments in areas where compaction is specified or has been ordered by the Architect: 1 density test per 1000 sq.m.
- (ii) All fill in embankments except the top layer: 1 density test per 1000 sq m.
- (iii) Formation in cutting and fill: 1 density test per 400 sq m.

The Contractor shall carry out a B.S. Standard Compaction test including CBR TEST AND A SET OF Atterberg Limit tests on soil samples from at least every tenth dry density determination test carried out as above. He shall also carry out a B.S. Standard Compaction test on soil sample from any dry density determination which failed to reach the specified percentage of the soil in which it is related in the above mentioned 1:10 representative grouping.

Specification
External Works

(2/W/11)

W.24

Soiling on slopes or verges

Where it is directed and/or shown on the Drawings that the slopes of embankments, back slopes of cuttings and verges shall be covered with a layer of top soil, such top soil shall be laid to a compacted thickness of 100mm or as specified by the Architect.

W.25

Base, Sub-base and surfacing of granular materials

The spreading and compaction of material must be carried out in such a manner that segregation is avoided. The layer must be uniformly compacted to at least 100% of the maximum dry density obtained at the B.S. Heavy Compaction Test.

Compaction should be done with a vibrating roller having a mass of at least 1800 kg per metre width of vibrating roll and finished to a smooth even surface with a static smooth-wheel roller.

The Contractor shall set out sufficient leveling points, each 20m on both sides of the road for the control of the thickness of the layer.

Simultaneously with compaction the layer must be made true to shape and level so that no point of the finished layer deviates more than 15 mm from the stipulated levels. Deviations shall not be considered.

Deviation of the surface when tested with a 3m straight edge shall be smaller than 10mm.

Filling in of depressions must only be done through previous scarification and recompaction to a homogeneous layer.

W.26

Macadam

The coarse aggregate shall be laid by mechanical plant to a thickness within the range 75-100mm and given two passes by a smooth -wheeled roller having a mass per metre width of at least 2500kg on at least one roll. The fine aggregate shall then be spread on it to a thickness of approximately 25mm by a suitable spreading machine and vibrated into the voids of the coarse aggregate by a vibrating plate compactor having a mass per unit area of the base plate of at least 1400 kg/sq m or a vibrating roller having a mass per metre width of vibrating roll of at least 1800 kg.

Specification
External Works

(2/W/12)

The operations of spreading and vibrating the fine aggregate shall be repeated as necessary until no more will penetrate into the layer of coarse aggregate and no hungry patches are visible on the surface, when it shall be brushed to remove the excess fines and leave the coarse aggregate standing 3-6 mm proud. The layer shall then be rolled with a smooth wheeled roller having a mass per metre width of at least 5000 kg on at least one roll.

The whole operation shall be repeated as necessary to provide the full specified thickness of road base.

W.27

Prime coat

Before application of bitumen prime coat, the base course shall be inspected and approved by the Architect. Any discrepancies shall be made good to the Engineer's approval before any work on the wearing course may start.

Prior to the application of the prime coat the surface of the base shall be swept clean of loose sand and dust and other foreign matter.

Bitumen for the prime coat shall be applied at a rate of approximately 0.8 litres/sq m in one even layer. After the prime coat has been applied the stretch of road shall be closed to traffic for 24 hours to allow the primer to soak into the surface.

In case it is not possible to close the primed stretch of road the prime coat shall be blinded with sand or crusher fines at a rate of approximately 5 kg/sq m.

W.28

First seal - coat

Prior to application of the first wearing coat the primed surface of the base-course must be carefully inspected, all areas found to be holding an excess of bitumen shall be blotted with sand or crusher fines, and all areas found to be deficient in bitumen shall be made good, all to the satisfaction of the Architect.

Specification
External Works

(2/W/13)

Bitumen for the first wearing coat shall be applied at a rate of approximately 1.0 litre/sq m and blinded with 14 mm chippings at a rate of 13 - 15 kg/sq m. The bitumen temperature at application shall be 120 - 140°C and the chipping shall be completely dry, clean and free of dust.

The chippings shall be uniformly spread over the binder film by a mechanical spreader, except where its use is impracticable. Any thinly chipped areas left by the spreading machine shall have additional chipping spread by hand to ensure complete cover.

The chippings shall be pressed into the binder by an approved pneumatic tyred multi-wheel roller moving slowly. The surfacing shall if possible be closed for traffic for 24 hours after finishing the first wearing-coat. The Contractor shall thereafter make arrangement, eg. by erecting signposts or the like to prevent excessive speeding, not more than 40km/h for 48 hours after the surfacing has been opened for traffic.

W.29

Second seal - coat

When the surfacing has been opened to traffic for a period to be agreed between the Architect and the Contractor the second wearing -coat shall be applied. Before application the first coat shall be made good. Excessive and loose chippings shall be brushed off so that the road surface appears with a firm even and clean texture to the satisfaction of the Architect.

Bitumen for the second wearing - coat shall be applied at a rate of approximately 1.1 litre/sq m and blinded with 10mm single sized chippings at a rate of 10 - 12 kg/sq m. The bitumen temperature at application shall be 120 - 140°C and the chippings shall be completely dry, clean and free of dust.

The chipping shall be uniformly spread over the binder film by a mechanical spreader, except where its use is impracticable. Any thinly chipped areas left by the spreading machine shall have additional chippings spread by hand to ensure complete cover.

The chipping shall be pressed into the binder by an approved pneumatic tyred multi-wheel roller moving slowly. Surplus chipping shall be afterwards removed.

Specification
External Works

(2/W/14)

The surfacing can be opened to traffic when the second wearing coat is finished, but the Contractor shall make arrangements, e.g. by erecting sign posts or the like, to prevent excessive speeding of not more than 40 km/h for 48 hours after finishings.

W.30

Premix bitumen macadam surfacing

Premix bitumen macadam surfacing shall consist of a premix macadam carpet of 500/700 grade bitumen and approved quality aggregate graded and mixed together prior to laying in the proportions and by the methods given to in B.S 1621. laid to finish to the thicknesses shown after compaction. The compaction shall be achieved with six to eight passes of a six to eight tonne roller.

W.31

General remarks on surfaces

The plant used by the Contractor for transporting, heating and spreading bitumen shall be an approved rubber tyred unit fitted with an efficient thermometer and heating control. The distributors shall be equipped to provide a constant rate of bitumen per square metre of surface at the full width of the work and there shall be a visible speedometer indicating the speed of the vehicle in metre per minute.

Application of bitumen for prime coat or wearing coats must not take place when the road is wet after rain, while it is raining or when rain is likely to be expected shortly after the surface dressing is finished.

Measures shall be taken to prevent overlapping of surface dressing at both transversal and longitudinal joints. At longitudinal joints either blinding off the already treated surface or by blocking off the distribution aggregate to the required width. At transversal joints the already treated surface shall be blinded off so that the spreading of bitumen can be started at the exact right moment, and when the spreading unit operates at the correct speed.

Hand spreading of bitumen shall be employed to touch up areas unavoidably missed by distributor.

Specification
External Works

(2/W/15)

W.32

Tolerances of thickness of pavements

The nominal thickness of surface dressing is for practical purpose assumed to be zero.

No layer in the pavement shall deviate more than 10% from the nominal thickness. The total pavement thickness shall not deviate more than 5% from that specified.

Deviations shall not be one-sided.

W.33

Laying precast paving slabs

Precast paving slabs shall be bedded on a sand bed compacted to the thickness specified with 10 mm wide joints, or as described on drawings, filled and pointed with cement mortar coloured to match the colour of the slabs and recessed 5mm deep. The paving shall finish true and even to the falls shown on the drawings with no surface irregularities.

W.34

Grassing

Grassing shall be carried out by a specialist using approved local grass. Prices for grass shall include for tending, watering, cutting and keeping weed free for a period of six months, to produce a dense and healthy "weed" free grass carpet.

Specification
External Works

(2/W/16)

GENERAL SPECIFICATIONS AND BILLS OF QUANTITIES ELECTRICAL INSTALLATIONS

1. GENERAL SPECIFICATION AND BILLS OF QUANTITIES

1.1 Scope of work

The work includes, unless otherwise specified, supply, installation, testing and commissioning and delivering up clean and in working order of the entire electrical installations as shown on the drawings in compliance with the specifications, drawings and generally accepted utility standards required of buildings. The works to be undertaken shall include, but shall not be limited to the following:

1.1.1. Working Drawings

Contract drawings as previously defined and forming part of the specification are listed as annexes to the specification. The Contractor shall prepare the working drawings as may be necessary for the proper execution of the contract works showing explicitly all the installation details and arrangement. All drawings shall be submitted for approval of the Service engineer before any work is carried out. The milestones for submission of drawings shall be indicated in the works programme on submission of tender.

Record drawings

During the execution of the works on site, the contractor shall in a manner approved by the Service engineer record on working drawing all deviations or modifications on the electrical works as actually installed from work indicated on the drawings. All construction drawings on-site shall be updated by the Contractor on a regular basis to reflect current as-built conditions until the final as-built and as commissioned drawings are submitted to the Service engineer for final approval.

1.1.2. As Built Drawings

On completion of the contract and before final payment certificate is issued, the contractor must provide a complete set of "as built" drawings of the entire installations. Drawings shall be in a scale and size approved by the Service engineer and shall be submitted in five (5) hardbound volumes and electronically in form of Compact Discs (CD). Drawing files shall be in AutoCAD format release 2004.

1.1.3. Shop-drawings

Shop drawings (also spare part list, operating instructions etc) of equipment installed shall form part of the "as-built" documentation.

1.1.4. Builders Work

The main contractor shall execute all builders' work in connection with the electrical installations.

The builder's works in connection with electrical installations shall include: Cutting away and making good after electrical installations and laying of all the necessary

Foundations for generators, switchgears, cable trenches, and supports for various equipments and plants. Works are to be executed in compliance with the existing standard and/or codes of practice adopted.

1.1.5. Testing and Inspection of Contractor's Work

The Service engineer or his representative shall at all reasonable time have access to such parts of the contractor's work as may be necessary for the purpose of inspecting and testing the materials, workmanship and performance of the equipment or plant.

On completion of any section of the installation and before they are concealed or insulated, they shall be tested according to the good practice of the relevant trades. Any defect revealed by the test must be rectified and the tests repeated at the contractor's expense.

In the event of any portion of the work or materials failing to pass the test specified herein, or set forth in the manufacturer's lists for that particular item, the Service engineer may, at his discretion, reject that portion of the work or material entirely.

1.1.6. Provisional Site Acceptance and Commissioning

All controls and safety devices must be tested to ensure that they function according to their design.

During commissioning, the contractor shall instruct the employer's representatives on how to operate and maintain the installations.

1.1.7. Materials

Where materials of a particular manufacture are called for in the Specification, the Service engineer shall have the authority to reject any materials that are not of the make specified. Where the words "or other approved equivalent" are used, it is understood that this means make of equal quality but the written approval of the Service engineer for the use of any such alternative shall be obtained prior to their use in the installation. In the absence of any such request the Service engineer is entitled to suppose that the material as specified will be used.

1.1.8. Workmanship

The whole work shall be carried out in a straightforward manner by competent workmen under skilled supervision as stipulated in conditions of contract. The Service engineer shall have authority to have portion of the work taken down, removed or undone, which is executed in a poor workmanship like manner or with improper materials. Where required, the contractor shall submit to the Service engineer samples of materials that he proposes to install for tests and approval for installation.

In the event of the portion of the work or materials failing to pass the specified test, or approval of the Service engineer, the Contractor will be required at his own expense to put right such defects.

1.1.9. Codes, Standards and Regulations

The works and installation of equipment will be governed by the applicable codes and standards from the issuing organizations and regulatory bodies listed below. The latest editions of the codes and standards, effective on the date of contract award, will apply.

Where there is a conflict between the specified codes and regulations, the standard, which requires the highest quality materials and workmanship, and offers the highest degree of safety to personnel, will be the governing standard.

In addition, all facilities will be constructed and put into service according to Tanzanian laws, regulations, codes and guidelines.

The codes and regulations shall include, but shall not be limited to, the following:
Current government Electrical Regulations

- IEE Regulations for Buildings

- International Electro technical Commissions Standards
- IEEE Regulations
- ITU Regulations
- NEMA
- UL
- TIA
- NFPA
- ANSI

In addition to the minimum requirements described in the codes and standards referenced herein, the contractor shall comply with all other requirements contained in this specification. Alternative codes and standards at least equivalent to those referenced may be substituted, but the Service engineer's written approval will be required for this substitution. In the event of any conflict, the Contractor shall seek resolution with the Service engineer.

1.1.10. Safety and Property Protection

All facilities of this contract shall be of the highest standards with respect to public, employee and equipment safety.

The design and construction activities shall meet the safety requirements of the Employer, TANESCO, Government of Tanzania, and normal practices as stipulated by the Contractors Registration Board.

The Contractor shall be solely responsible for the safety and protection of persons and property on or near the place of Work.

1.1.11. Environmental Protection.

1.1.11.1. General

The impact on the environment and on the surrounding community during construction, commissioning and operation shall be minimized.

Use of materials known to be hazardous to personnel or the environment such as asbestos, chlorofluorocarbon (CFC) based refrigerant, halon, PCB, Tritium, etc. is prohibited.

Noise Criteria

1.1.11.2.

All works shall be carried out such that noise to the surrounding area is minimized.

1.1.12. Drawings, Data and Documentation

1.1.12.1. Drawings

Drawing format shall be in accordance with the Employer's requirements. One (1) reproducible and three (3) copies each of certified drawings should be submitted to the Employer for approval.

No more than two (2) months after the completion of the Contract, the Contractor shall update all drawings to as-built and as-commissioned status. These as-built drawings to be submitted to the Employer shall include:

Three (3) sets of reduced sized prints

Three (3) sets of full size prints

Two (2) sets of full sized reproducible

Electronic files of drawings in AutoCAD drawing format 2004

All construction drawings on-site shall be updated by the Contractor on a regular basis to reflect current as-built conditions until the final as-built and as-commissioned drawings are submitted to the Employer for approval.

1.1.12.2. Operators' Instruction and Facility Manuals

The Contractor shall provide six (6) sets of Operators' Instruction and Facility Manuals covering all facilities constructed and equipment supplied by the Contractor prior to the commencement of pre-commissioning.

1.1.13. Service and Maintenance Manuals

The Contractor shall prepare six (6) sets of Service and Maintenance Manuals for the equipment supplied by the contractor prior to the commencement of pre-commissioning.

The equipment supplier's service and maintenance manuals shall pertain specifically to equipment supplied under the Contract. Catalogue information is not acceptable except for low-cost standard off-the-shelf items.

1.1.14. Language, Measurements and Format

All communication between the Contractor, his Subcontractors and the Employer, including all documents, notes on drawings, and submissions required under this Contract, shall be in the English language.

Manuals shall be divided into sections covering the various systems or equipment supplied and shall be properly indexed and cross-referenced.

The International System of Units (SI) with imperial in brackets shall be used on all drawings and design documents, except that Imperial units may be used if followed by SI equivalent in brackets.

1.1.15. Equipment Registration

1.1.15.1. Certificates and Registration of Equipment

The Contractor will be responsible for obtaining relevant certificates and registration (for the equipment), which may be required by the authorities, named in the "Codes and Regulations". The certificates and registration will be transferred to the Employer prior to Final Acceptance.

1.1.15.2. Electrical Equipment

All electrical equipment shall be tropicalized and approved by the electrical authority having jurisdiction.

1.1.15.3. Materials

All materials and equipment shall be new and unused commercially available materials, and shall be suitable to perform satisfactorily under the operating conditions described in this specification.

All equipment shall be of a proven type that has been in successful operation. The proposed use of equipment that is unproven shall be clearly identified in the Contractor's proposal.

1.1.15.4. Site Testing

The Contractor shall submit his standard Quality Assurance (QA) procedure for the service engineers' approval.

Before submitting any finished site work for inspection by the Employer, the Contractor shall completely inspect such work and shall carry out all tests that the specifications require. The Contractor shall keep inspection and test records covering all phases of the work and shall submit these records to the Engineer on completion of the work on any system. Failure to do such tests will result in the work being deemed "Not Completed". The Contractor shall make all arrangements for inspection with the Government and local authorities and the Employer.

The Contractor shall arrange for all site inspection by the authorities having jurisdiction, including Tanesco, Municipal Authority and Local Healthy Authorities.

1.1.16. Procurement, Inspection and Expediting

1.1.16.1. Contractor's Responsibilities

General

The Contractor shall be wholly responsible for the procurement, inspection, expediting and shipment to site of all materials and equipment, etc. within the Contractor's scope.

Placement of Purchase Order

The Contractor shall be wholly responsible for the negotiation and placement of purchase orders for all equipment, etc. within the Contractor's scope.

Inspection

The Contractor shall be wholly responsible for the inspection of all materials and equipment within the Contractor's scope, including establishing inspection and test points. All such points shall be indicated in the Sub-vendor's production schedule.

The Employer shall be notified of all upcoming inspection points at least five (5) days in advance, and shall reserve the right to accept or decline the invitation to

attend inspections. In any event, the Contractor shall be fully responsible for the quality of the material and equipment.

The Contractor shall provide the Employer with certified copies of all testing reports.

Shipment, Off-Loading and Storage

The Sub Contractor shall be wholly responsible for the shipment, off-loading and proper storage on site of all required materials and equipment in accordance with good shipping and storage practices (and as recommended by equipment manufacturers). The Contractor shall prepare all materials for shipment and storage in such a manner as to protect them from damage or deterioration and shall be responsible for and make good any and all damage due to improper preparation and loading for shipment.

The contractor shall take all necessary precautions to ensure that all materials that may be subject to deterioration in humid tropical conditions are packed in such a manner as to prevent such deterioration.

All parts shall be carefully boxed or otherwise suitably prepared for shipment to a tropical climate. All openings shall be tightly closed before shipment. Equipment that will be vulnerable to damage due to seawater or moisture during transportation or storage at the Site shall be protected by a suitable vapour barrier and, if considered necessary by the Contractor or an Employer request, by an internal atmosphere of inert gas or approved desiccant.

All parts exceeding 100 kg gross weight shall be prepared for shipment so that slings for handling by crane may be readily attached while the parts are on railway cars or on broad ship. The Contractor shall paint or mark the weight of all pieces in excess of 5 tones. The Contractor shall take necessary measures to avoid ingress of moisture during transportation, storage and installation.

Three (3) copies of all bills of lading and packing lists shall be forwarded to the Employer on shipment of materials and twenty (20) days notice shall be given to the Employer of the arrival of any materials at the Port of Entry.

1.1.17. General requirements for commissioning

Upon practical completion of the works and before handing over the installations to the employer, an acceptance test on proper will be carried out.

These will involve but not restricted to;

- Check the compliance of all installed system operation with design parameters.
- Operation of all control components and if they have been installed in accordance with specified requirements and manufacturer's instructions.
- Checking all safety devices including circuit breakers, fire protection equipment, emergency lighting and cutouts if they have been installed correctly into the overall system.

PARTICULAR SPECIFICATIONS

GENERAL

CONTRACT DRAWINGS

The drawings listed in appendices shall be the contract drawings. It should be noted that these are meant only as a guide to the Contractor, who shall therefore be deemed to have included for all work and materials, including accessories and fixing etc. whether or not these are shown on drawings.

SCOPE OF WORKS

ELECTRICAL INSTALLATIONS SPECIFICATIONS AND BILLS OF QUANTITIES

1. SCOPE OF WORKS.

The detailed works are as indicated on the tender drawings and as described later in this specification and bills of quantities but as a guide the main elements will include but not necessarily be limited to the following: -

- (i) about Complete power and lighting conduit wiring system in and buildings as shown in the drawings. All conduit work shall be planned and executed in compliance with the current I. E. E. Regulations. Particular consideration must be put on conduit bends and cable space factors. Insertion of draw wires during installation is strictly prohibited.
- (ii) Complete conduit system for telephone, insertion of draw-wires and supply and fixing of telephone outlets.
- (iii) Supply and drawing-in of all sub-circuit cables in installed conduit.
- (iv) Supply, installation, testing and commissioning all wiring accessories such as light switches, socket outlets, air conditioner switches, hand dryer switches, extra fan switches.

- (v) Supply, installation, testing and commissioning all electrical switchgear as specified and shown on drawings.
- (vi) Supply installation, testing and commissioning all indoor, outdoor and area light fittings as specified and shown on drawings.
- (vii) Supply, installation, testing and connecting all underground distribution network as shown on drawings.
- (viii) Earthing the whole installation to comply with the I. E. E. Regulations (15th Edition).
- (ix) Liaising with TANESCO on energizing the installation.
- (x) Production of Record Drawings as specified.
- (xi) Handing over the installation to the Client.
- (xii) Installation of MV and LV Switchgears and equipment
- (xiii) Installation of standby generators
- (xiv) Installation of transformer
- (xv) Installation of cables and wiring
- (xvi) Installation of fire alarm system
- (xvii) Installation of lightning protection and earthing systems

The Contractor shall supply all materials, labour, installations, fixing, connecting, testing, labelling, commissioning and delivering the installations complete and working in every detail as described elsewhere in the specifications and on the drawings to the satisfaction of the Service engineer.

2. DESCRIPTION OF MEASURING UNITS.

The following terms used to quantify various units as used in the Schedules, shall have the meanings defined hereunder.

Lighting Point shall mean a terminal point at the end of final sub-circuit for connection of a light fitting. Such a point shall include the ceiling rose, outlet box, all cables, p.v.c conduit and accessories, from the distribution board, and including switch drops, draw or loop-in boxes as necessary to facilitate the light fitting to function. This does not include the light fitting and switch.

Socket Outlet Point shall mean a terminal point at the end of a final sub-circuit for connection of a socket outlet. Such a point shall include the outlet box, all cables, p.v.c conduit and conduit accessories from the distribution board and including draw or loop-in boxes as necessary to facilitate the socket outlet to function. This does not include the socket outlet.

Air Conditioner Outlet Point shall mean a terminal point at the end of a final sub-circuit for connection to an air conditioner. Such a point shall include the air conditioner switch outlet box, all cables, p.v.c conduit and conduit accessories from the distribution board and including all draw and loop-in boxes as necessary to facilitate the air conditioner to function. This does not include the air conditioner, switch or cable connection to the air conditioner.

Extra Fan Point shall mean a terminal point at the end of a final sub-circuit for connection of an extra fan. Such a point shall include the fan switch outlet box, all cables, p.v.c conduit and conduit accessories from the distribution board and including all draw and loop-in boxes as necessary to facilitate the extra fan to function. This does not include the extra fan or switch.

Hand Dryer Point shall mean a terminal point for connection of hand dryer switch. Such a point shall include hand dryer switch outlet box, all cables, p.v.c conduit and conduit accessories from the distribution board and including all draw and loop-in boxes as necessary to facilitate the hand dryer to function. This does not include the hand dryer or its switch.

Ceiling Fan Point Ceiling Fan Outlet Point shall mean a terminal point for connection of a ceiling fan. Such a point shall include ceiling fan to function. This does not include the ceiling fan or fan speed regulator.

Telephone Outlet Point shall mean a terminal point for connection of telephone set. Such a point shall include the telephone outlet box, the telephone socket outlet, p.v.c conduit and conduit accessories interlinking all telephone outlet points and including insertion of draw wires.

SUPPLY OF ELECTRICITY

TANESCO shall supply power for the building at 33/11kV. The Contractor shall be responsible to follow up TANESCO to ensure timely delivery of power to the site. TANESCO shall provide bulk metering on the high voltage side. The contractor shall be responsible for arranging the necessary applications for the tariff meters and all liaisons with Tanesco. Any and all applicable costs that the Employer is liable for to TANESCO in conjunction with this service in any way shall be included. The client will reimburse the Contractor of the TANESCO costs for provision of power and commissioning at actual.

The Contractor is strongly advised to inspect the site. Any claim due to lack of knowledge that should otherwise have been obtained by so doing shall not be entertained.

MV INSTALLATIONS

POWER TRANSFORMERS

The Contractor shall supply and install power transformer rated as shown on the drawings, 3 phase, 50Hz, oil immersed, naturally self-cooled (ONAN), double wound core type design, suitable for indoor service designed, manufactured and tested in accordance with IEC 76 (BS 171) and suitable for operation in the climate and altitude of Morogoro, Tanzania.

5.1.2

The transformer shall be fitted with rating and connection plate, earthing terminal, lifting lugs, skid type under base, flush mounting oil gauge, drain valve and plug, plain air breather, and thermometer pocket.

5.1.3

The transformer shall be fitted with oil temperature indication and protection, winding temperature and indication, bulchholz type relay, dehydrating breather, plain rollers and a fully rated neutral.

5.1.4

The transformer shall have off-loaded tap-changers. The tap changer switch shall be manually operated and shall have provision for locking by means of a padlock in any of the five positions. The central position shall produce nominal output

voltage and - 2½%, 0, + 2½ + 5%, tapping shall be provided on M. V. winding.

5.1.5

Cable boxes on the MV sides shall have 3-pole air-filled cable box with undrilled gland plate suitable to receive 1-to-3-core cable and for use with heat shrink terminations. The LV side shall have 4-pole air insulated cable box with undrilled gland plate suitable to receive multiple 1-core cables.

5.1.6

In addition to the above specification, the transformer shall meet the following requirements:

5.1.7.1 *Voltage ratio*

33000/415 volts or 11000/415 between phases at no load, giving approximately 400V at full load, 0.8 power factor and 4.5% impedance.

5.1.7.1 *Connections*

Delta/star in accordance with vector group reference Dyn 11 to BS171: 1970 or IEC 76

5.1.7.1 *Type of tank*

Welded steel with removable radiators.

5.1.8

The transformer shall be given adequate paint treatment as specified in BS 381 C.

5.1.9

The transformer shall be supplied complete with the first filling of oil complying with B.S. 148:1959.

SPECIFICATION FOR MV SWITCHBOARD

- 5.2.1 The 33kV circuit breakers shall be of horizontally isolated type and shall be housed in a self-standing metal cubicle. The circuit breaker shall be rated for a symmetrical short circuit breaking capacity of 400MVA at 33kV.
- 5.2.2 The circuit breaker shall be of Air breaker type suitable for 33 kV 3ph 50Hz supply, Shall also be the type that requires very little maintenance and easy to carry out general service.
- 5.2.3 The circuit breaker shall have facilities provided for earthing the feeder cable without the use of loose attachments. It shall be possible to select and lock the circuit breaker by means of a padlock in three positions clearly marked as Test, Service and isolated.
- 5.2.4 The circuit breaker shall be provided with the necessary interlocks to ensure safety in operation and maintenance.
- 5.2.5 The circuit breaker shall be suitable for both mechanical and electrical closing and tripping. Electrical closing and tripping coils shall be rated at 24V dc nominal value while spring motors shall operate at 24V dc.
- 5.2.6 The circuit breaker cubicle shall house wound-type cast epoxy resin current transformers for indication and protection purposes, 33kV bus bars with lockable shutters, and 33kV 3-pole oil circuit breaker.
- 5.2.7 The Circuit breaker cubicle shall be fitted with over-load and a single earth fault relay, and phase to ground relay as per specification in clause 2.2.9.1
- 5.2.8 The circuit breaker cubicle shall also be fitted with auxiliary relays for alarms and tripping commands from oil temperature and bulchholz units.
- 5.2.9 The circuit breaker cubicle shall have the following instruments fitted:
Out going: 0-60A ammeters incorporated with an ammeter selector switch.
Control buttons for breaker close and breaker open.
Indication lamps for breaker open and in service.

MV METERING CUBICLE

If The metering cubicle will be required to be supplied by contractor, shall be of air insulated, rated for system voltage of 36KV, 15KA at 50HZ 3 phase..

The cubicle shall include instrument transformers of the following features:-

- Potential transformers (PTS)
Rated burden - 50VA
Rated voltage - $\frac{33000}{(3)^{1/2}}$ $\frac{110}{(3)^{1/2}}$ V
Accuracy class - 0.5 percent

- Current transformers (CT'S)
Rated burden - 15VA
Current ratio - 50-100/1A
Accuracy class - 0.5 percent

5.2.10 The LV Compartment on circuit breaker cubicle shall have the following instruments fitted.

Incomer: 0-36kV voltmeter incorporated with a phase selector switch.

0-200A ammeter incorporated with ammeter selector switch.

Switch buttons for breaker close and breaker open or "and" indication lamps for breaker closed and breaker opened.

5.2.11 The circuit breaker and circuit breaker cubicle shall be manufactured and tested in accordance with BS 5311.

SUPPLY AND DISTRIBUTION

MAIN L.V. SWITCHBOARD

The main switchboard (MS) shall be of the cubicle type, free standing and front access. The maximum height shall be 2.2 metres and the maximum depth shall be 800mm. Layout of the main switchboard is subject to approval.

The low voltage switchgear shall be rated as follows: -

- Rated voltage-1000V
- Rated service voltage -690V
- Rated impulse withstand voltage-12kV
- Power frequency - 50HZ
- Rated short time withstand current -30kA
- Rated peak withstand current- 65kA
- Forms of protection in accordance to IEC 439-1-Form 4
- Degree of protection in accordance to IEC 529- IP 54
- Colour standard RAL 7015

The switchgear shall have the following features: -

- Insulation - air
- Arc quenching - air
- Number of poles - 4
- Operating mechanism - hand
- Selective solid-state, microprocessor based
- With-drawable

The low voltage switchgear shall be housed in a metal enclosure cubicle, which shall also accommodate automatic changeover switch for generator- transformer operations, power factor correction equipment and surge protectors. Cable entries shall be made from below and above.

TECHNICAL SUMMARY

6.2.1 Protections

The following protections shall be incorporated:

- Over current protection solid state microprocessor based
- Asymmetrical short circuit protection [magnetically operated]
- Current settings - Provided [programmable]
- Interrupting chambers - Air
- Operating mechanisms - spring loaded
- Spring charging - Motor/hand

The following features shall also be included

- Breaker position indication flags
- Breaker operations counter
- Electrical/mechanical inter-locks with a standby generator supply

The switchgear shall be manufactured to comply with protection class IP42 based on IEC 529

INDICATING INSTRUMENTS

No ammeters with maximum pointers one in each phase of the incoming supply for both mains and standby power supply - shall be incorporated in switchboards. Metering for power factor correction equipment shall also be included in the switchboard.

Construction and Operation

The enclosures, front plates and doors of the low-voltage switchboard shall be made of 2mm thick, steel sheet metal, which shall have received an anti-corrosion coating (hot polymerized polyester/epoxy powder).

The low-voltage switchboards shall be designed for simple and dependable installation of bus bars and switchgear and control gear components, as well as the necessary connections, using specific protective barriers and supports for each function.

The front panels of the switchboards shall be removable to facilitate servicing.

The system of construction shall offer a complete functional set of prefabricated elements for installation of switching, protective, measurement, control and monitoring components.

A set of bus bars shall be installable from the top to the bottom of the switchboard to facilitate connection of switchgear and control gear components and subsequent modifications.

Insulated current distribution arrangements shall be used to supply a row of modular components.

Reserve space shall be pre-equipped to supply new modular components.

DISTRIBUTION BOARDS

Distribution boards shall be of the modular cubicle type in compliance with BS 5484:Pt 12 and BS EN 60439-3. All breakers and other apparatus shall only be accessible through the door(s), only the incorporated isolator or residual current devices shall be accessible from outside. Appropriate MCBs to BSEN 60898 rated at 10kA of types to suit various types of loads shall be provided.

Typewritten or stenciled labels showing each circuit shall be fixed on the inside of the door(s).

Voltage surge protectors in conformity with IEC 61543 shall be incorporated in each distribution board. The surge protectors shall be fitted with built-in thermal protection and indicators to show protector status.

All distribution boards shall be complete with earthing terminal bus bars, blanking-off plates for spare ways and equipped with miniature circuit breakers in accordance with appropriate diagrams unless otherwise stated.

Where main isolators or Residual Current devices are called for on the diagrams they shall be an integral part of the DB's.

The circuits of the DB's shall have phase arrangement in accordance with that shown on the diagrams. However, it shall be the responsibility of the Contractor to measure the load at each DB after commissioning and balance the load to the satisfaction of the Engineer.

ELECTRICAL INSTALLATIONS RELATED TO MECHANICAL PLANTS

SCOPE

The Contractor shall supply all labour, material and incidentals necessary to provide a complete, workable electrical installation to all the mechanical plants as stated or implied by mechanical services specifications or accompanying drawings as listed in schedule of drawings for mechanical services.

MOTOR CONTROL CENTRES

7.2.1 Scope

Motor control centres for all the mechanical plants shall be supplied and installed under the Mechanical works scope of works. Supply of power to the respective control panels for the Mechanical plants shall be undertaken as part of the electrical scope of works.

Power reticulation from the control centres to the specific mechanical plants shall be Undertaken under the mechanical works scope.

The Contractor shall ensure that cables are run and connected to the appropriate equipments on the suitable location of the feeder connection at the motor control centres.

7.2.2 Mechanical Plants

Mechanical plants shall include but shall not be limited to water pumps, fire fighting pumps, air conditioning plants, and lifts, together with their associated automatic pressure and water level controls.

LIGHTING INSTALLATIONS

SCOPE

The work to be carried out under this scope shall include the supply and installation, connection, lamping and commissioning of the complete lighting installation as specified and as detailed on the tender drawings.

GENERAL

A sample luminaries shall be provided for evaluation and approval by the Service engineer prior to installation. Luminaries, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets etc. and shall be delivered to site in protective clothing.

STANDARDS

All luminaries shall be manufactured in accordance with BSEN 60598.

INSTALLATION

Recessed luminaries shall be directly installed in suspended ceiling grid. The diffuser or the reflector shall fit flush with the ceiling and the only visible part shall be the reflector or diffuser. Surface mounted luminaries shall be installed either directly on structural soffit or walls.

Lighting fixtures shall be of the type specified in the Bills of Quantities and shall be supplied complete with the associated supports.

EMERGENCY LIGHTING

The Contractor shall supply and install emergency lighting of the type indicated in bills of quantities and tender drawings. Exit signs together with their associated wiring shall be provided on all points as called for in drawings.

Emergency luminaries shall be provided with emergency lighting inverter battery packs. The battery packs shall have sufficient capacity to provide full illumination for a period of 3 hours upon mains failure.

Clearly visible charge operation/failure indicators shall be provided with each emergency luminaries.

The Contractor shall provide wall mounted key operated isolating switch for test purposes. These switches shall be engraved "Emergency Lighting Test".

A separate un-switched supply to each fitting shall be provided from the local lighting circuit.

EXTERNAL LIGHTING

The Contractor shall be responsible for erection, alignment and provision of the foundations for the external lights as shown on the drawings. All luminaries designated for outdoor use shall be suitably rated for outdoor applications.

The contractor shall also be responsible for excavation of trenches and routing of the cables for the outdoor lights.

LIGHTING CONTROLS

WHERE CONVENTIONAL SWITCHES ARE INDICATED THEY SHALL BE INSTALLED AT STRIKE SIDE OF DOORS AS FINALLY HUNG.

Exterior lights shall be controlled by photocell switches located at positions indicated on drawings or as agreed at site.

LIGHTNING PROTECTION

MATERIALS

The lightning protection system for the rooftops shall comprise of High Conductivity Annealed Copper (HCAC) tape 25x3mm and elevation Copper rods with multiple point of height 1.5m. For down conductors (dc) and wall horizontal conductors, HCAC tape, 25x3mm, shall be used along exposed surfaces behind concrete sunshades.

Connections to air terminations and to any exposed metal parts on roof or to any metallic installations on the roof shall be effected by HCAC tape 20x2.5mm. This conductor shall also be used for side bonding where necessary.

All accessories in the lightning protection system shall be of copper. For PVC covered HCAC tape, either PVC covered copper or non-metallic accessories shall be used. The inspection earth pits shall be made of concrete materials

INSTALLATION

9.2.1 General

CONDUCTORS FOR LIGHTNING PROTECTION SYSTEM MUST ALWAYS RUN BY THE MOST DIRECT ROUTE POSSIBLE.

At sharp bends and re-entrant loops, the conductor length shall not exceed eight (8) times the shortest route measured through air or building. When necessary, projections shall be pierced for free passage of the Conductor.

9.2.2 Joints

Joints shall as far as possible be avoided in the Conductors of lightning protection system. Where they are necessary, the surface in contact shall be cleaned, tinned and sweated in contact with six (6) rivets not less than 6mm diameter through the joint.

9.2.3 Air Terminations.

The air termination network shall consist of elevation copper rods with multiple point, 1.5m, and copper mesh of 10mx20m maximum, such that no part of the roof shall be more than 5m from the nearest horizontal conductor. Tapes shall be secured at 1.0m centres.

All metallic parts/projections on or above the main surface of the roof which are connected intentionally or fortuitously to the general mass of the earth shall be bonded to and form part of the air termination network. Bonding shall be facilitated by HCAC tape 20x2.5mm where electrolytic corrosion is ruled out. All elements of lightning protection system shall be joined together.

9.2.4 Down Conductors (DC)

The dc system shall be directly routed from the air termination to the earth termination network and shall be connected to the steel reinforcement of the structure starting from each corner with all lightning connections to the structural steel welded at junctions to ensure electrical continuity.

Bonds shall be mechanically and electrically effective and protected from corrosion and erosion by the operating environment. Joints shall be protected against corrosion and erosion from the elements of the environment and shall present adequate contact area.

Each dc shall be provided with a test joint in such a position that, while not inviting unauthorized interference, it is convenient for tests. Plates indicating the position, number and type of electrodes shall be fitted above each test point.

Tapes shall be secured at 0.5m centres.

9.2.5 Grounding

An earth electrode shall be connected to each dc emanating from air termination. The dispersion resistance of the earth termination network shall be not more than 10 ohms. The earth electrodes shall be capable of being isolated and a reference earth electrode shall be provided for testing purposes.

The earth rods shall be driven into the ground as close as possible to the structure and dc. The point of connection to the earth termination network shall be removable and easily accessible from above ground to facilitate inspection, testing and maintenance of the lightning protection system. Care shall be taken to avoid contact between copper electrode and any elements (e.g. salt) in the vicinity that may cause corrosion.

EMERGENCY POWER SUPPLY

STANDBY GENERATORS

10.1.1 GENERAL

This section covers the particular specifications for the design, manufacture, transport, erection and commissioning of the containerized super silenced prime model diesel generator sets to be installed outdoors as shown on drawings. The diesel generator set will be required to provide the necessary standby power supply during mains failure.

10.1.2 SCOPE OF SUPPLY

The tender shall consist of complete system including all necessary components and equipment constituting fully automatic power supply producing rated output continuously for periods up to 24 hours before refueling. The scope shall include provision and installation of fuel reserve tank.

The supply shall include:

Complete standby diesel generator, continuous output each 400 volts, 3-phase, 50Hz, enclosed in a sound attenuated weather proof container, the whole to consist of Diesel Engine, Alternator, control board, fuel system and starter batteries with main chargers and a load management unit.

Training of operating staff in testing, operating and maintenance of the standby generator set.

Tools and spare parts including 1 set of special tools required for operation, maintenance, disassembly and reassembly of the equipment, and recommendation of spare parts needed for a period of two years of normal operation of the equipment or 2,000 hours running time for the engine.

10.1.3 TECHNICAL REQUIREMENTS

The generator set shall consist of the following basic components:

- Alternator
- Engine
- Air filter system
- Cooling system
- Fuel system
- Oil system
- Engine exhaust system
- Enclosure
- Electrical system
- Safety devices
- Control system
- Service Tank
- Load Management Panel

10.1.3.1 Alternator

The alternator shall be manufactured to comply with IEC 34-1, BS 4999-5000, EN 60034-1 and other standards. The alternator shall be 3-phase, synchronous, brushless type, self-exciting and self-regulating. The alternator shall be equipped with a 3-phase sensing automatic voltage regulator. In order to reduce the harmonics contents of the voltage the alternator windings shall have optimum 2/3 pitch. The alternator shall meet the standard application demands to include lighting and motor starting.

Radio interference suppression shall be in accordance with VDE 0875 and EMC compliance to EN 50081-1 and EN 50082-1.

10.1.3.2 Engine

The engine shall be self-priming, four-stroke diesel, compression ignition, twin turbocharged for rapid load acceptance. The units shall run on diesel fuel and shall operate at a speed not exceeding 1500 rpm. The engines shall comply with the specifications set out in BS 5514 - or equivalent national standard, and shall be capable of producing the rated output continuously under the most adverse climatic conditions maximum ambient temp 50°C. and relative humidity of 85%. The offered equipment shall be of a well-proven type, with reference of similar engines installed preferably at locations of similar climatic conditions (tropicalized).

The overload capacity based on motor starting shall be 300% for 20seconds, 50% for 2minutes and 10% of the rated output for one hour every 6 hours of operation.

10.1.3.3 Air Filter System

Two stage air intake filters with safety cartridges shall be employed to provide maximum protection in all environments.

Service indicators shall show when the filters need to be cleaned.

10.1.3.4 Cooling System

The cooling system shall be of tandem radiators with variable speed drive electric fans to ensure optimum cooling at ambient temperatures of up to 50 degrees centigrade.

10.1.3.5 Fuel System

The fuel system shall consist of primary filters each with a water separator and secondary filters. All filters shall have replaceable elements. The built-in fuel tank shall be double skin with leakage sensor and shall have fuel capacity for 24hours operation. An electric fuel transfer pump to allow refueling from an external fuel tank shall be incorporated together with fuel connection to hook up to the external fuel tank. The system shall incorporate overfill warning and overfill shut down switches and low fuel warning and low shut down switch with audible and visual alarms.

10.1.3.6 Exhaust System

The engine shall be furnished with a piped exhaust system allowing the discharge of exhaust gases via a silencer to the atmosphere. The silencer shall be installed close to the engine. The exhaust system shall be integrated heavy duty silencer, thermally insulated rated for residential applications.

10.1.3.7 Enclosure

The alternator /engine assembly shall be fully enclosed in a sound attenuated 20ft ISO container. Drain plugs shall be provided to remove split liquids within the container. Variable speed fan cooling fans shall be used to reduce the noise levels. Sound pressure level at 7m distances shall not be in excess to 64dB

10.1.3.8 Electrical System

The electrical system shall be a 24V system with separate battery charging alternator with axial type starter motor.

The battery rack shall be mounted inside the generating set.

10.1.3.9 Safety Devices

Full guarding for all rotating parts, hot spot parts and electrical connections shall be provided.

An interlock shall be provided to ensure that whenever the terminal board access door is opened during operation the main circuit trip switch shall be instantly activated.

10.1.3.10 Control System

A read out LCD panel shall be provided to allow the operator to selectively view voltage, current and power outputs as well as engine status and service parameters. A three-position starter control to facilitate local or remote start-up to be selected shall also be provided.

An RS 232 interface to enable a laptop or PC to directly interface with the control module shall be incorporated.

Other controls to be incorporated shall include motorized integral trip to provide thermal and magnetic overload protection and various warnings and shutdowns.

10.1.3.11 Service Tank

The diesel engine shall be equipped with a steel fuel tank mounted on suitable steel structure in an elevated position in order to provide fuel under pressure to the engine fuel injection pumps. The capacity of the tank shall be sufficient for approximately twenty-four hours operation on full load. The tank shall be provided with a float switch and fuel level gauge.

The fuel shall pass through a fine mesh filter before entering the fuel injection pump on the engine. The tank shall be provided with all necessary cocks including drain cock to enable maintenance crew to isolate the tank from the rest of the fuel system for repairs.

A drip tray shall be installed below the service tank to each minor leak. To drain the drip tray a cock shall be provided in a suitable position.

10.1.3.12 Automatic Load Transfer Mechanism

The generators shall be supplied together with automatic load transfer switches to enable automatic transfer of the loads to the generator sets upon mains failure.

POWER CABLES

GENERAL

Cable routes are indicated on the drawings for tender purposes but the exact final routes shall be agreed with the Engineers.

All work including the builders' work shall be carried out by the Electrical Contractor, who is to include for the supply and installation of all jointing materials, cable supports, steel racking and making all the necessary cable joints. The cable shall be installed and tested in strict accordance with the appropriate clauses of the IEE Regulations, the factories Acts and B.S. 6346 P.V.C. Insulated cables.

Cables shall at all times be handled with care and every effort made to avoid damage. Unloading, rolling to position and mounting of cable drums shall be carried out efficiently and carefully in the recognized manner and cable shall be pulled from the top of drum and twisting shall at all times be avoided.

Adequate numbers of drum jacks, rollers and other handling accessories shall be used and make-shift arrangements will not be tolerated. In all cases care shall be taken to break the rotation of the drum and cable shall not be dragged over ground, concrete or any surface but shall be adequately supported on rollers or man-handled into position.

The Contractor shall take particular care to avoid damage to other services, which may run adjacent to or across the route of the cable being installed.

Cables shall be installed with a minimum of 200mm clearance of any equipment or pipe work including lagging associated with other services. Where this condition is unavoidable or difficult to maintain the engineers shall be informed prior to the installation being commenced, otherwise the Contractor may be called upon to divert or adjust the route of any cable so affected.

Cables shall not be installed within 300mm of a metal roof, unless clipped to the lower side of wooden joints or otherwise protected from radiant heat.

Cables passing through structural floors shall be tightly wrapped with asbestos tape and grouted in with a hardwood filling below, shaped to suit the cables passing through.

Where cables are run vertically heavy gauge sheet metal guards shall be supplied and fixed to the wall. The casing shall be fixed from floor level to the underneath side of the appropriate end diving box or to a height of 1.5 meter above floor level.

Where cables run through service ducts or cable trenches they shall be fixed by means of purpose made cable hangers if cable hangers in the existing cable trenches are not previously incorporated, then the mode of installation shall be agreed for between the Electrical contractor and the Engineer.

Hangers shall be of metal or of steel and shall be treated with one coat of metal and two coats of anticorrosive paint and shall be suitable for horizontal and vertical mounting either cast in or secured to concrete structure using such brackets and adaptors as are available from the manufacturers.

Hanger shall be spaced according to the IEE Regulations or to the Manufacturer's recommendations, as appropriate, for the supports of the cables. The Contractor shall take particular care to avoid sagging or stress on any cable by wrongly positioned or inadequately spaced hangers.

The sizes of cleats shall be selected such that all cleats can be tightened down without exerting undue pressure or strain on the cable.

In the case of vertical cables the cleats shall be so designed and of sufficient number to grip the cable firmly to prevent creeping. No cable shall be without fixings and all cable hangers and racks shall be approved by the Engineers before installation.

Where cable routes are subject to numerous changes in level and direction, additional cable hangers shall be provided to satisfactorily negotiate all such obstructions.

Where cables are spaced some distance from a supporting surface, the cable racks shall be separately bolted to additional lengths of channel section, which in turn shall be fixed to brackets bolted and fixed into the structure. LV Cables shall be colour coded throughout their length.

Identification of cables installed within buildings shall be supplied and attached to each cable at intervals not greater than 15 metres and at all conspicuous positions such as within cable trenches, manholes, and at all cable terminations. Characters shall not be less than 3mm high and shall be clearly visible.

Trenching and back filling will be carried out by the electrical Contractor, and the same is responsible for marking out the cable route and for the supervision of the back filling insofar as the prevention of damage to cables in this process is concerned.

Cables in trenches are to be laid at a minimum depth of 0.6 m for LV cables and 0.75 m for 11 kV cables and are to be on a 110 mm bed of sifted soil or sand and a further 100 mm shall be added before laying cable covers in position.

The electrical Contractor shall be responsible for carrying out sand bedding and covering of the trenches.

Where laid in trenches the cables are to be completely protected by interlocking concrete or other approved cable covers indelibly marked "Danger - Hatari", to be supplied and laid by electrical Contractor.

The Contractor shall supply and install concrete marker post at each cable entry into a building, each change of direction, and throughout the length of the cable at intervals not exceeding 50 metres.

The position of all cable marker posts shall be agreed with the Service engineers and Engineers before installation.

After the installation of cables all ducts shall be adequately sealed to prevent the ingress of moisture. The sealing substance shall be of the non-hardening type.

The Contractor's attention is drawn to the fact that all cable size and fuse ratings given in the specification and/or Contract Drawings are based on the use of cables with copper conductors unless specifically specified to the contrary.

The Contractor shall be deemed to have allowed in his prices for supplying sufficient cable lengths of each type and size to complete the system and for making allowance for any additional length for cutting and waste and explicitly studied the existing site to see the conformity of the cable routes to the specified lengths in the Bill of Quantities.

The contractor shall allow for the sum to cater for the builder's work in so far as is concerned for excavation of any cable trench and/or making good finish to the existing building.

In the event that alterations to the system cable routes become necessary the Contract Drawings will be revised and any adjustments in lengths shall be measured thereof from and a variation order will be issued to the Contractor based on the rates in the bills of quantities.

The system shall be firmly supported on ceiling or wall as recommended by the manufacturer and shall maintain a minimum clearance of 2.5 above floor level. The Contractor shall attach his proposal and a breakdown of all components forming the system on tendering.

PVC, SWA, PVC CABLES

PVC sheathed multi-core cables shall have solid copper conductors and shall be 600/1000 volt grade, manufactured in accordance with B.S 6346. An approval system of compression terminations as recommended by cable manufacturer shall be used. Cable sizes and application shall be as indicated on particular drawings.

11.2.1 MV Cables

Cables shall be of XLPE insulating medium non-armoured, designation N2XSE2Y Standard DIN VDE 0273 or IEC 502 capable to withstand lightning impulse of 75kV IEC 71-1 and shall be of three cores. Inner live conductive part shall be of copper strands with cross sectional area as shown on drawings. Ends termination shall be made of heat shrinkable materials suitable for indoor 33000V insulation level.

Connection to other live conductive part shall be through appropriate compression copper lugs.

11.2.2 LV Cables

These shall be of XLPE insulating medium or equivalent, non armoured, designation N(A) 2XY Standard DIN VDE 0272 capable to withstand highest equipment voltage of 1200V at 50Hz, at 95°C and they shall be single core or multicore as specified in the bill of quantities.

Inner live conductive parts shall be of copper strands.

End terminations shall be of direct crimp on method while connections to other live conductive parts shall be through compression copper lugs of appropriate sizes.

12 WIRING

Wiring shall be carried out in an approved type of PVC insulated single core or multi-core copper conductor cable.

The colours of the cores shall comply with the colour code requirements of the IEE Regulations.

Under no circumstances shall it be permitted to draw cable into an incomplete section of the conduit installation. The wiring shall be carried out in the looping-in principle. All joints shall be made at the terminals of main switches, and socket outlets, etc, and fixed apparatus only. No joints shall be made in boxes unless approved.

The cable shall be run in the conduit so as not to exceed the capacities as set out in the IEE Regulations (15th Edition) with current amendments. Where such situation cannot be achieved surface wiring shall be implemented to the approval of the Engineers.

Where fittings and accessories require earthing, an earth continuity conductor shall be run through the conduit. The earth continuity conductor shall be a bare copper wire of minimum size 2.5mm² and shall be continuous between terminals. All metal boxes shall be equipped with an earth terminal. Each final sub-circuit that is required to be earthed shall be provided with its own individual earth continuity conductor, which shall be run from a terminal on the earth bar in the distribution board or consumer's control unit protecting the particular final sub-circuit. Attention is drawn to the requirements to install earth continuity conductors when plastic conduit system are used. The load and return conductors of the same circuit or circuits shall, in all cases, be drawn in the same conduit (note that the final sub-circuits are already in place but it will be the duty of the contractor to connect to the Engineers satisfaction the final sub-circuit in the DBs to their proper functioning).

13 CONDUITS, TRUNKING AND ASSOCIATED FITTINGS

13.1 GENERAL

Surface conduit shall be run in square symmetrical lines and shall be marked on site for approval before installation. Conduits shall be fixed by means of distance saddles spaced at not more than 1.2 m (for 20 and 25 mm diameter conduit) and 1.5 m for larger sizes and steel conduits and 0.7m for PVC conduits. Surface conduits shall also be fixed on both sides of all boxes at a distance not greater than 0.9m. Surface conduit shall also be fixed on both side of all boxes at a distance not greater than 0.2 m, the box itself being securely fixed.

Where such an arrangement of boxes and saddles would prove to be both unsightly and unnecessary, short lengths of conduit not exceeding 0.9m in length between boxes need not be secured further than by connection to the adjacent boxes.

Conduits shall be installed in such a manner as to prevent interference with other services and shall be kept at least 150mm clear of gas or water pipes and heat in excess of 70°C.

Where conduit runs enter specified areas requiring flameproof equipment, barrier boxes shall be inserted immediately before the conduit enters the flameproof area. All Conduits installed within this areas shall be solid drawn galvanized, as shall be conduit fittings and accessories and Buxton Certified as suitable for Group II hazards. Equipment shall comply with B.S.229, B.S. 889, and Code of Practice C.P. 1003.

13.2 STEEL CONDUITS - STEEL TRUNKING

Conduits shall be of heavy gauge class B welded to British Standard Specification B.S.31. In no case will conduit smaller than 20 mm diameter be used on the works. Conduits installed within buildings shall be PVC heavy gauge except where specified otherwise. Where installed externally or in damp conditions they shall be galvanized. Conduit fittings, accessories or equipment used in conjunction with galvanized conduits shall also be galvanized or otherwise as approved by the Engineer.

Metal Trunking shall be fabricated from galvanised steel of not less than 18 swg. All section of trunking shall be

rigidly fixed together and attached to the framework or fabric of the building at intervals of not less than 1.2 m.
Joints in trunking shall not overhang fixing points by more than 0.5 m.

All trunking shall be made electrically continuous by means of galvanised flat iron strips.

All trunking fittings (i.e. bends, tees, etc.) shall leave the main trough completely clear of obstruction and continuously open except through walls and floors, at which points suitable fire resisting barriers shall be provided as may be necessary. The inner edge of bends and tees shall be chamfered where cables larger than 35 mm² are employed.

Where trunking passes through ceilings and walls the cover shall be solidly fixed to 150 mm either side of ceilings and floors and 50 mm either side of walls.

Screws and bolts securing covers to trunking or sections of covers together shall be arranged so that damage to cable cannot occur either when fixing covers or when installing cables in the trough.

Where trunking is used to connect switchgear or fuse boards, such connections shall be made by trunking fittings manufactured for this purpose and not by multiple conduit couplings.

Where vertical sections of trunking are used which exceed 4.5 m in length, staggered tie off points shall be provided at 4.5 m intervals to support the weight of cables.

The number of cables to be installed in trunking shall be such as to permit easy drawing in without damage to the cables, and shall in no circumstances be such that a space factor of 50% is exceeded. Conduit and trunking shall be mechanically and electrically continuous. Metal conduit shall be tightly screwed between the various lengths so that they butt at the socketed joints. The internal edges of conduit and all fittings shall be smooth, free from burrs and other defects. Oil and any other insulating substance shall be removed from the screw threads. Where conduits terminate in fuse-gear, distribution boards, adaptable boxes, non-spouted switchboxes, etc., they shall, unless otherwise stated, be connected thereto by means of smooth bore male brass bushes, compression washers and sockets. All exposed threads and abrasions shall be painted using galvanising paint for galvanised tubing immediately after the conduits are erected. All bends and sets shall be made cold without altering the section of the conduit. The inner radius of the bend shall not be less than four (4) times the outside diameter of the conduit. Not more than two right angle bends will be permitted without the interposition of a draw-in box. Where straight runs of conduit are installed, draw-in boxes shall be provided at distances not exceeding 15 m. No tees, elbows, sleeves, either of inspection or solid type, will be permitted.

Conduit shall be swabbed out prior to drawing in cables, and they shall be laid so as to drain off all condensed moisture without injury to end connections.

All adaptable boxes and lids of the same size shall be interchangeable.

Boxes used on surface work are to be tapped or drilled to line up with the conduit fixed in distance type saddles allowing clearance between the conduit and wall without the need for setting the conduit.

Where run on the surface, unpainted fittings and joints shall be painted with two coats of oil bound enamel applied to rust and grease free metalwork.

13.3 NON METALLIC CONDUITS - TRUNKINGS

Conduit shall be best quality new super high impact grade heavy gauge Class "A" rigid PVC unplasticised conduit. The conduit shall be bent and formed strictly in accordance with the manufacturer's instructions. Small sizes i.e. 20 mm diameter and 25 mm diameter shall be bent cold by inserting the correct size bending spring. It is essential for

right angle bends that the conduit is bent past 90° to allow for "spring back". Large sizes of conduit shall be pre-heated before inserting rubber cord to prevent kinking. Conduit badly formed or bent, or damaged in any way, shall not be used.

Unless it is clearly specified or shown on the drawing, the method of installing conduit shall be subject to the approval of the Engineers.

13.4 FLEXIBLE CONNECTIONS

All flexible connections shall be made by armoured cable.

Flexible conduit will not be accepted in this contract. The armoured cable shall be secured at each end by means of proper purpose made glands for armoured cables.

13.5 CABLE CARRIER TRAY SYSTEM

13.5.1 Standards

The cable carrier tray system shall comply with all relevant requirements of the 15th edition of the IEE wiring regulations.

13.5.2 Description

The cable carrier system shall be of open wire grid structure to allow cables to be routed in and out of the tray in any direction.

The tray shall be supplied in lengths, which can be easily cut, bent, formed and jointed on site.

Cable tray sections required for changes of direction; sizes and level shall be fabricated on site using bolt cutters by simply clipping; bolting or splicing the pieces together.

13.5.3 Selection

The sizes for the cable trays shall be determined by the contractor based on the total cross sectional areas of the cables being carried by the tray in a particular area and the resulting weight of the cables per metre run based on manufacturer recommendations. The contractor shall allow 10% for future cables.

Cable trays shall be of sizes shown on drawings.

13.5.4 Installation

The cable tray together with all the appropriate installation tools and accessories e.g. clip on couplers, splice plates, bends, tees, cross overs, reducers, wall mounting brackets, threaded rods, brackets, channels, bolts etc. shall be supplied and installed by the contractor.

The cable tray shall in most cases be ceiling suspended/beam mounted except in areas where it is not possible to do so.

Adequate cable tray supports shall be provided as recommended by the manufacturer.

14 EARTHING AND BONDING

14.1.0 EARTHING AND EQUIPOTENTIAL CONNECTIONS

The earthing conductors, clamps, connectors, terminals and connections shall be installed to ensure that the system earthing is in accordance with the requirements of TANESCO or BS 7430:1991.

Non live conductors and parts designed to become live during operation, all metal work forming part of or associated with electric installation shall be earthed or protected as required by BS 7430:1991

Each apparatus shall be earthed through the shortest direct route with minimum joints. Earthing by series of conductors looped from an earth terminal on one equipment to another shall be prohibited.

The disconnection of protective conductor or conductors from any equipment shall not isolate another equipment from the earth grid. The protective conductors shall be installed such that all equipment shall be connected to earth grid during maintenance and servicing.

14.1.1 EARTHING AND PROTECTIVE CONDUCTORS

The conductors shall be made of pvc insulated stranded copper wire or annealed high conductivity copper tape. The cross section areas shall be as indicated in the drawing. Each downward earth conductor shall be protected by conduit from ground level to 1500mm above the ground. Earth conductors shall be firmly clipped to wall. No any Cu/Al joints shall be allowed in the system.

Under no circumstance shall conductors be run through plates, sections, conduits or pipes of iron, steel or other ferromagnetic materials which completely surround them unless all live conductors which these protect pass through the full length of such apertures, conduits pipes etc.

Where support for a conductor is required, a steel channel or a non-magnetic support or insulated pipe shall be used.

There shall be one conductor to each circuit or cable where the equivalent cross section and measured resistance values can be maintained at adequate levels. The sheaths (including armouring of cables) and metal conduits shall be bonded to earth potential.

14.1.2 PRINCIPAL EARTH CONTINUITY CONDUCTORS AND JOINTS

A principle protective conductor shall be run from the main electrical intake position in one unbroken length to each distribution board, and hence to any major equipment fed there from. Branch protective conductors shall be jointed and sweated or attached in other permanent and approved manner to the principal protective conductor as required.

In any run of cable trunking exceeding one length of trunking shall be provided. Each individual length of trunking shall be earthed to this conductor. Straight through joints shall not be permitted unless the situation is unavoidable and approved by the engineer. Principal and Branch earth Conductors shall be laid out so that any earth leakage or fault current passes to earth through the shortest reasonable length of conductor and the minimum number of joints.

Branch conductors shall be properly jointed into principal conductors and the joints sweated solid, or made in other approved manner. Where earth clips are required, they shall be of substantial construction in copper or galvanised steel. Clips shall be provided with washers designed to secure the earth continuity conductor.

14.1.3 BRANCH PROTECTIVE CONDUCTORS AND BONDING

Each equipment required to be earthed shall be connected to the principal protective conductor directly or via a branch conductor. No branch protective conductor (other than one incorporated in a plastic sheathed cable by the manufactures or the earth core of a multi core flexible cord) shall have a cross-sectional area of less than 4sq.mm copper or equivalent.

In all cases where plastic conduits are used a protective conductor shall be drawn into it in addition to circuit wiring. The protective conductor shall run from the distribution board to the farthest point in each circuit directly and without any break or looping point.

Bonding shall be provided where necessary to ensure continuous electrical conductivity across conduit and trunking joints. Bonding metal pipes shall be with copper earth clips provided with washers to secure the connection.

14.1.4 EARTH TERMINATIONS

The earth termination from the transformer neutral point shall be copper plated steel rods driven to ground at not less than 1 metre below ground level. The earth wire of 95 sq. mm shall be connected to the said rods by copper clamps supplied with electrodes.

Other earth terminations shall be of solid copper or copper-clad steel not less than dia.15mm in sections of 1500mm. Joints between lengths shall be made by internal coupling pieces and shall make good copper to copper contact between lengths. A hard steel point shall be connected to the leading end of the first rod driven at each termination. A half-hard steel driving head shall be used to protect the upper end of the rod while driving. Rod electrodes shall be driven into the ground with the top set 100mm below finished ground level.

The earth dispersion resistance shall be not more than $1.0 \cdot \text{ohm}$ at the socket to the combined earth grid by earth plates and shall be not more than $10 \cdot \text{ohm}$ at the socket to earth grid for lightning discharge earth terminal.

14.1.5 EARTHING CONDUCTOR AND CONNECTIONS

The earth wire or tape shall be secured to the rod with an approved clamp. The upper end of each earth rod shall be housed in a concrete lined pit with a concrete slab cover. The house may be of the prefabricated cast iron type with "EARTH" written on the cover.

When required by the drawings or by variation order, base copper tapes on bare copper solid conductors shall be used as earth terminations. These shall have a cross-section of not less than 95mm^2 and will be coiled and assembled into mats or laid at length as instructed. The earth terminations shall contain no buried joints other than those required by the drawings and shall be buried at the depths specified, but normally not nearer the surface than 100cm.

Water carrying pipes shall not be used as earth terminations except when authorised by the engineer. Where more than one earth termination is required the earth leads from these will be brought to a convenient point and bolted individually to a common bar, which will form part of the main earth lead. Where multiple earth terminations are used, the spacing between these will normally be twice the maximum depth of the terminations.

14.1.6 TEST POINTS

There shall be a test point in every down lead of a lightning protection system, and in every earth lead to multiple earth terminations where they cannot otherwise be disconnected for testing individually.

Test points shall be provided 150cm from ground level in all down tapes. They shall be a screw down type test clamp of an approved pattern and the ends of the tape at this point shall be tinned. Both ends of tape shall pass through both sides of the test clamp. Special requirement will be stated in the particular specification.

15 INSPECTION, TESTING AND COMMISSIONING

The inspection, testing and commissioning of all works under the project shall be carried out in accordance with the acceptable TANESCO procedures.

A detailed test procedures document shall be prepared by the Contractor, based on the requirements on the TANESCO Inspection and Certificate Manual, and submitted for approval by the Engineer before commencement of any testing. All tests shall be run in accordance with the agreed procedure and recorded as required.

Where commissioning procedures are contained within the Inspection and Certification Manual, these shall be adhered to. Where procedures do not exist or the commissioning is subject to specialist vendor commissioning, then the procedure to be adopted shall be developed and agreed with the Engineer.

The provision of suitable test equipment to enable testing and commissioning to be carried out shall be the responsibility of the Contractor. Where the contractor does not have the necessary equipment, he shall arrange its hire at his own cost to prevent any delay to the testing and commissioning programme.

The Contractor shall not submit equipment for testing or inspection until he has completed his own inspection and remedied any faults.

Before formal testing commences, the Contractor shall ensure that a complete set of documentation is available which accurately reflects the installation. This documentation shall be for the use of system commissioning.

The Contractor shall be responsible for demonstrating the satisfactory operation of all equipment within the scope of works, and the provision of all consumable equipment required for testing and commissioning.

16. SPECIFICATION FOR A RISING ARM BARRIER EB450 PARKING BARRIER

A. Requirement

This document is to be used to specify the physical and operational requirements of the EB450 Parking Rising Arm Barrier.

The EB450 Parking Barrier is an ideal automatic car park barrier for medium to high usage. EB450 Parking Barrier can easily integrate with revenue collection and access control systems, suited to standard road widths and is recommended for parking and traffic control.

B. Barrier Unit

B.1 Barrier Construction

The steel cabinet is shot blasted, primed and powder coated (RAL 1007 other options available) Barrier Arms shall be of rectangular extruded aluminium 76 x 38mm white powder coated with red fasal strips, Max length 4m.

B.2 Barrier Height

The height of the Barrier Arm when in the closed (lowered) position, as measured from the top of the Arm frame to the road surface, will be a minimum of 900mm in accordance with BS6571 part 4.

B.3 Barrier Width

The width of the Barrier Arm will be a maximum of 4 Metres in length. B.4 Finish
The Barrier Cabinet and Boom Arm are to be finished with an anti-corrosion paint system

C. Technical Details

C.1 Operation

The heavy duty motor plate supports the 100% duty cycle permanent 4 pole T.E.F.C. motor, which powers the sinusoidal drive mechanism via an industrial grade low ratio gearbox. Two heavy duty bearings secured to the motor plate support the drive shaft, this having two machined cams to activate the adjustable limit switches to control the boom travel.

C.2 Motor

The heavy duty motor used will be a single phase, 230v unit with a power rating sufficiently sized to allow for continuous operation (100% duty cycling).

The motor should be protected by a thermal overload cut out device.

Procurement Specification – EB450 Parking Barrier Ver.2014

2

C.3 Power fail conditions

A winding handle will be provided to enable the manual raising and lowering of the Barrier Arm in the event of electrical power failure.

C.4 Casing

The Barrier Cabinet will have fully lockable doors to the front of the cabinet for ease of access.

D. Control System

D.1 Voltage

The main system input voltage is to be 230v 1phase 50-60Hz supply with the control system operating at 24V SELV provided from an internally mounted power supply.

D.2 Casing

The control system will be located inside the main Barrier Cabinet and should give easy access to all electrical components for connection, maintenance and programming, including the power isolation switch.

E. Access Control

E.1 System Interfacing

The control system will be capable of accepting inputs from every major type of access control including but not limited to - Push buttons to raise, lower and emergency stop, swipe card readers, proximity card readers, inductive loop systems, RF transmitter equipment and biometric readers.

The system must be able to interface with other equipment (by other manufacturers) to create an interlock.

F. Performance

F.1 Manufacturers Experience

The manufacturer of the Rising Arm Barrier will have a minimum of 20 years' experience in the manufacture, installation and maintenance of this type of equipment and must be a member of a recognized Professional Trade Association.

F.2 Speed of Operation

Standard operation speed will be 2.4 seconds for either raising or lowering.

In normal operation the Rising Arm Barrier shall be capable of 100% duty cycling and must have been satisfactorily factory tested in a single continuous run of 1,200 cycles.

Technical summary

1. Electro-Mechanical drive unit 2. 100% duty cycling 3. Fast acting 2.4 sec 4. Modular design 5. Multi-process coating specification 6. Winding handle for manual operation 7. Power requirement 230V single phase 50Hz 6A 8. Operating temperature range available: -25°C - +70°C 8. Cabinet-305mm W x 460mm D x 1135mm H 9. Barrier Arm Length Max 4m

G. QA

G.1 Equipment Testing

The manufacturer will have fully tested the Rising Arm Barrier and Control System prior to dispatch. These tests will be fully traceable to each unit dispatched and must be transparent.

The QA testing will include dimensional checks, workmanship quality and finish as well as full operational testing. Once fully tested, the Rising Arm Barrier will be fitted with a nameplate bearing the manufacturers details, serial number and test date.

The manufacturer's quality system must be certified to ISO 9001.

VII. DRAWINGS

AMENDMENTS

No.	Date:	Revision:

NOTE:

1. Use only the written dimensions.
2. All the dimensions are in millimeters.
3. Contractor to check and verify all dimensions on the site.
4. Any discrepancies to be reported to the Architect immediately.

CLIENT DETAILS:

TANAPA
P.O. BOX 3134
ARUSHA.

PROJECT TITLE:

PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO
BE IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

CONSULTANTS:

STAMP:

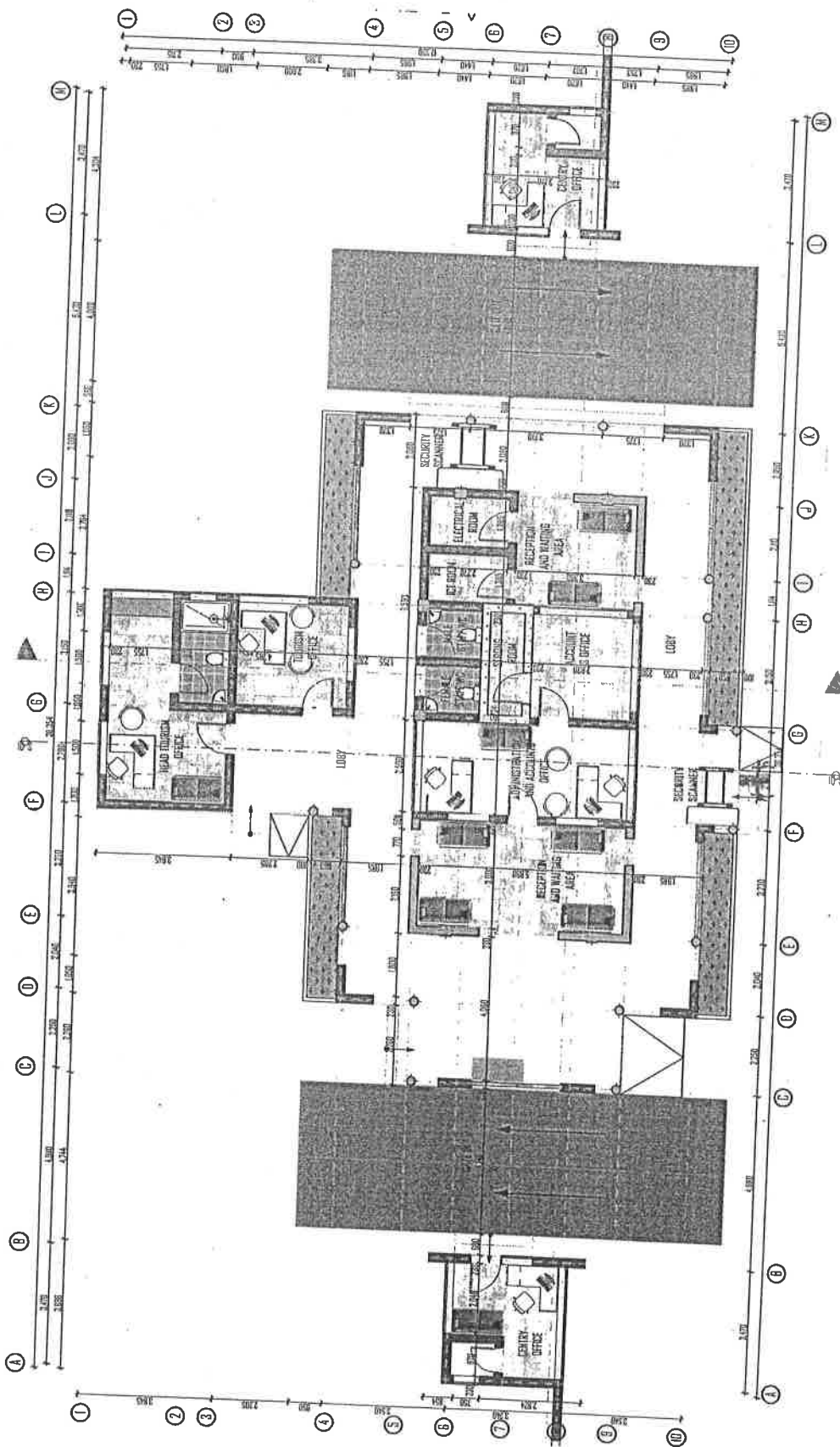
Drawing Title: GROUND FLOOR PLAN

Designed by: DR. SIMON MPYANGA & ANDAMBIKE

Checked by: DR. SIMON MPYANGA

Drawn by: DR. SIMON MPYANGA & ANDAMBIKE

DATE: Drawing No: SCALE:



No.	Date:	Revision:

NOTE:

1. Use only the written dimensions.
2. All the dimensions are in millimeters.
3. Contractor to check and verify all dimensions on the site.
4. Any discrepancies to be reported to the Architect immediately.

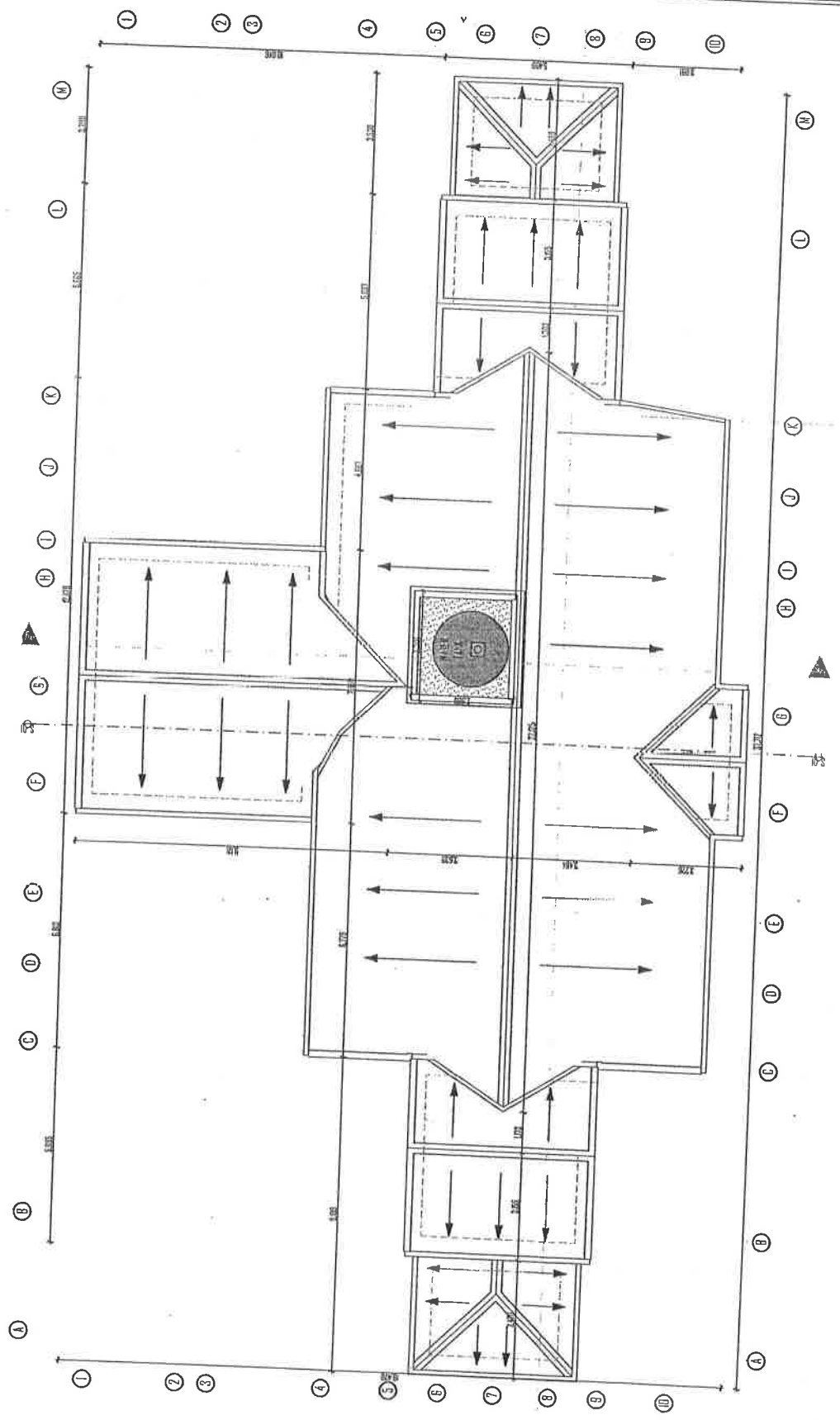
CLIENT DETAILS:
 TANAPA
 P.O.BOX 3134
 ARUSHA.

PROJECT TITLE:
 PROPOSED NATIONAL PARKS
 REVENUE COLLECTION GATES TO
 BE IMPLEMENTED TO DIFFERENT
 NATIONAL PARKS.

CONSULTANTS:

STAMP:

Drawing Title: ROOF PLAN
Designed by: DR. SIMON MPYANGA & ANDAMBIKE
Checked by: DR. SIMON MPYANGA
Drawn by: DR. SIMON MPYANGA & ANDAMBIKE
DATE: Drawing No: SCAI F.



AMMENDMENTS

No.	Date:	Revision:

NOTE:

1. Use only the written dimensions.
2. All the dimensions are in millimeters.
3. Contractor to check and verify all dimensions on the site.
4. Any discrepancies to be reported to the Architect immediately.

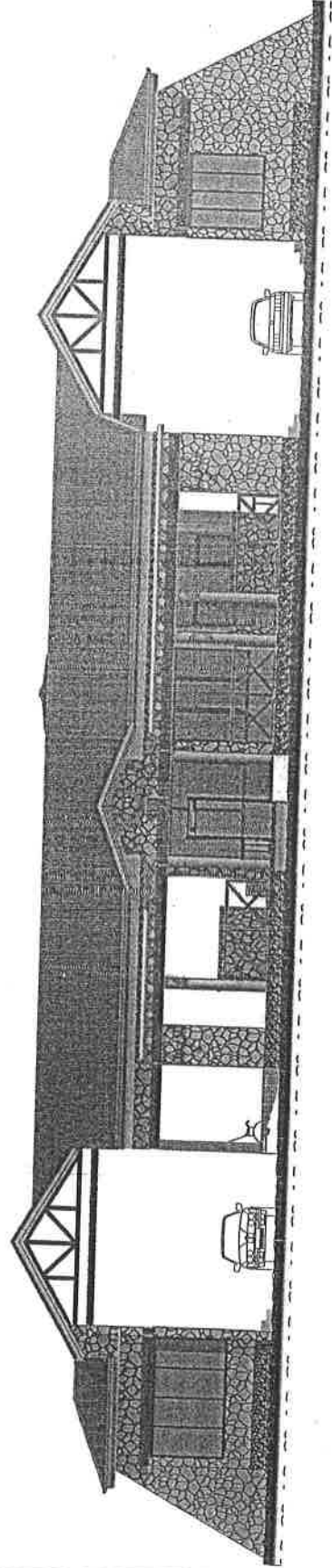
CLIENT DETAILS:
TANAPA
P.O.BOX 3134
ARUSHA

PROJECT TITLE:
PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO
BE IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

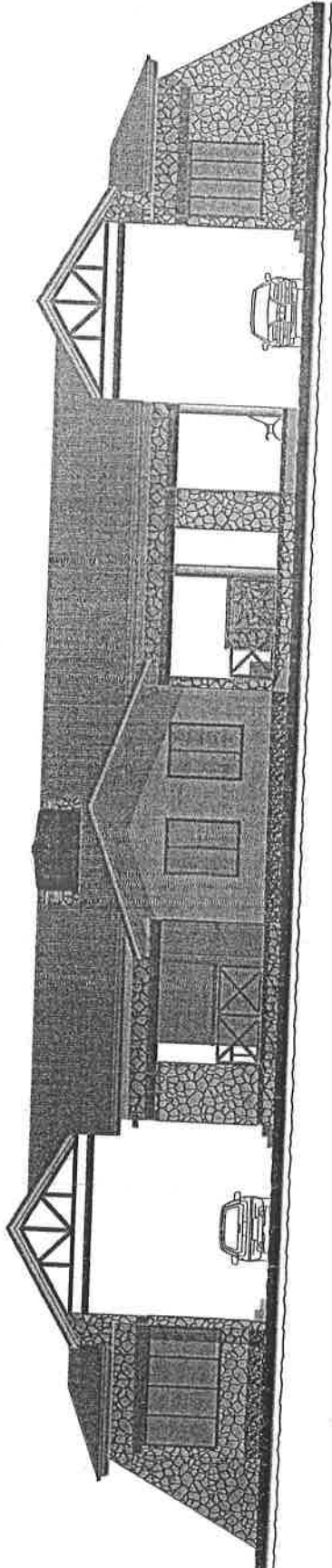
CONSULTANTS:

STAMP:

Drawing Title: ELEVATION
Designed by: DR. SIMON MPYANGA & ANDAMBIKE
Checked by: DR. SIMON MPYANGA
Drawn by: DR. SIMON MPYANGA & ANDAMBIKE
DATE: Drawing No: SCAI F-



FRONT ELEVATION



REAR ELEVATION

AMMENDMENTS

No. Date: Revision:

No.	Date:	Revision:

NOTE:

1. Use only the written dimensions.
2. All the dimensions are in millimeters.
3. Contractor to check and verify all dimensions on the site.
4. Any discrepancies to be reported to the Architect immediately.

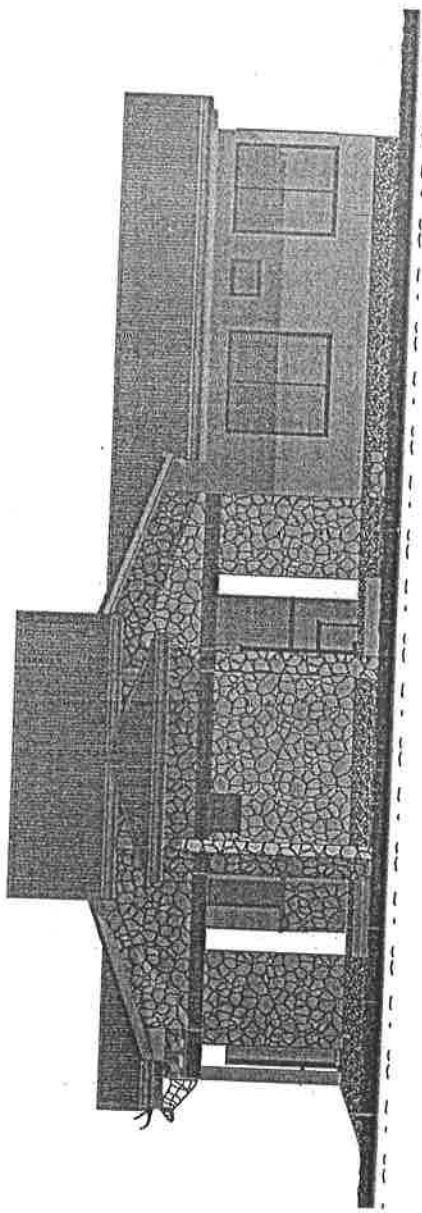
CLIENT DETAILS:
TANAPA
P.O.BOX 3134
ARUSHA,

PROJECT TITLE:
PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO
BE IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

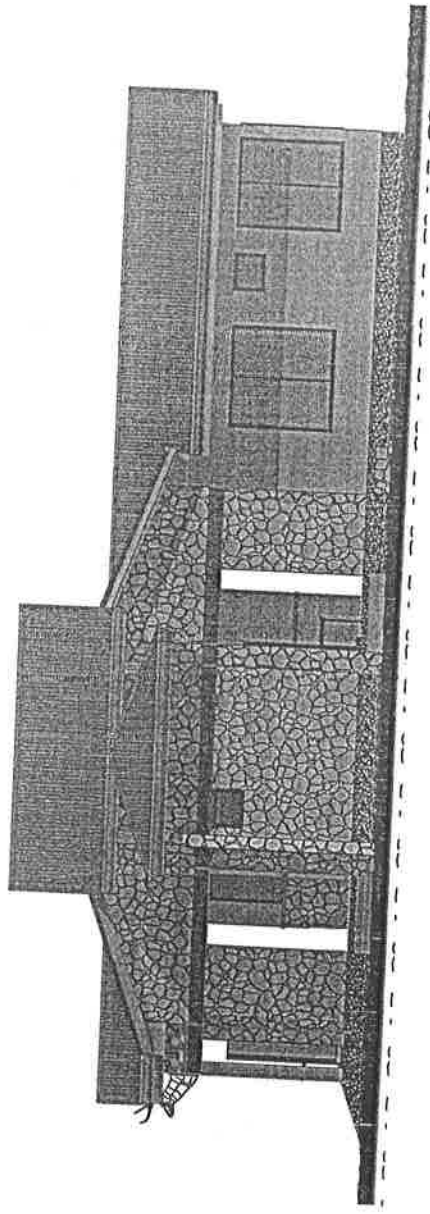
CONSULTANTS:

STAMP:

Drawing Title: ELEVATION
Designed by: DR. SIMON MPYANGA & ANDAMBIKE
Checked by: DR. SIMON MPYANGA
Drawn by: DR. SIMON MPYANGA & ANDAMBIKE
DATE: _____



LEFT ELEVATION



RIGHT ELEVATION

AMENDMENTS

No.	Date	Revision

NOTE:

1. Use only the written dimensions.
2. All the dimensions are in millimeters.
3. Contractor to check and verify all dimensions on the site.
4. Any discrepancies to be reported to the Architect immediately.

CLIENT DETAILS:
 TANAPA
 P.O.BOX 3134
 ARUSHA.

PROJECT TITLE:
 PROPOSED NATIONAL PARKS
 REVENUE COLLECTION GATES TO
 BE IMPLEMENTED TO DIFFERENT
 NATIONAL PARKS.

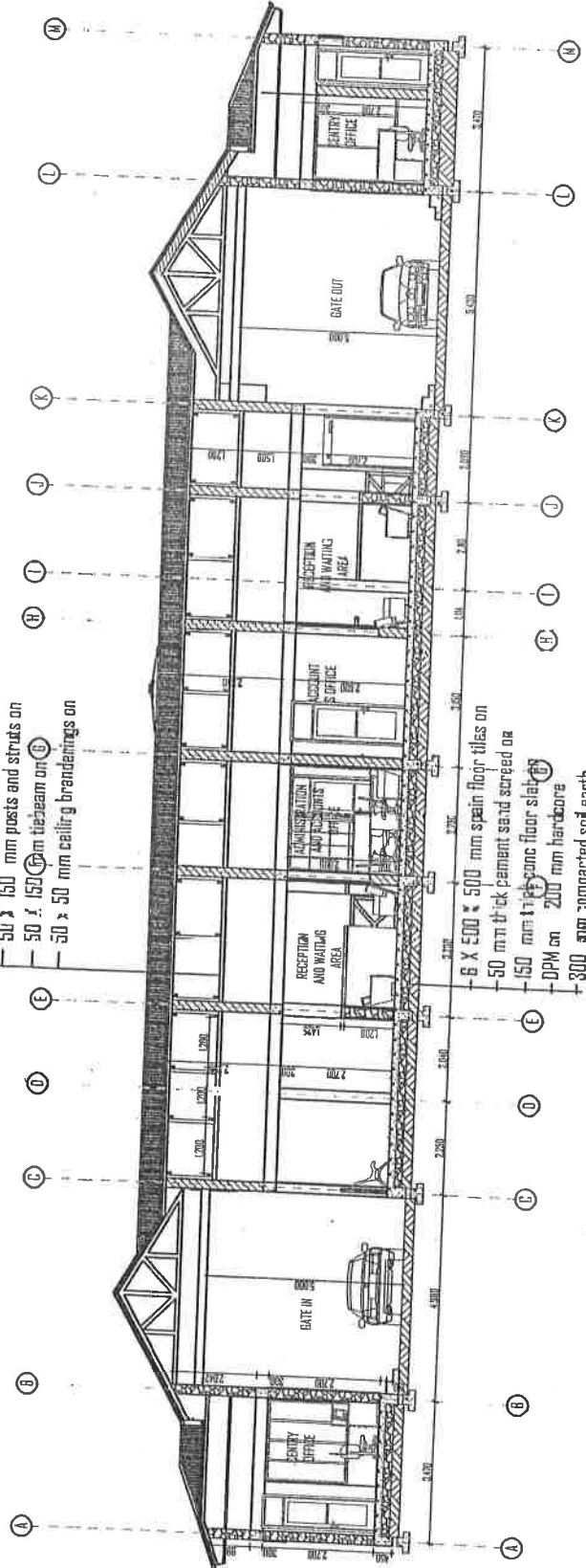
CONSULTANTS:

STAMP:

Drawing Title: SECTION S-01
Designed by: DR. SIMON MPYANGA & ANDAMBIKE
Checked by: DR. SIMON MPYANGA
Drawn by: DR. SIMON MPYANGA & ANDAMBIKE
DATE: _____ **Drawing No.:** _____

Roof Angle 20°
 F box profile roofing sheets on
 50 x 75 mm purlins on
 50 x 150 mm rafters on
 50 x 150 mm posts and struts on
 50 x 150 mm tiebeam on
 50 x 50 mm ceiling bracing on

6 x 500 x 500 mm Spain floor tiles on
 50 mm thick cement sand screed on
 150 mm thick concrete floor slab on
 DPM on 200 mm hardcore
 300 mm compacted soil earth



AMMENDMENTS

No.	Date:	Revision:

NOTE:

1. Use only the written dimensions.
2. All the dimensions are in millimeters.
3. Contractor to check and verify all dimensions on the site.
4. Any discrepancies to be reported to the Architect immediately.

CLIENT DETAILS:

TANAPA
P.O. BOX 3134
ARUSHA.

PROJECT TITLE:

PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO
BE IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

CONSULTANTS:

STAMP:

D-01

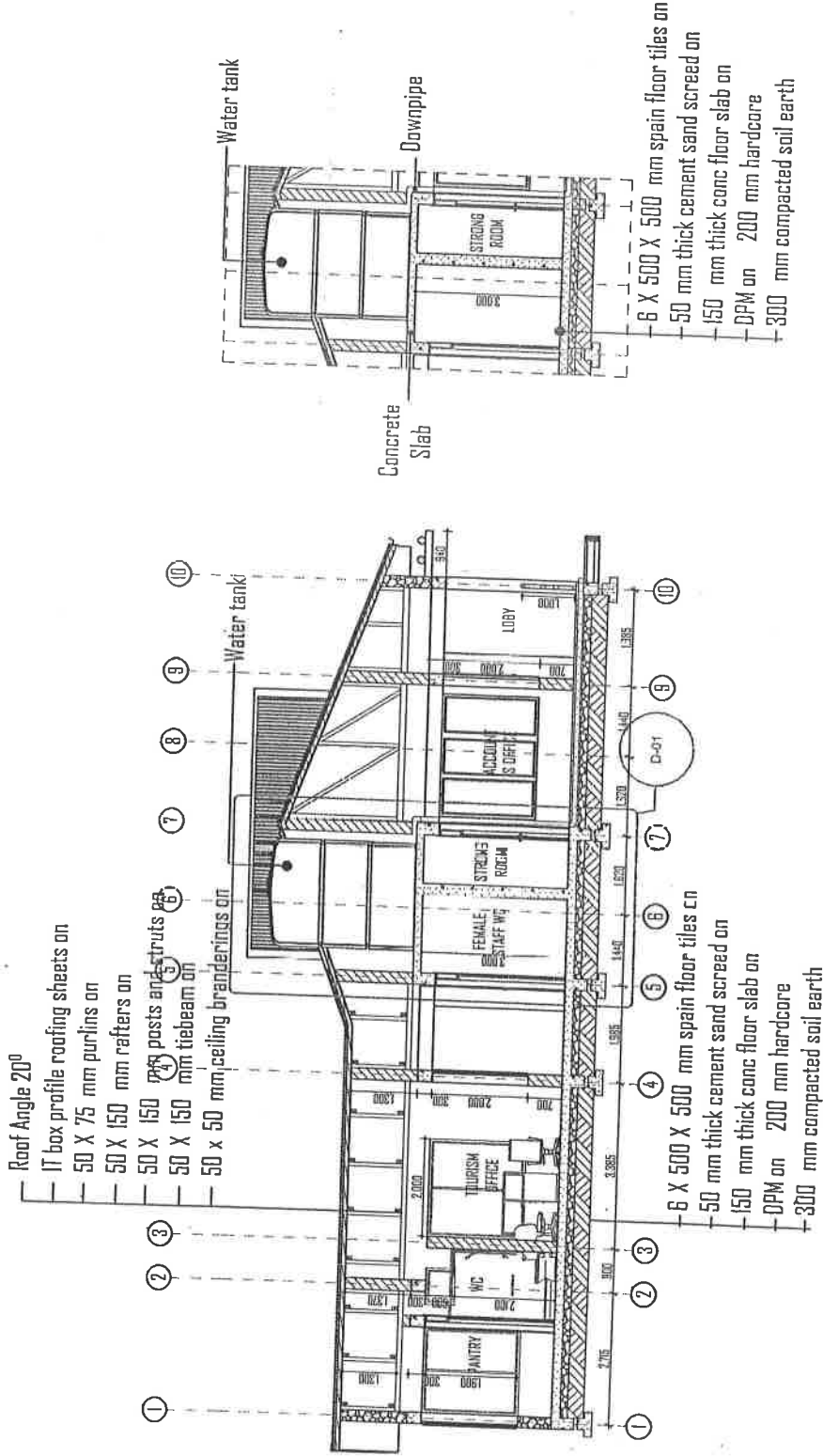
Drawing Title: SECTION

Designed by: DR. SIMON MPYANGA & ANDAMBIKE

Checked by: DR. SIMON MPYANGA

Drawn by: DR. SIMON MPYANGA & ANDAMBIKE

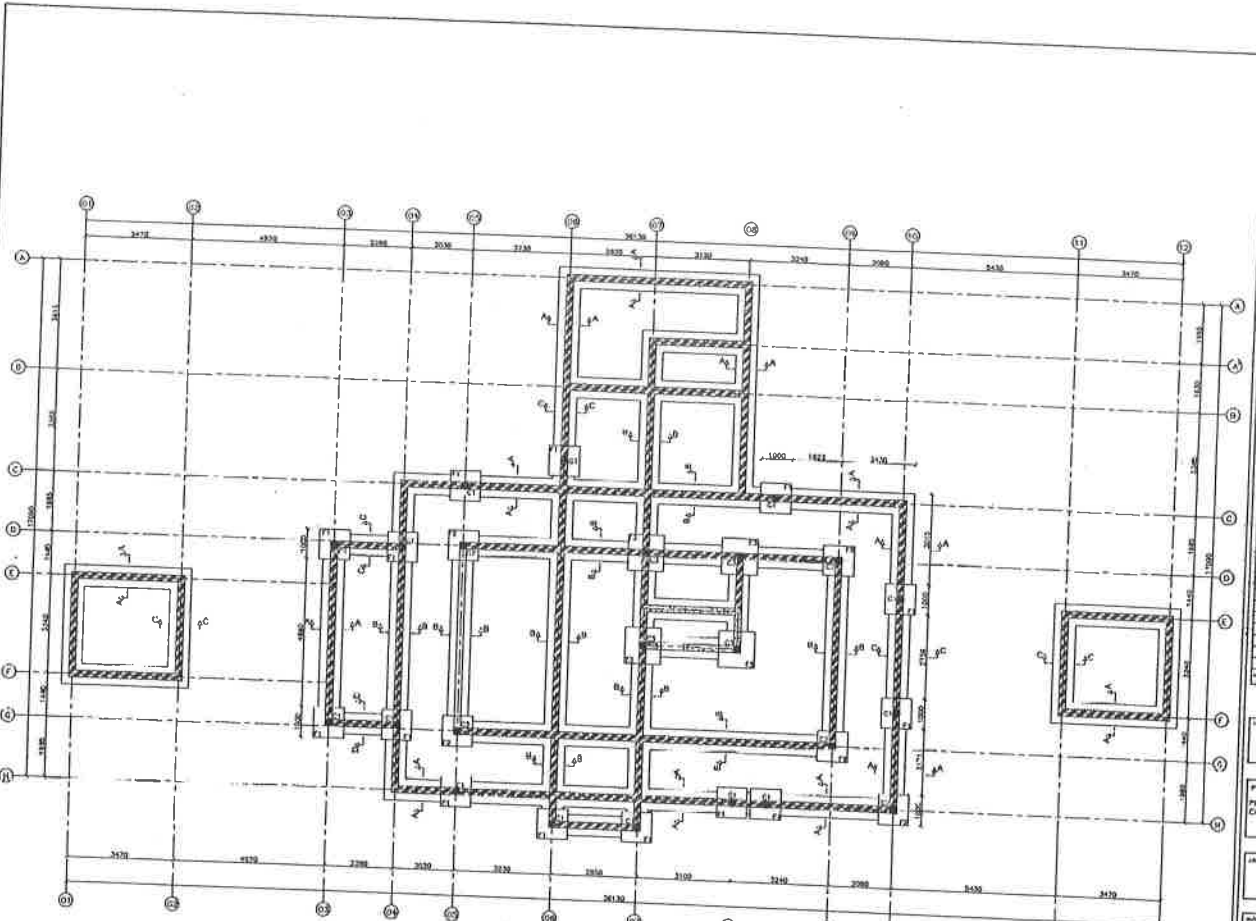
DATE: Drawing No. | SCALE:



**PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED
TO DIFFERENT NATIONAL PARKS**

STRUCTURAL DRAWINGS

DATE: 02nd, NOVEMBER, 2021



FOUNDATION STRUCTURAL LAYOUT PLAN
SCALE 1:50

- NOTES**
1. Structural drawings to be read in conjunction with structural, architectural and other special drawings.
 2. All structures are to utilize unless otherwise specified. See notes #1 of drawings to be used for design.
 3. Details of existing foundations depends on conditions and are to be verified according to structural engineer's instructions.
 4. No footing or foundation to be set on soil.
 5. Reinforcement all to be mild steel designated "M" with $f_y = 270 \text{ N/mm}^2$, and high tensile designated "HT" with $f_y = 480 \text{ N/mm}^2$.
 6. Concrete for RC walls to be grade 25 with crushing strength of not less than 25 N/mm^2 .
 7. Full concrete cover to be given 25 (not less than 25).
 8. Sliding control to be of min 1:100 by volume.
 9. Concrete cover to reinforcement: min. (clear) Slabs, 25mm; columns, 25mm; foundations, 35mm.
 10. Reinforcement
 - (1) Casting length of 90 bent binding plates not less than 2 x depth with standard lap casting length not less than 4 x depth.
 - (2) Casting length of 90 standard binding plates not less than 25 x depth with lap casting length of minimum 300 and not less than 25 x depth.

REVISIONS

No.	Date	Description

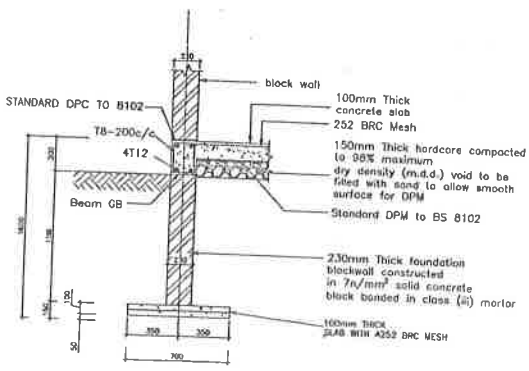
DESIGNED BY:
 CHECKED BY:
 DRAWN BY:
 DATE:

PROJECT:
PROPOSED NATIONAL PARKS REVENUE COLLECTION SALTS TO BE DEMONSTRATED TO EMPLOYMENT NATIONAL PARKS

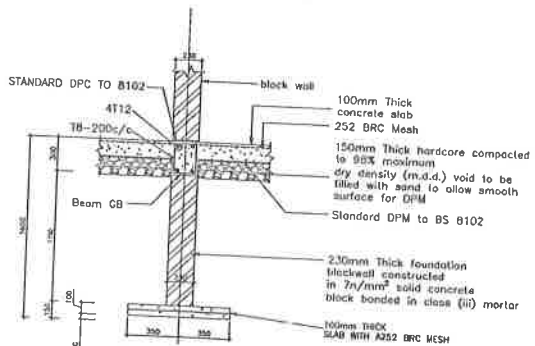
CLIENT:
TANZANIA NATIONAL PARKS POLICE/NTSA ARUSHA

PROJECT NAME:
FOUNDATION LAYOUT PLAN

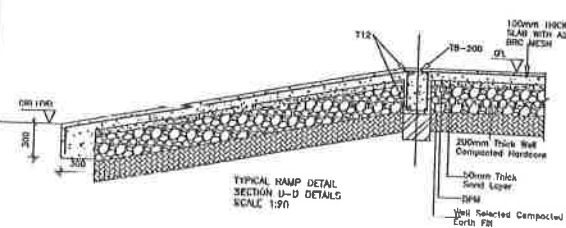
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DATE:	CHECKED BY:	NO.
PROJECT NAME:		
STRUCTURAL		
NO.	DATE:	NO.
STRASVAD		0



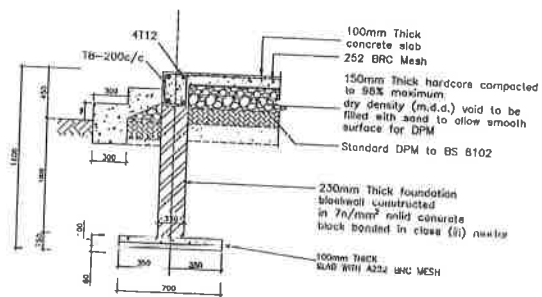
TYPICAL EDGE STRIP SECTION A-A
SCALE 1:25



TYPICAL MIDDLE STRIP SECTION B-B
SCALE 1:25



TYPICAL RAMP DETAIL SECTION U-D DETAILS
SCALE 1:50



TYPICAL STEP SECTION C-C
SCALE 1:25

NOTES

1. Structural drawings to be read in conjunction with respective specification and other associated drawings.
2. All dimensions are to centreline unless otherwise specified. No fixing all of dimensions to be done from average.
3. Depth of working foundations measured at finished level and not be adjusted according to standard engineer's foundation.
4. No loading or foundation to be set on wet.
5. Foundations to be held over suspended 'Y' with a 20mm lead, and high limits suspended 'Y' with a 20mm lead.
6. Concrete to be cured in the open air, with covering strips of wet straw 25mm thick and one inch 15 (15) thick straw.
7. Thick concrete to be set on 100mm thick.
8. Working concrete to be set on 100mm thick.
9. Excavate away to satisfactory level, 20mm thick (20mm) minimum, 20mm diameter.
10. Backfill/Bitumen:
 - (i) Casting depth of 100mm layering shall not be less than 2 1/2mm with 15mm (15mm) thick concrete to be not less than 15mm.
 - (ii) Casting depth of 100mm layering shall not be less than 15 1/2mm with 15mm (15mm) thick concrete to be not less than 15 1/2mm.

ALIGNMENTS

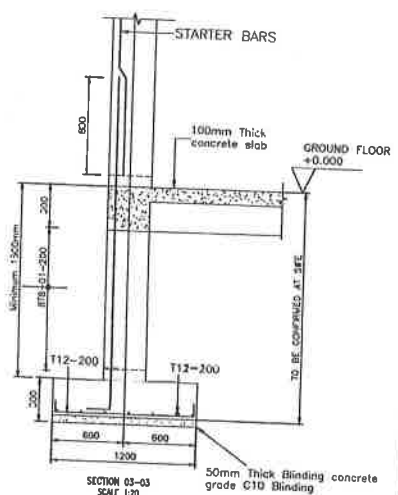
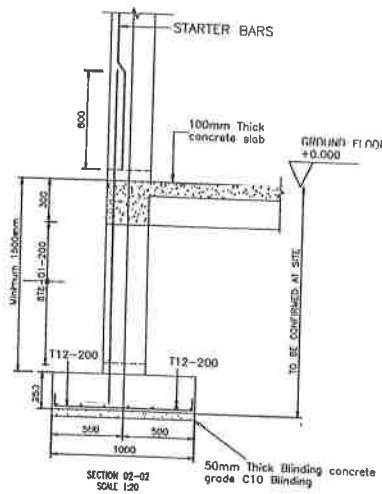
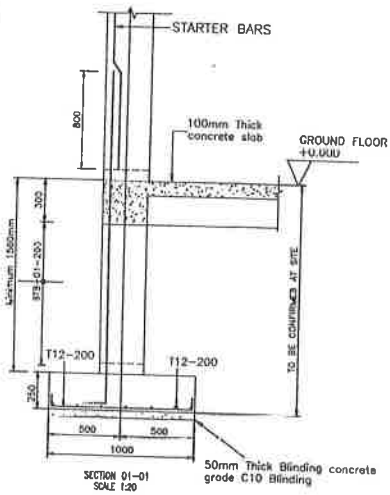
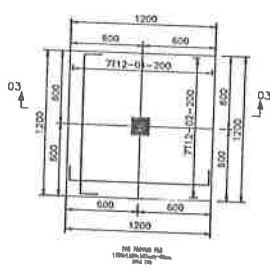
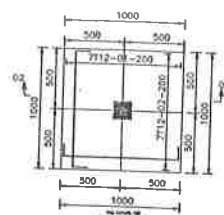
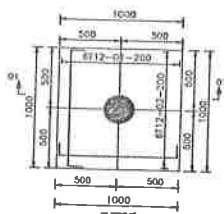
No.	Description	Level

PROPOSED NATIONAL PARKS REVENUE COLLECTION SCHEM TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS

TANZANIA NATIONAL PARKS FUNDING 314 ARUBWA

PLINTH SECTION DETAILS GENERAL ARRANGEMENT

NO. 10	DATE	BY
10/10/2008	10/10/2008	MM KALLUMBI
S T R U C T U R A L		
10/10/2008	DATE	BY
10/10/2008	10/10/2008	MM KALLUMBI



- NOTES**
- Structural drawings to be read in conjunction with respective architectural and other specialist drawings.
 - All dimensions are in millimeters unless otherwise specified. No scaling off of dimensions to be done from drawings.
 - Depth of setting foundations depends on conditions and may be adjusted according to structural engineer's instructions.
 - No footing or foundation to be set on soil.
 - Reinforcement shall be set and maintained "in situ" by $+250 \text{ N/mm}^2$ and high tensile compressed "C" wire $19 \text{ mm} \times 200 \text{ N/mm}^2$.
 - Concrete for RC slabs to be grade 30, (min crushing strength of not less than 200 N/mm²).
 - Block concrete grade to be grade 15 (min 15 N/mm²).
 - Blinding concrete to be of min 1:1:2 by volume.
 - Formwork shall be reinforced with 20mm x 20mm x 25mm sections, along boundaries.
 - Blockwork/Brickwork
 - Cracking strength of 16 N/mm² based on total block weight, except min. for block 12 N/mm².
 - Cracking strength of 16 N/mm² based on total block weight, except min. for block 12 N/mm².

AMENDMENTS

No.	Description	By	Date

PROJECT: PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS

CLIENT: TANZANIA NATIONAL PARKS P.O. BOX 3194 ZILWAJI

DESIGN: PAD FOOTING FC DETAILS SHEET 01 OF 06

DATE: 2023

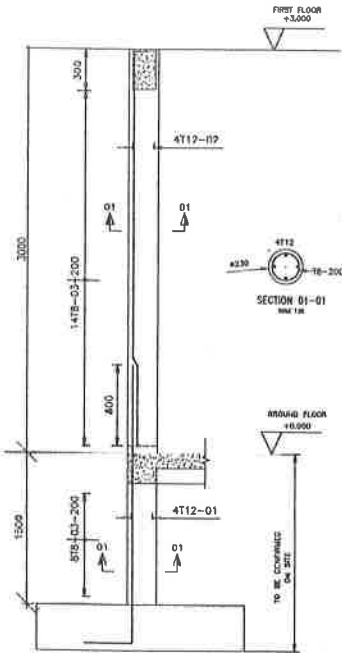
DRAWN BY: M. KILIMBE

CHECKED BY: M. KILIMBE

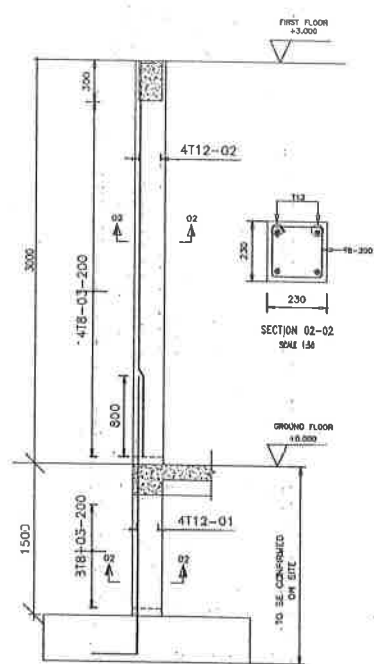
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PROJECT: STRUCTURAL

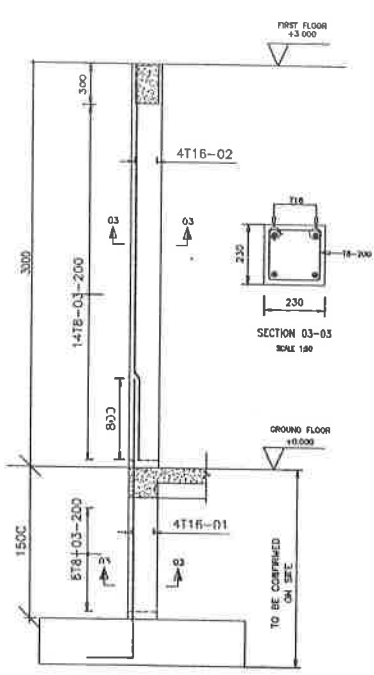
NO: STRW001



COLUMN C01 (Diameter 230mm)
12Nos.
SCALE 1:25



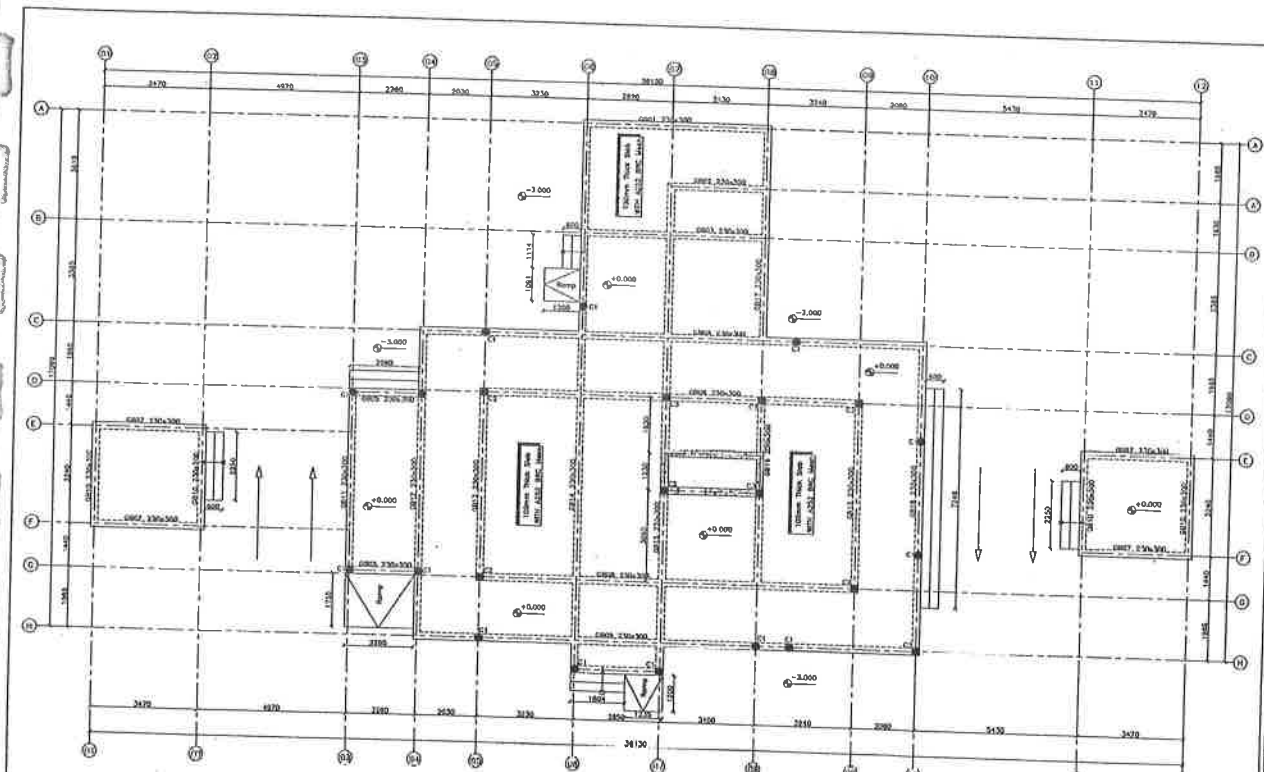
COLUMN C02 (230x230mm)
5Nos.
SCALE 1:25



COLUMN C03 (230x230mm)
4Nos.
SCALE 1:25

- NOTES**
- Structural drawings to be read in conjunction with respective architectural and other specialist drawings.
 - All dimensions are in millimeters unless otherwise specified. An ending off of dimensions is to mean full size.
 - Depth of setting foundation depends on conditions and may be adjusted according to structural engineer's instruction.
 - All fixing of reinforcement to be as per code.
 - Reinforcement all per code and designated 'T' with length 250mm and lap length as specified 'T' with length 250mm.
 - Concrete for C01 shall be to grade 20, with curing strength of not less than 20N/mm². For other concrete grades to be grade 15 (flat slab 150).
 - Setting process to be as per 1:25 by column.
 - Structural cover to reinforcement shall, Slab: 20mm, Column: 25mm, Foundation: 50mm.
 - 16. Rebar/Re-bars**
 - Casting strength of 18 N/mm² based on test results not less than 7.8 N/mm² with lap length not less than 33d (where d is nominal diameter of bar) or 300mm, whichever is less.
 - Casting strength of 18 N/mm² based on test results not less than 28 N/mm² with lap length not less than 33d (where d is nominal diameter of bar) or 300mm, whichever is less.

AMFMSHEETS	
No.	
Date	
Project	
Drawn	
Checked	
Approved	
TANZANIA NATIONAL PARKS PUMBA 3134 AFRIKA	
COLUMNS IFC DETAILS SHEET 01 OF 01	
Scale	As shown
Project No.	250
Drawn By	
Checked By	
STRUCTURAL	
Page No.	1 of 1



GROUND FLOOR SLAB AND BEAM STRUCTURAL LAYOUT PLAN
SCALE 1:50

- NOTES**
- 1. Structural drawings to be read in conjunction with respective architectural and MEP specifications drawings.
 - 2. All dimensions are to centerlines unless otherwise specified. No scaling off of dimensions to be done from drawings.
 - 3. Depth of Jeffrey beam/slabs depends on conditions and may be adjusted according to structural engineer's instructions.
 - 4. No loading or finishes to be set out yet.
 - 5. Reinforcement will be mild steel designated "M" with $f_y = 250$ N/mm², and high tensile designated "H" with $f_y = 460$ N/mm².
 - 6. Concrete for RC shall be to grade 30, with crushing strength of not less than 28 N/mm².
7. Plain concrete shall be to grade 15 (flat rate 1:3:6).
 - 8. Working concrete to be set out by site.
 - 9. Concrete cover to reinforcement shall follow: beams 25mm, columns 20mm, slabs 15mm.
 - 10. Reinforcement:
 (i) Cracking strength of 18 bar/slab thickness will meet the 7 N/mm² with least bar/slab area based on cracking strength not less than 0.8%
 (ii) Cracking strength of 13 bar/slab thickness will meet the 2.5 N/mm² with least bar/slab area based on cracking strength of not less than 0.15%

AMENDMENTS

No.	Date	By	Description

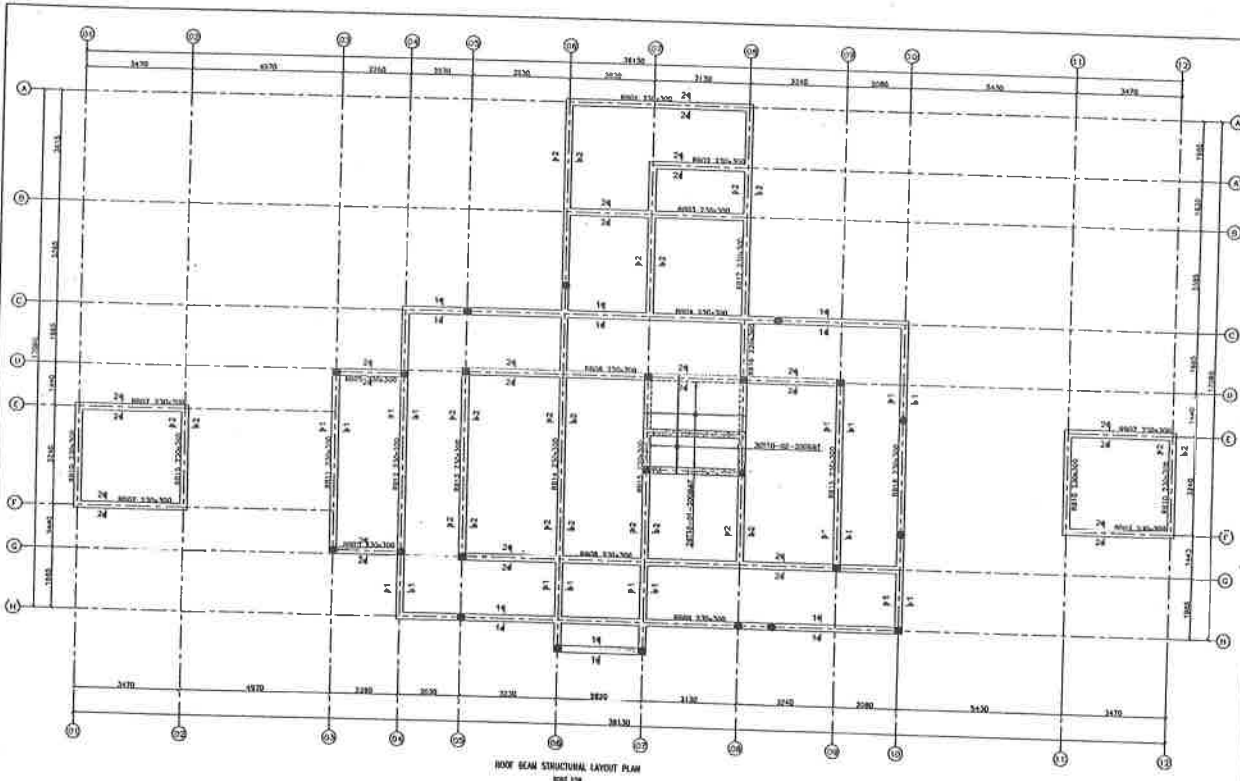
APPROVED: NATIONAL PARKS REVENUE COLLECTOR OFFICE TO BE IMPLEMENTED BY ENTIRETY NATIONAL PARKS

DESIGNED: TANZANIA NATIONAL PARKS REGIONAL OFFICE ARUSHA

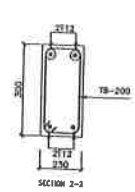
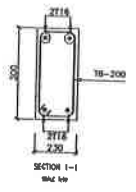
PROJECT: GROUND BEAM STRUCTURAL LAYOUT PLAN

DRAWN BY: A.S.M.	CHECKED BY: Z.L.P.
DATE: 2010, 2011	DATE: 2010, 2011
DESIGNED BY: M.I. HILLUMBI	DESIGNED BY: M.I. HILLUMBI
DESIGNED BY: M.I. HILLUMBI	DESIGNED BY: M.I. HILLUMBI
SCALE: 1:50	SCALE: 1:50

STRUCODE 0



ROOF BEAM STRUCTURAL LAYOUT PLAN
SCALE: 1/50



- NOTES**
1. Structural drawings to be read in conjunction with specification, schedule and other special drawings.
 2. All dimensions are to centreline unless otherwise specified. For cutting all of foundations to be true level always.
 3. Depth of setting foundations depends on structure and may be adjusted according to relevant engineer's instructions.
 4. No heavy or expansion to be set on G sub.
 5. Reinforcement will be steel reinforcement 'N' with $f_y = 250 \text{ N/mm}^2$, and high tensile wire mesh 'T' with $f_y = 1950 \text{ N/mm}^2$.
 6. Concrete for PG works to be grade 30, with casting strength of not less than 20 N/mm^2 .
 7. Final concrete works to be grade 15 (final mix 1:2:8).
 8. Slabing concrete to be cast 1:2:4 by machine.
 9. Concrete cover to reinforcement and, where known, 25mm column, 20mm foundation.
- REVISIONS/REVISIONS**
- (1) Casting strength of 40 load bearing bricks not less than 2 N/mm^2 with tested individual cores casting strength not less than 40 N/mm^2 .
 - (2) Casting strength of 40 non-load bearing bricks not less than 2 N/mm^2 with tested individual cores casting strength of not less than 40 N/mm^2 .

AMENDMENTS

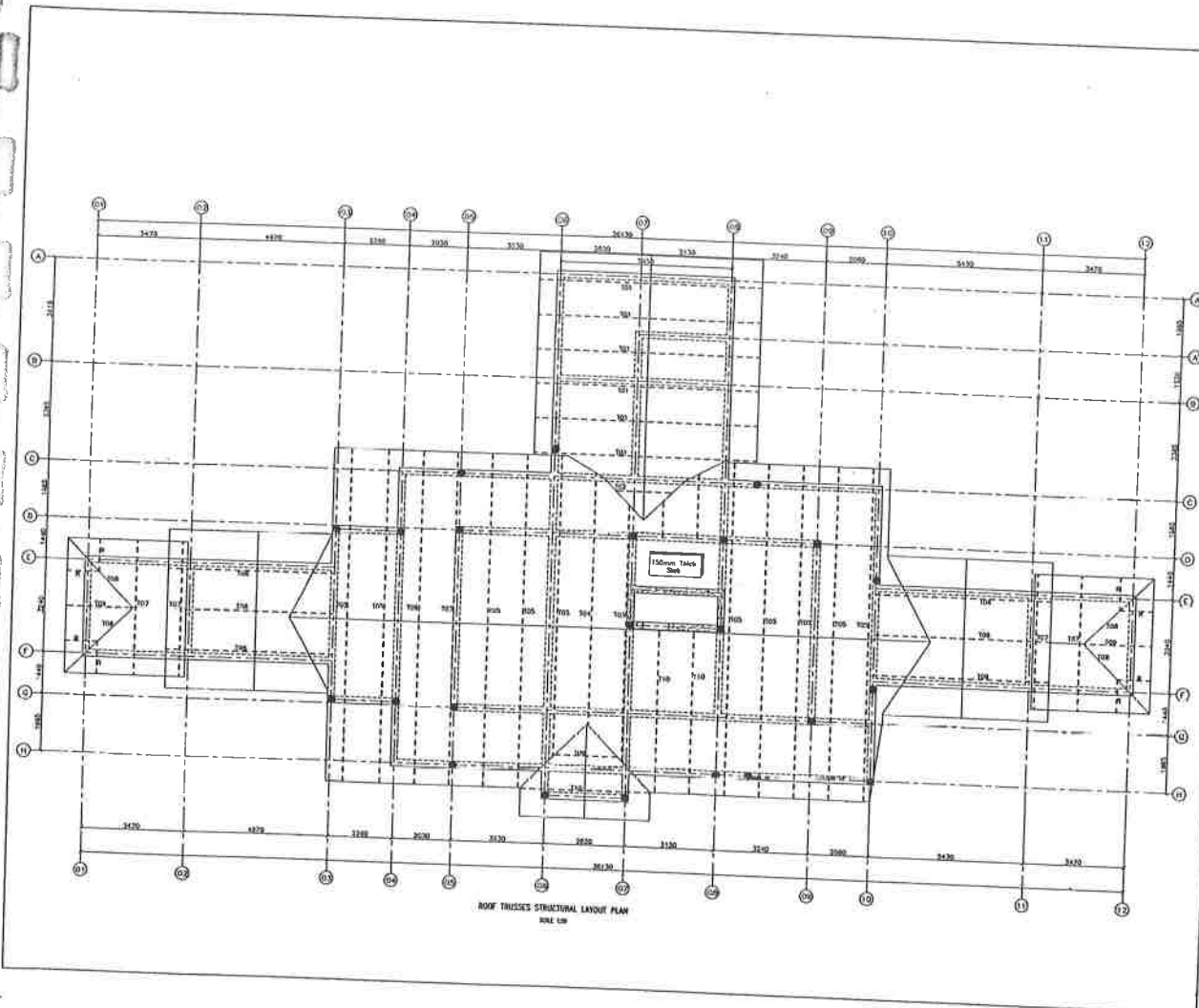
NO.	DATE	DESCRIPTION	BY	CHKD.

PROPOSED NATIONALE PARKS REVIEW
POLICEHEAD BAY TO BE DEVELOPED TO
DIFFERENT NATIONAL PARKS

TANZANIA NATIONAL PARKS
P.O. BOX 3154
ARUSHA

ROOF BEAM STRUCTURAL LAYOUT PLAN

DATE	DESIGNED BY	Z.S.D.
NO. OF SHEETS	CHECKED BY	Z.S.D.
DATE	DRAWN BY	M. MALLIKARJUN
NO.	PROJECT	STRUCTURAL
SHEET NO.	DRAWING NO.	STRUC008



ROOF TRUSSES STRUCTURAL LAYOUT PLAN
SCALE: 1/20

- NOTES**
1. Structural drawings to be read in conjunction with applicable architectural and other special drawings.
 2. All dimensions are in millimeters unless otherwise specified. No rounding off of dimensions to be done from drawings.
 3. Depth of ceiling finishings depend on conditions and may be adjusted according to structural engineer's instructions.
 4. For loading or foundation to be as per IS 8750.
 5. Reinforcement all to be cold steel designated 'T' with $f_y = 235 \text{ N/mm}^2$, and high tensile designated 'H' with $f_y = 485 \text{ N/mm}^2$.
 6. Concrete for RC walls to be grade M20, with curing strength of not less than 20 N/mm².
 7. Full concrete cover to be given IS 456 side 150.
 8. Sliding joints to be as per IS 800 by value.
 9. Concrete cover to reinforcement: slab, 20mm; beam, 25mm; column, 40mm; shaft, 25mm.
 10. Reinforcement:
 - (a) Casting strength of 18 mm bar bearing heads not less than 7.5mm with spaced lap joint area casting strength not less than A5.
 - (b) Casting strength of 18 mm bar bearing heads not less than 2.5 mm with spaced lap joint area casting strength of reinforced steel not less than 33 N/mm².

AMENDMENTS

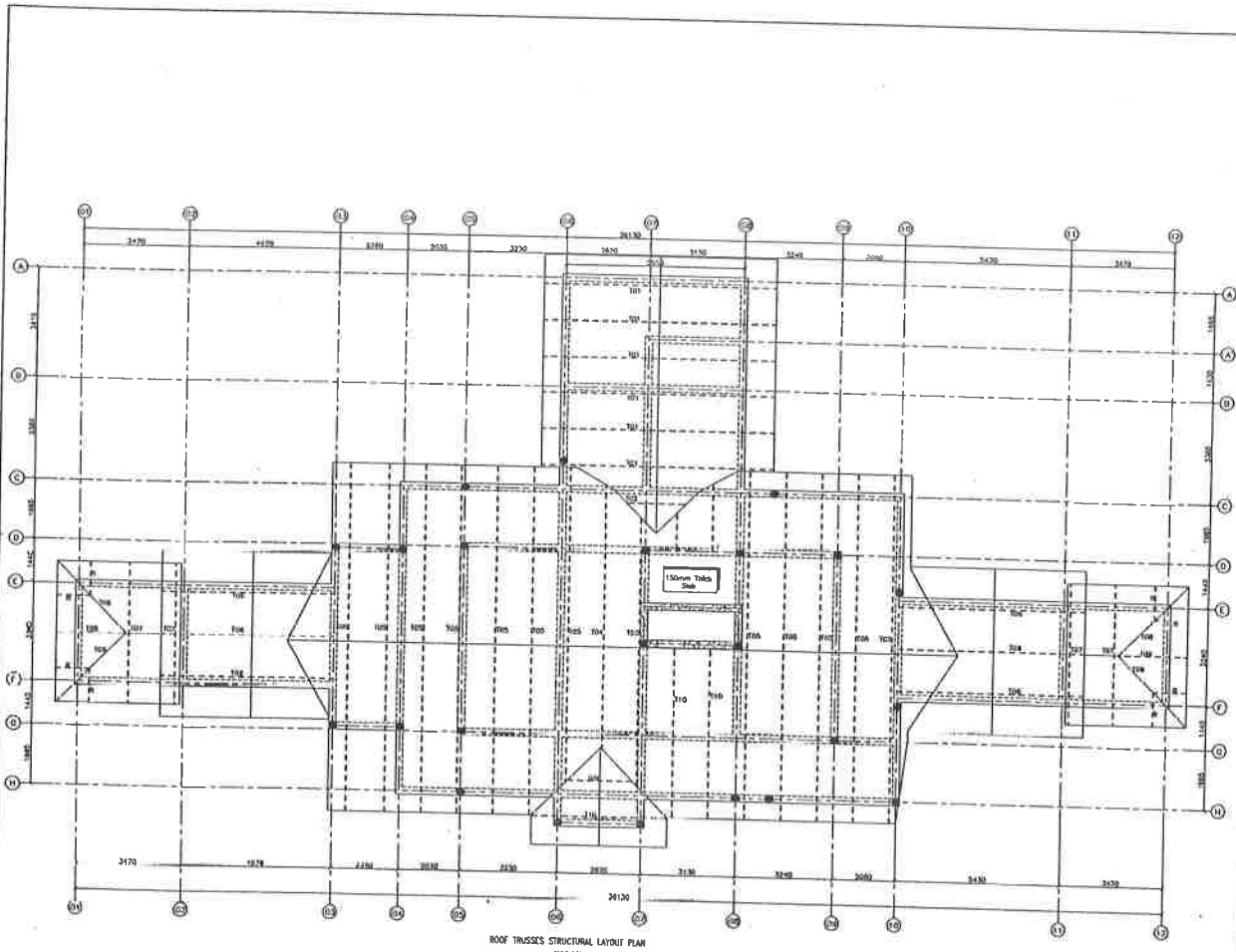
NO.	DESCRIPTION	DATE

PROPOSED NATIONAL PARK RESERVE
CERTIFICATE ISSUED TO BE IMPLEMENTED TO
EXISTING NATIONAL PARK

STATE: **TAMIL NADU NATIONAL PARK**
PONDICHERRY
ALUWA

SCALE: **ROOF TRUSSES LAYOUT PLAN**

DESIGNED BY: SDS	CHECKED BY: SDS
DRAWN BY: SDS	APPROVED BY: SDS
STRUCTURAL	
BY: STANDART	



- NOTES**
1. Structural drawings to be read in conjunction with respective contract and other special drawings.
 2. All drawings are in millimetric unless otherwise specified. The drawing of all elements to be done from drawings.
 3. Depth of setting foundation depends on condition and may be adjusted according to structural engineer's instructions.
 4. No setting of foundation to be in 0% soil.
 5. Reinforcement shall be mild steel designated "T" with $f_y = 250 \text{ N/mm}^2$ and max. length notional "T" shall be $\leq 1000 \text{ mm}$.
 6. Concrete for RC walls to be grade C15, min. curing strength of not less than 20 N/mm^2 .
7. Full concrete shall be grade C15 (min. 15 N/mm^2).
 8. Slabing concrete to be of min. 1:2:8 by volume.
 9. Concrete cover to reinforcement shall: 25mm for bars, 20mm for mesh, 15mm for cast-in-place.
 10. Protection/finish:
(i) Slabing strength of 18 N/mm² bearing loads not less than 7 kN/m². All based on full width bearing strip not less than 250 mm.
(ii) Slabing strength of 18 N/mm² bearing loads not less than 2.5 kN/m² with based bearing strength of individual slab not less than 2.5 kN/m².

AMENDMENTS

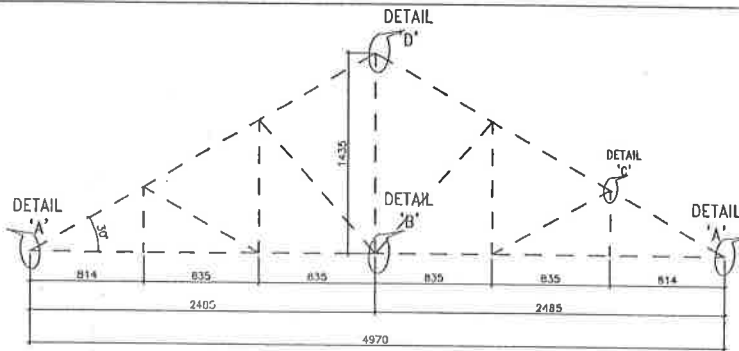
No.	Description

PROPOSED NATIONAL PAVING REVERSE CONNECTION BARS TO BE SUPPLIED TO DIFFERENT NATIONAL PAVES

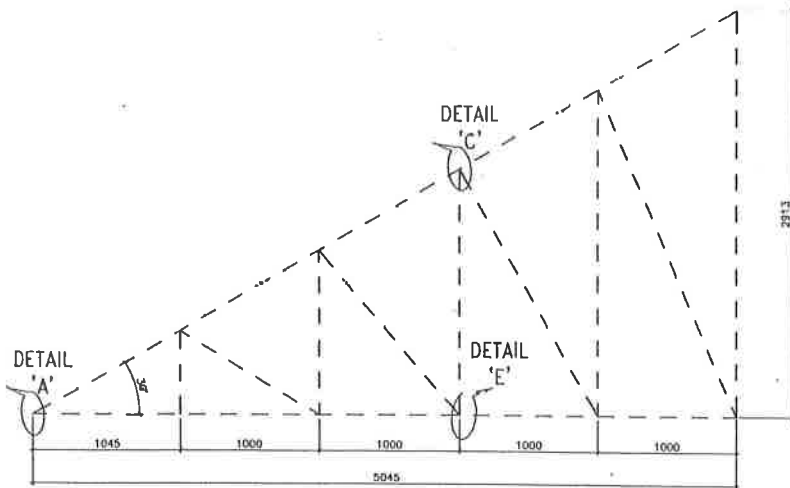
Project: TANZANIA NATIONAL PARKS
P.O. BOX 3111
ARUSHA

DRWG NO. ROOF TRUSSES LAYOUT PLAN

Scale: AS SHOWN	Designed by: ZLD
Date: NOVEMBER 2007	Checked by: ZLD
Drawing No. MOKELUMI	
STRUCTURAL	
DRW NO. STR0407	REV. 8



TRUSS T06-6Nos.
SCALE 1:50



TRUSS T10-2Nos.
SCALE 1:50

NOTES

1. Structural drawings to be used in conjunction with respective architectural and other specialist drawings.
2. All dimensions are to finishing unless otherwise specified. No scaling off of dimensions to be done from drawings.
3. Depth of setting horizontal beams on wallplates and not be adjusted according to structural engineer's instruction.
4. No tapering of truss members to be done.
5. All dimensions shall be added and deducted "T" with $\frac{1}{2}$ and "B" with $\frac{1}{2}$ and "B" with $\frac{1}{2}$ and "B" with $\frac{1}{2}$.
6. Concrete for RC shall be to grade 20, grade casting strength of not less than 20 N/mm².
7. Full concrete shall be to grade 15 (and not 10 N/mm²).
8. Sliding members to be of min 1000 kg weight.
9. Concrete shall be reinforced with 20mm bars, 20mm diameter, spaced 100mm.
10. Reinforcement Details
 - (i) Quantity of length of 10 mm and 12 mm bars not less than 7 N/mm² with 100mm spacing and 10 mm and 12 mm bars.
 - (ii) Quantity of length of 10 mm and 12 mm bars not less than 20 N/mm² with 100mm spacing and 10 mm and 12 mm bars.

AMENDMENTS

No.	Description	Date

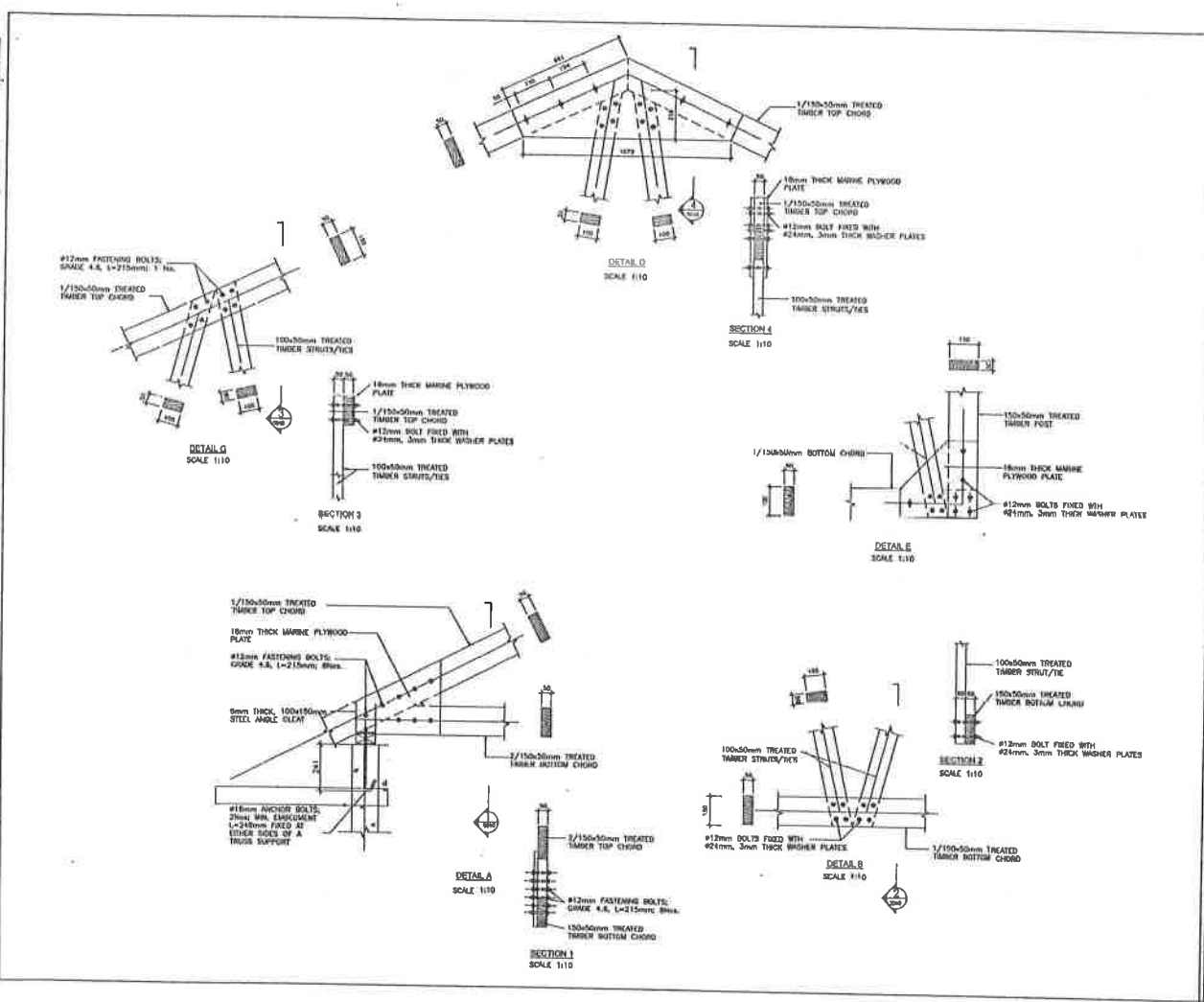
PROPOSED MATERIAL FINISHES INCLUDING COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT FINISHERS

PRELIMINARY LAYOUT PLAN
P.O. BOX 3124
ARUDA

ROOF TRUSSES ELEVATION
SHEET 02 OF 02

Drawn by	Checked by	Scale

STRUCTURAL
0



- NOTES**
- 1. Structural drawings to be read in conjunction with relevant specifications and other special drawings.
 - 2. All dimensions are in millimetres unless otherwise specified. No scaling off or dimension to be done from drawings.
 - 3. Depth of writing throughout depends on conditions and may be adjusted existing in structural engineer's satisfaction.
 - 4. In fixing or assembly to be as per detail.
 - 5. Reinforcement will be steel rod designated 'T' with $f_y = 235 \text{ N/mm}^2$ and top bars designated 'T' with $f_y = 235 \text{ N/mm}^2$.
 - 6. Strands for RC shall be to grade 20, pile casting strength of not less than 25 N/mm^2 . 2. Pile concrete shall be to grade 20 (2000 psi min).
 - 7. Shoring elements to be as per detail by volume.
 - 8. Concrete shall be reinforced with 20mm bars, 20mm spacing, 20mm diameter, clear.
 - 9. Bolts, $16 \text{ mm} \times 65 \text{ mm}$.
 - 10. Casting strength of 18 bar heavy black steel bar less than 7 N/mm^2 with least minimum steel quantity strength not less than 18 N/mm^2 .
 - 11. Casting strength of 18 bar black heavy black steel bar less than 15 N/mm^2 with least minimum strength of 18 bar steel bar less than 15 N/mm^2 .

AMENDMENTS

No.	Date	By	Description

PROJECT INFORMATION

PROPOSED NATIONAL PARKS REVENUE COLLECTION GALLEY TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS

NAME: TANZANIA NATIONAL PARKS PROJECT 3134 ARUSHA

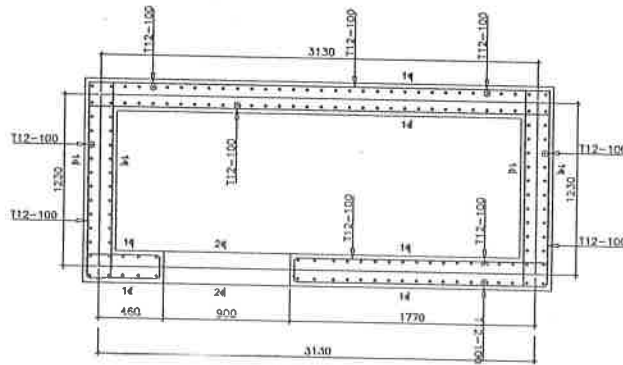
PROJECT: ROOF TRUSSES CONNECTION DETAILS

DATE: 06/06/2011 **DESIGNED BY: J.D.**

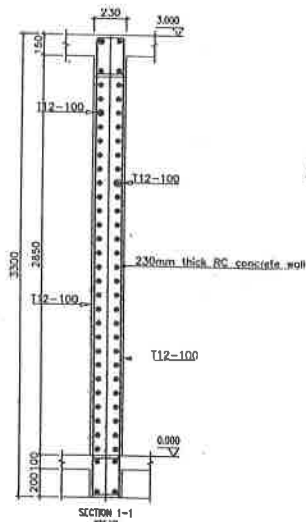
SCALE: 1:20 **CHECKED BY: J.M.KULLIWI**

STRUCTURAL

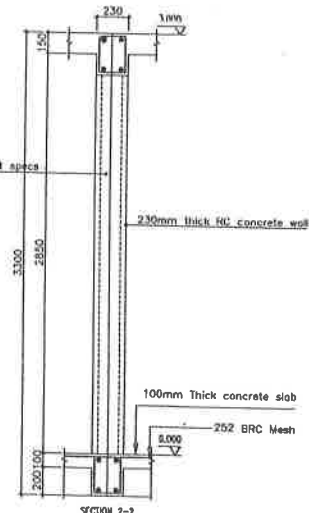
STRONG 10 **PAGE 0**



STRONG ROOM
STRUCTURAL LAYOUT PLAN
SEE 12



SECTION 1-1
SEE 13



SECTION 2-2
SEE 14

NOTES

1. Structural drawings to be read in conjunction with descriptive architectural and other special drawings.
2. All dimensions are in millimeters unless otherwise specified. No scaling off of dimensions to be done from drawings.
3. Date of setting boundaries depends on conditions and may be subject according to structural engineer's instructions.
4. No latching or fastening to be on the wall.
5. Reinforcement shall be mild steel developed 'W' with $f_y = 235 N/mm^2$, and high tensile reinforcement 'T' with $f_y = 415 N/mm^2$.
6. Concrete for RC walls to be grade 25, with crushing strength of not less than $25 N/mm^2$. 2.0% minimum cement to be grade 15 (flat rate 5.5%).
7. Slabing concrete to be of min. 1:1.8 by volume.
8. Concrete cover to reinforcement: slab, 25mm; column, 25mm; foundation, 50mm.
9. Reinforcement/finish:
 - (1) Cracking strength of 18 bar bending bar is not less than $7 N/mm^2$ with bond length of 20d, crushing strength not less than 8.8 N/mm².
 - (2) Cracking strength of 18 bar bending bar is not less than $15 N/mm^2$ with bond length of 20d, crushing strength of individual steel not less than 11 N/mm².

AMENDMENTS

No.	Description	Date

PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE SUPERSEDED TO DIFFERENT NATIONAL PARKS



TANZANIA NATIONAL PARKS
P.O. BOX 3154
ARUSHA

STRONGROOM RC DETAILS

Drawn by	Checked by	Date

STRUCUTURAL
STRONGROOM

LEGEND FOR WATER SUPPLY & FIRE FIGHTING

S/No.	SYMBOL/ABREV.	DESCRIPTION
1.		RINSING SPRAY
2.		COLD WATER SUPPLY PIPE LINE
3.		FLOAT VALVE
4.		SOCKET UNION
5.		GATE VALVE
6.		SOCKET REDUCER
7.	DP	DOWN PIPE
8.	TB	TO BELOW
9.	BS	BELLOW THE SLAB
10.	ACL	AT CEILING LEVEL
11.		AUTOMATIC FIRE EXTINGUISHER BOTTLE
12.		ABC POWDER FIRE EXTINGUISHER

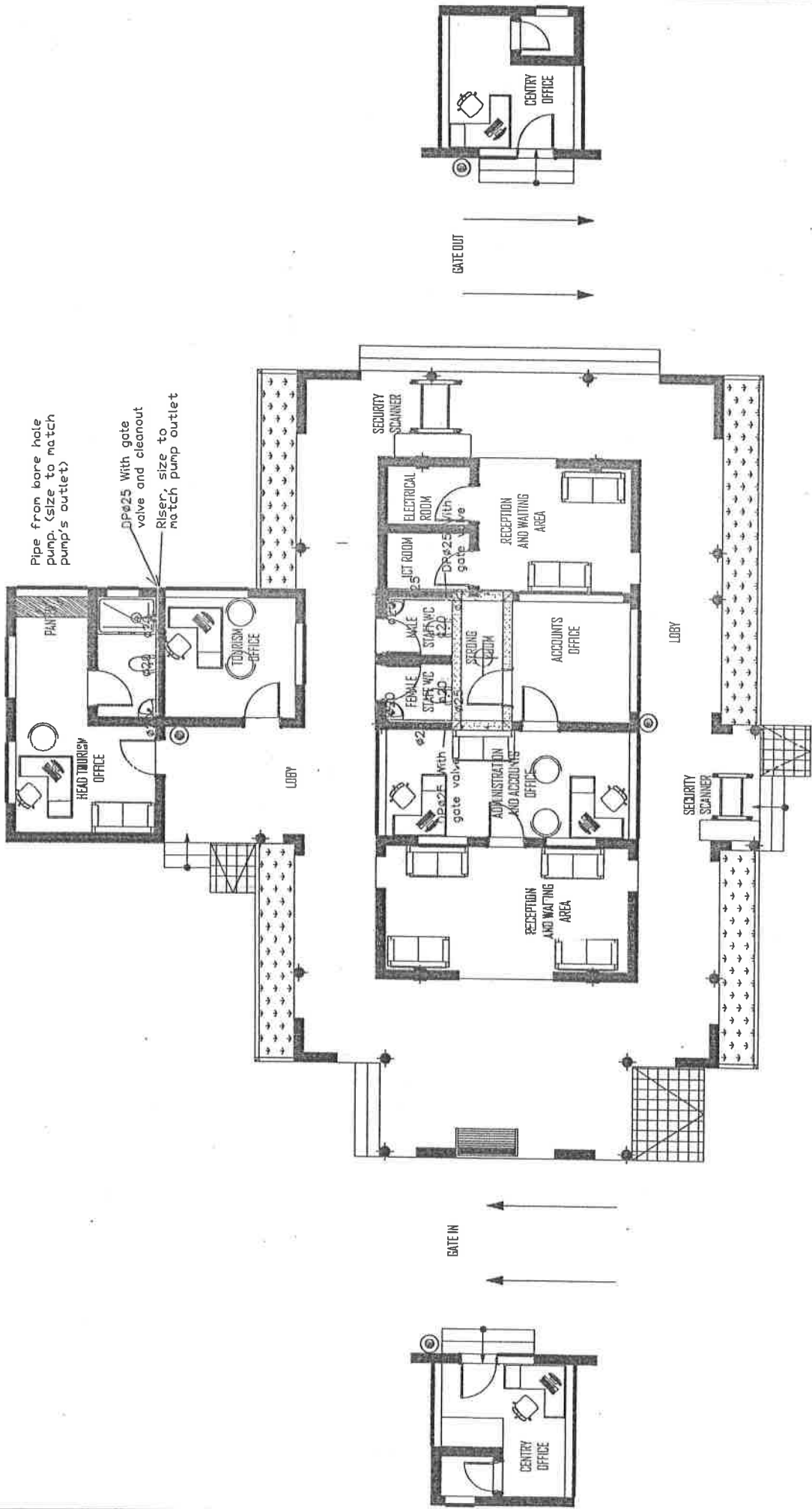
NOTES FOR WATER SUPPLY

- ALL CONNECTION PIPES AND PIPE FITTINGS SHOULD BE PPR OR EQUIVALENT
- ALL DISTRIBUTION PIPES AND PIPES FITTINGS TO BE PPR OR EQUIVALENT.
PIPES AND FITTINGS SIZE:
 - # All pipes and fittings should be as per drawing.
 - # All relative fittings will be as per manufacturer's recommendations subject to approval.
- WATER PUMPING:
 - #The pumping system will be done as per drawing.
- WATER STORAGE AND TAPPING:
 - #The water storage will be done through pumps to elevated water tanks as per drawing.

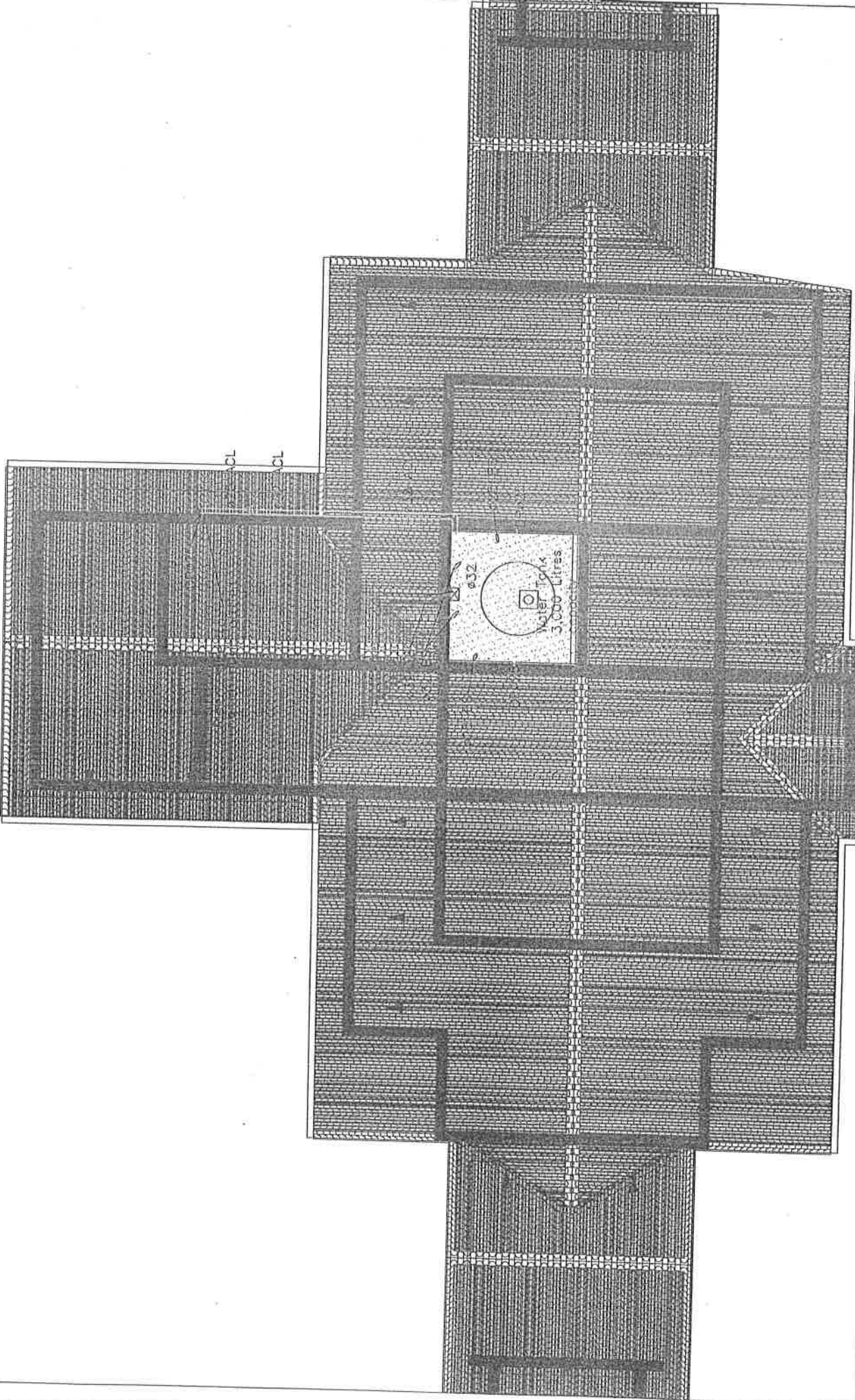
Notes for fire fighting:

- Installation to be conducted as indicated on the drawing and to conform with standards.

CLIENT NAME	PROJECT TITLE	Revision	Description	Date	Drawing Title: LEGEND FOR WATER SUPPLY & FIRE FIGHTING DRAWINGS
TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.	Designed by: MMW&S Drawn by: MMW&S Checked by: W/G		Date: NOVEMBER, 2021 Date: NOVEMBER, 2021 Date: NOVEMBER, 2021	
					Drawing NO: SC/TANAPA/WS&FF-01



CLIENT NAME	PROJECT TITLE		
	TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.		
Drawing Title: FLOOR PLAN WATER SUPPLY & FIRE FIGHTING DRAWINGS	DESIGNED BY: MWA&SC DRAWN BY: MWA&SC CHECKED BY: W.C.		
	DATE: NOVEMBER, 2001 DATE: NOVEMBER, 2001 DATE: NOVEMBER, 2001		
Drawing NO: SC/TANAPA/WS&FF-02	Revision Description Date		
	Scale: N.T.S.		



CLIENT NAME
 TANZANIA NATIONAL PARKS
 P.O. BOX 3134
 ARUSHA.



PROJECT TITLE
 PROPOSED NATIONAL PARKS
 REVENUE COLLECTION GATES TO BE
 IMPLEMENTED TO DIFFERENT
 NATIONAL PARKS.

Drawing Title: ROOF TOP PLAN
 WATER SUPPLY & FIRE FIGHTING
 DRAWINGS

Drawing NO: SC/TANAPA/WS&FF-03

Revision	Description	Date
1	Design by: MWAMBALE	Date: NOVEMBER, 2021
2	Drawn by: MWAMBALE	Date: NOVEMBER, 2021
3	Checked by: M.E.	Date: NOVEMBER, 2021
Scale:		N.T.S.

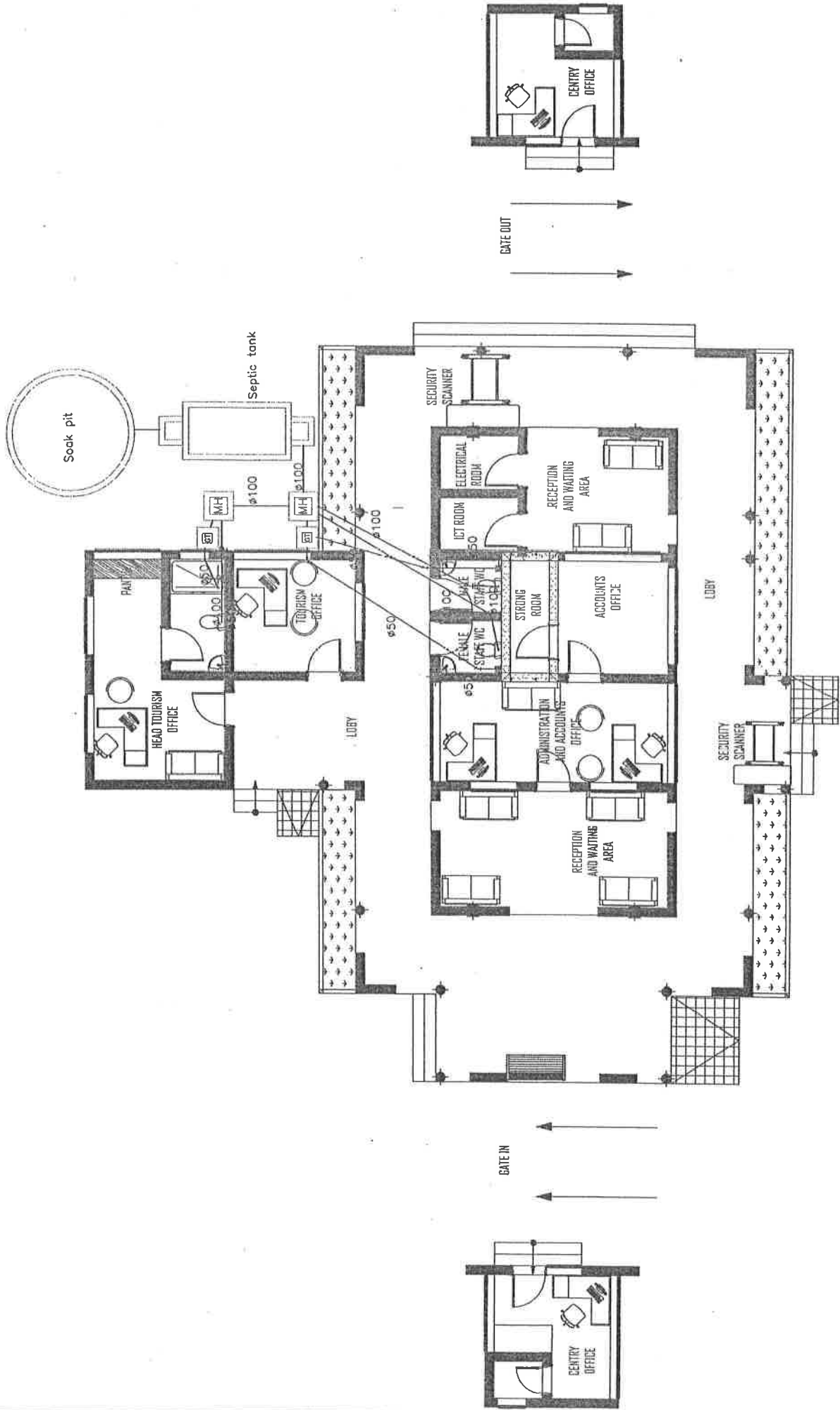
LEGEND FOR WASTE WATER LAYOUT.

S/No	SYMBOL/ABBREVIATIONS.	DESCRIPTION
1	GT	GULLY TRAP
2	MH	MANHOLE
3	—	FOUL WATER PIPES
4	—	GREY WATER PIPES
5		FLOW TRAP
6		VENT PIPE

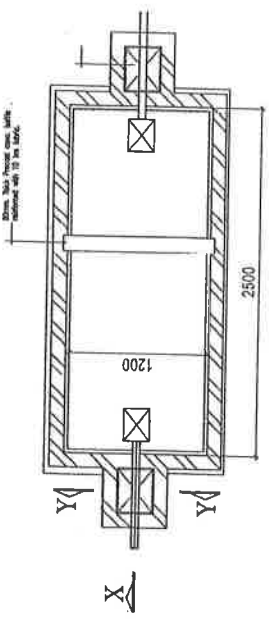
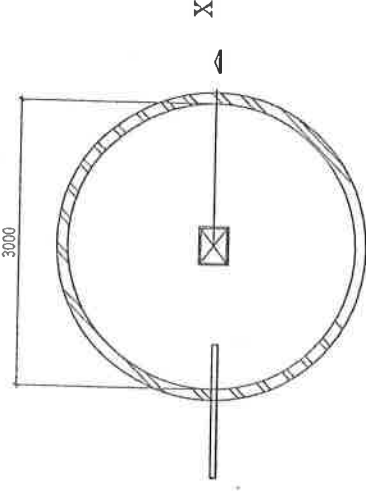
NOTES

1. PIPE FITTINGS
All pipes and fittings to be uPVC
2. PIPE SIZE
Pipes from WC should be $\phi 100$.
Pipes from HWB, SH and UR should be $\phi 50$.
Pipes from manholes to manholes are $\phi 100$
3. SLOPE
The Slope between manholes is 1: 100
4. MANHOLE DESCRIPTIONS
Manhole size: 450 x 450 internally - Depth to depend on the level in consideration
Gully trap size: 300 x 300 x (130-----300) internally

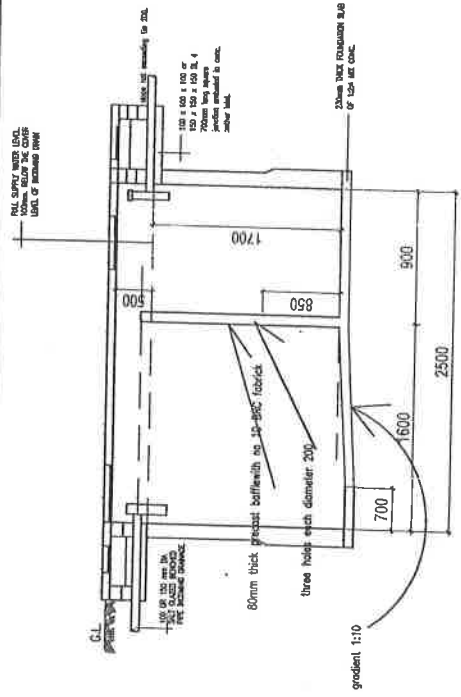
CLIENT NAME TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.	PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.				Author	Description	Date
					Designed by: MWANUSC Date: NOVEMBER 2021		
				Drawn by: MWANUSC Date: NOVEMBER 2021			
				Checked by: WC Date: NOVEMBER 2021			
				Scale: 1:1.5			
							Drawing Title: LEGEND FOR WASTE WATER DRAWINGS
							Drawing NO: SC/TANAPA/MW-01



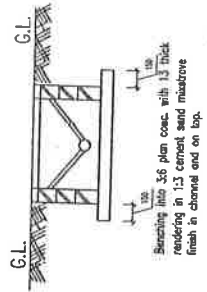
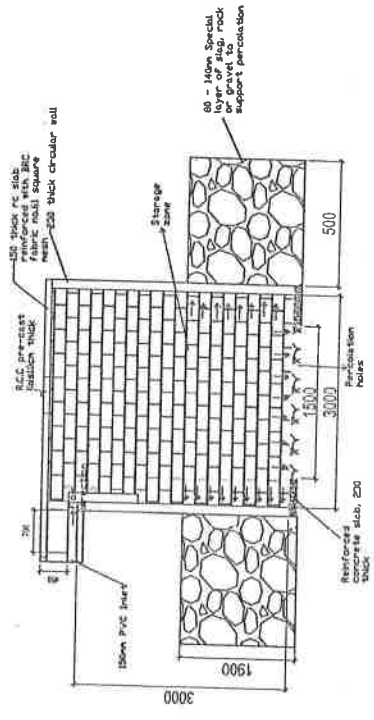
CLIENT NAME	TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA	
	PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.	
Drawing Title: FLOOR PLAN WASTE WATER DRAWINGS	Revision	Date
	Revision	Date
Drawing NO: SC/TANAPA/WW-02	Designed by: MWAJUMBE, 2021	Date: NOVEMBER, 2021
	Drawn by: MWAJUMBE, 2021	Date: NOVEMBER, 2021
	Checked by: W.C.	Date: NOVEMBER, 2021
	Scale:	N.T.S.



SEPTIC TANK AND SOAK PIT PLAN



SECTION X - X

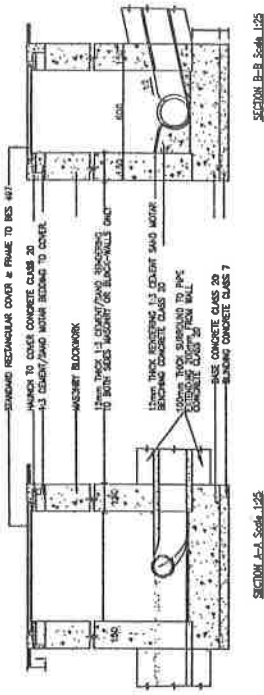


SECTION Y - Y

CLIENT NAME	PROJECT TITLE		Revision	Description	Date
	TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.			
Drawing NO: SC/TANAPA/WW-03					
Scale: V.T.S					

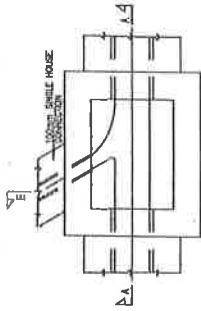
MANHOLE

MASSSET BLOCKWORK OR IN SITU CONCRETE
MANHOLE JKS SHALL 1.1m TO GROUND LEVEL

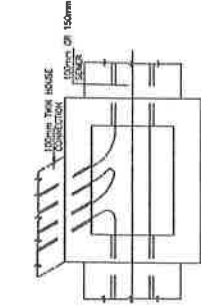


SECTION A-A Scale 1:25

SECTION B-B Scale 1:25

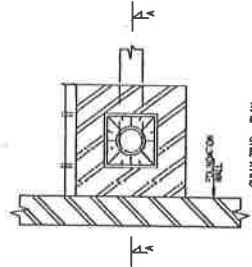


PLAN SCALE SINGLE INLET CONNECTION Scale 1:25

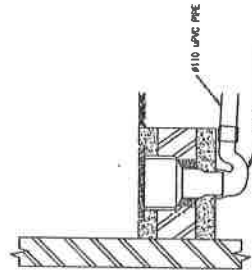


PLAN SCALE AUTOMATIC RISE HOSE CONNECTION Scale 1:25

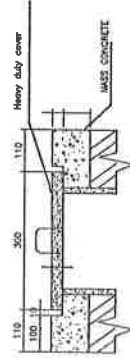
GULLY TRAP



SECTION A-A



SECTION B-B



COVER DETAIL (200x300mm)

CLIENT NAME

TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA.

PROJECT TITLE

PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO BE
IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

Revision	Description	Date
1	DESIGNED BY: MWAHALIC	DATE: NOVEMBER, 2021
2	DRAWN BY: MWAHALIC	DATE: NOVEMBER, 2021
3	CHECKED BY: MJC	DATE: NOVEMBER, 2021
SCALE		N:1:1

Drawing Title: MANHOLES & GULLY TRAPS DETAILS

Drawing NO: SC/TANAPA/WW-04

ELECTRICAL INSTALLATION LEGEND:

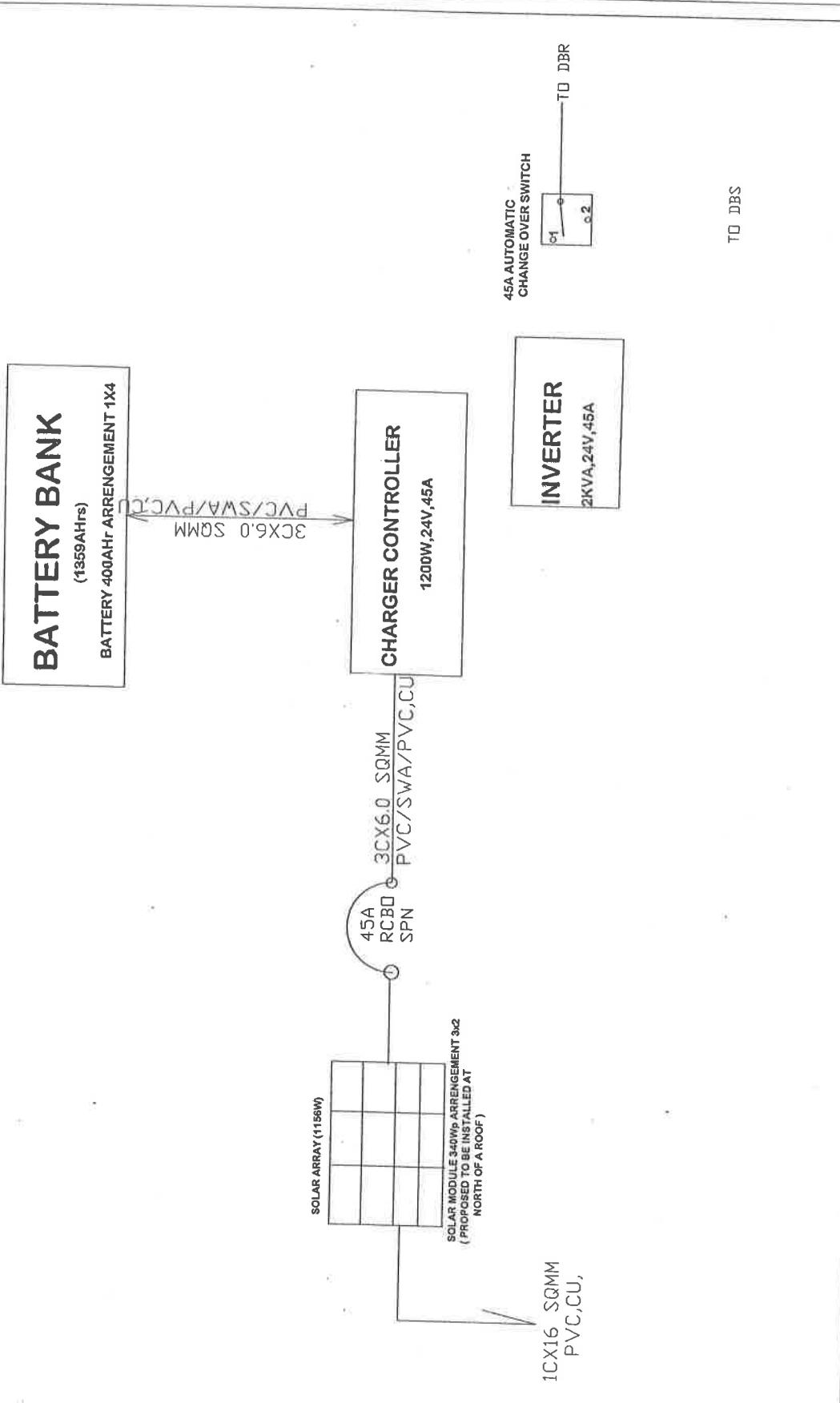
S/No.	SYMBOL	DESCRIPTION	MOUNTING	MOUNTING HEIGHT(MM)
1.		600X600 RECESSED, 40W LED PANEL COMPLETE WITH RECESSED MOUNTING ACCESSORIES AS OPPLLE LED SLIM ECOMAX 40W	CEILING	CEILING
2.		WALL MOUNTING IP65 PROTECTION 100W LED FLOODLIGHT LIGHT COMPLETE WITH ALL ACCESSORIES AS OPPLLE LED FLOODLIGHT ECOMAX II	WALL	WALL
6.		RECESSED MOUNTING 18W LED DOWNLIGHTER COMPLETE WITH ALL ACCESSORIES AS OPPLLE LED SLIM ECOMAX III HPT	CEILING	CEILING
7.		HANGING 3 HOUR DURATION MAINTAINED EMERGENCY EXIT SIGN FOR 11V T-C-SEL LAMP WITH DOWNEXIT BALBE AS THORN VOYAGER ELITE SX 96003784	CEILING	CEILING
8.		LIGHT SWITCH, 10A ONE WAY, ONE/TWO GANG, FLUSH, MOULDED, ABB OR, NEM	WALL	1200MM AFFL
9.		LIGHT SWITCH, 10A ONE WAY, TWO GANG, FLUSH, MOULDED, ABB OR, NEM	WALL	1200MM AFFL
10.		LIGHT SWITCH, 10A TWO WAY, ONE GANG, FLUSH, MOULDED, ABB OR, NEM	WALL	1200MM AFFL
11.		13A TWIN SWITCH SOCKET FLUSH MOULD PLASTIC AS NEM / ABB	WALL	300MM AFFL
12.		13A TWIN CLEAN POWER SWITCH SOCKET FLUSH MOULD PLASTIC WITH NEM LAMP AS NEM / ABB	WALL	1200MM AFFL
13.		20A DP SWITCH FOR AIR CONDITION	WALL	1200MM AFFL
14.		20A DP SWITCH FOR HAND DRIER	WALL	1200MM AFFL
15.		45A ISOLATOR SWITCH FOR COOKER CONTROL UNIT AS ABB	WALL	1200MM AFFL
16.		20A DP SWITCH FOR FIRE DETECTION PANEL	WALL	1200MM AFFL
17.		DISTRIBUTION BOARD AS SPECIFIED IN THE SCHEMATIC DRAWINGS.	WALL	1500MM AFFL

KEY

AWP = ABOVE WORKING PLAN

AFFL = ABOVE FLOOR FINISH LEVEL

CLIENT NAME	PROJECT TITLE		
TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.		
	Designed by: DAUD V.	DATE: NOVEMBER, 2021	Revision
	Drawn by: ELIUS V.	DATE: NOVEMBER, 2021	Date
	Checked by: BA	DATE: NOVEMBER, 2021	
	Scale: N.T.S		
			Drawing Title: LEGEND FOR ELECTRICAL DRAWINGS
			Drawing NO: SC/TANAPA/EL-01



CLIENT NAME		PROJECT TITLE		Drawing Title: SOLAR SYSTEM DRAWINGS	
TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.		PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.			
Designed by: ELIAS N.	Date: 18/02/2021	Description:	Date:		
Drawn by: ELIAS N.	Date: 18/02/2021				
Checked by: BM	Date: 18/02/2021				
Scale:	1:1				
				Drawing NO: SC/TANAPA/EL-02	

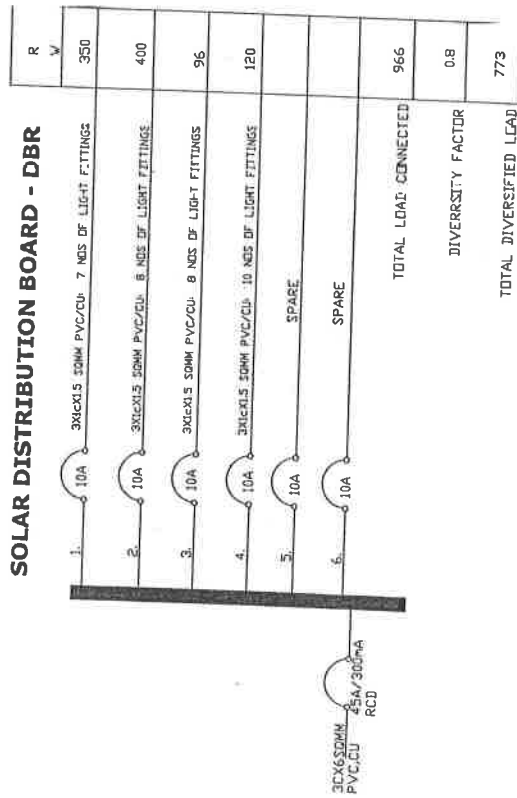
MAIN DISTRIBUTION BOARD - DBS

R	Y	B	R	Y	B		
(C/W)	(C/W)	(C/W)	(C/W)	(C/W)	(C/W)		
1	10A	30X125	30MM	PVC/CU	11 NOS OF LIGHT + 2 FAN POINTS	376	
2	10A	30X125	30MM	PVC/CU	11 NOS OF LIGHT + 2 FAN POINTS		
3	10A	30X125	30MM	PVC/CU	11 NOS OF LIGHT + 2 FAN POINTS		
4	10A	30X125	30MM	PVC/CU	11 NOS OF LIGHT + 2 FAN POINTS	740	
5	32A	30X125	30MM	PVC/CU	5 NOS SWITCH SOCKET RING	2500	
6	32A	30X125	30MM	PVC/CU	6 NOS SWITCH SOCKET RING	3000	
7	32A	30X125	30MM	PVC/CU	5 NOS SWITCH SOCKET RING	2500	
8	32A	30X125	30MM	PVC/CU	6 NOS SWITCH SOCKET RING	3000	
9	32A	30X125	30MM	PVC/CU	5 NOS SWITCH SOCKET RING	2500	
10	45A	30X125	30MM	PVC/CU	ISOLATOR SWITCH FOR CORNER CONTROL	3000	
11	32A	30X125	30MM	PVC/CU	4 NOS SWITCH SOCKET RING	2000	
12	60A	30X125	30MM	PVC/CU			
13	60A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
14	60A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
15	60A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
16	60A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
17	60A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
18	32A				SPARE		
19	10A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
20	10A	30X125	30MM	PVC/CU	IP SWITCH FOR AIR CONDITION SKTU	882	
21	15A	30X125	30MM	PVC/CU	FOR CLEAN ROOF DISTRIBUTION BOARD - DBS RCBD	10348	
22	15A	30X125	30MM	PVC/CU	SOLAR DISTRIBUTION BOARD - DBS RCBD	966	
23	60A	30X125	30MM	PVC/CU	TO SOLAR CDS	1176	
24	60A	30X125	30MM	PVC/CU	TO SOLAR CDS	1176	
TOTAL LOAD CONNECTED					10228	9198	10348
DIRVESITY ELECTION					29774	0	0
TOTAL DIRVESITY LEAD					23820		

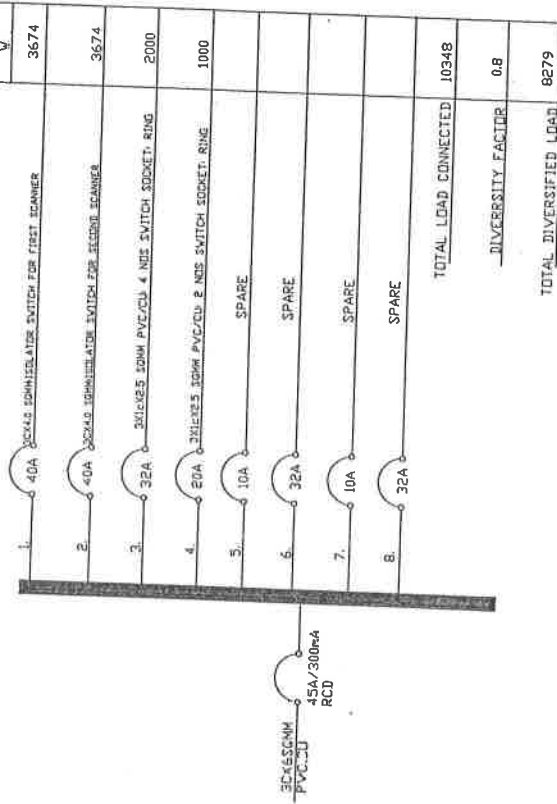
10X10 30MM ECC
 60X16 30MM PVC/SVA/PVC/CU
 8 WAY TPN DB, FITTED WITH 63A/300MA RCD INCOMER AS PER HAGER/AMERLIN CATALOG, METALCLAD, AND OUTGOING AS SPECIFIED ABOVE.

CLIENT NAME	PROJECT TITLE		Revised by	Date
TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.		CLAUDE V.	NOVEMBER 2021
			Checked by	Date
			BJJ	NOVEMBER 2021
			Scale	N.T.S
			Drawing Title: MAIN DISTRIBUTION BOARD FOR ELECTRICAL DRAWINGS	
			Drawing NO: SC/TANAPA/EL-03	

SOLAR DISTRIBUTION BOARD - DBR



CLEAN POWER DISTRIBUTION BOARD - DBK



1 -PHASE 6 WAY DB, FITTED WITH 40A/300MA RCD INCOMER AS PER ABB/MERLIN GERLIN, METALCLAD, AND OUTGOING AS SPECIFIED ABOVE.

CLIENT NAME

TANZANIA NATIONAL PARKS
P.O.BOX 3134
ARUSHA.

PROJECT TITLE

PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO BE
IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

Prepared by

DATE: NOVEMBER 2021

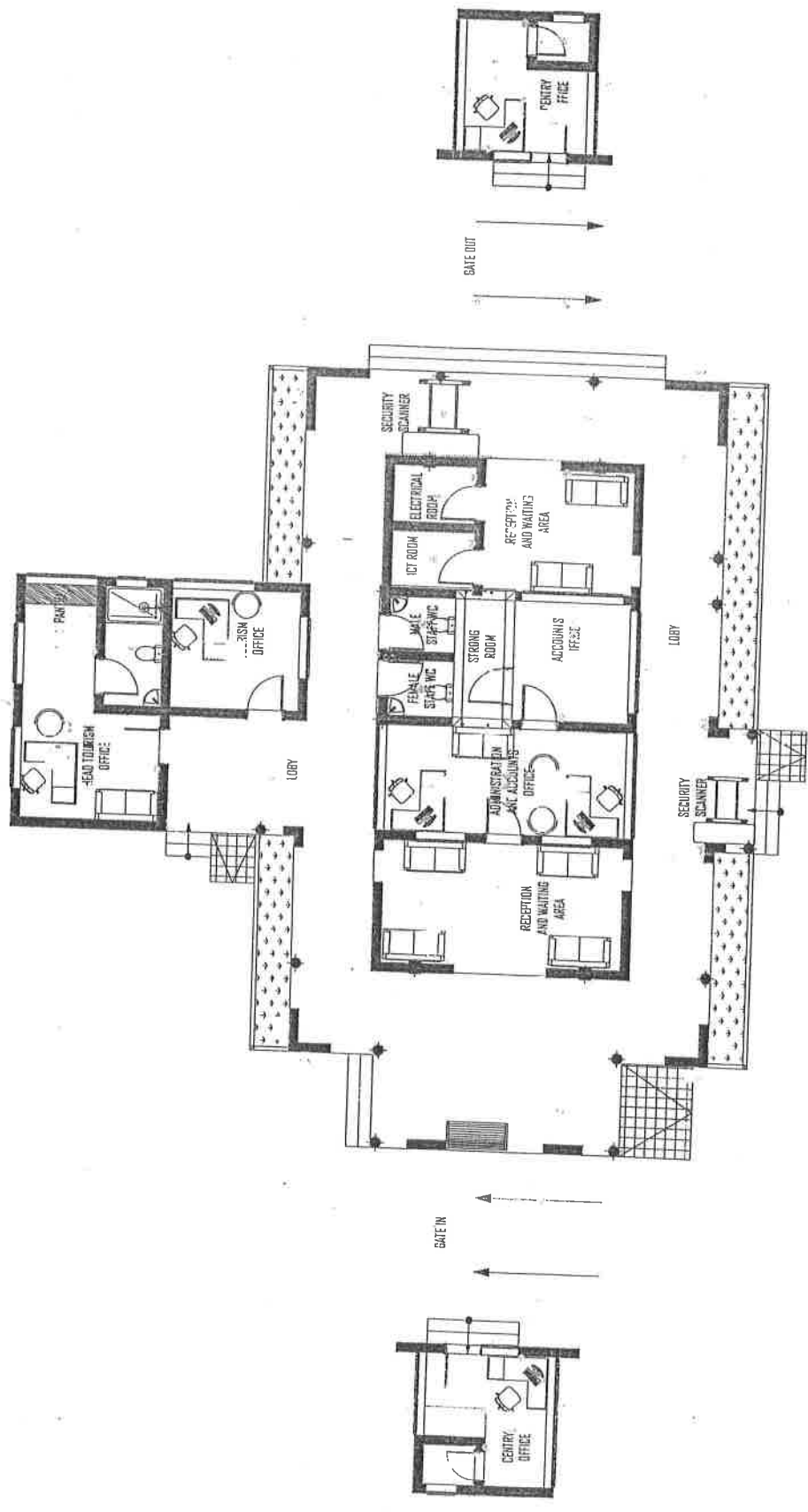
Checked by

DATE: NOVEMBER 2021

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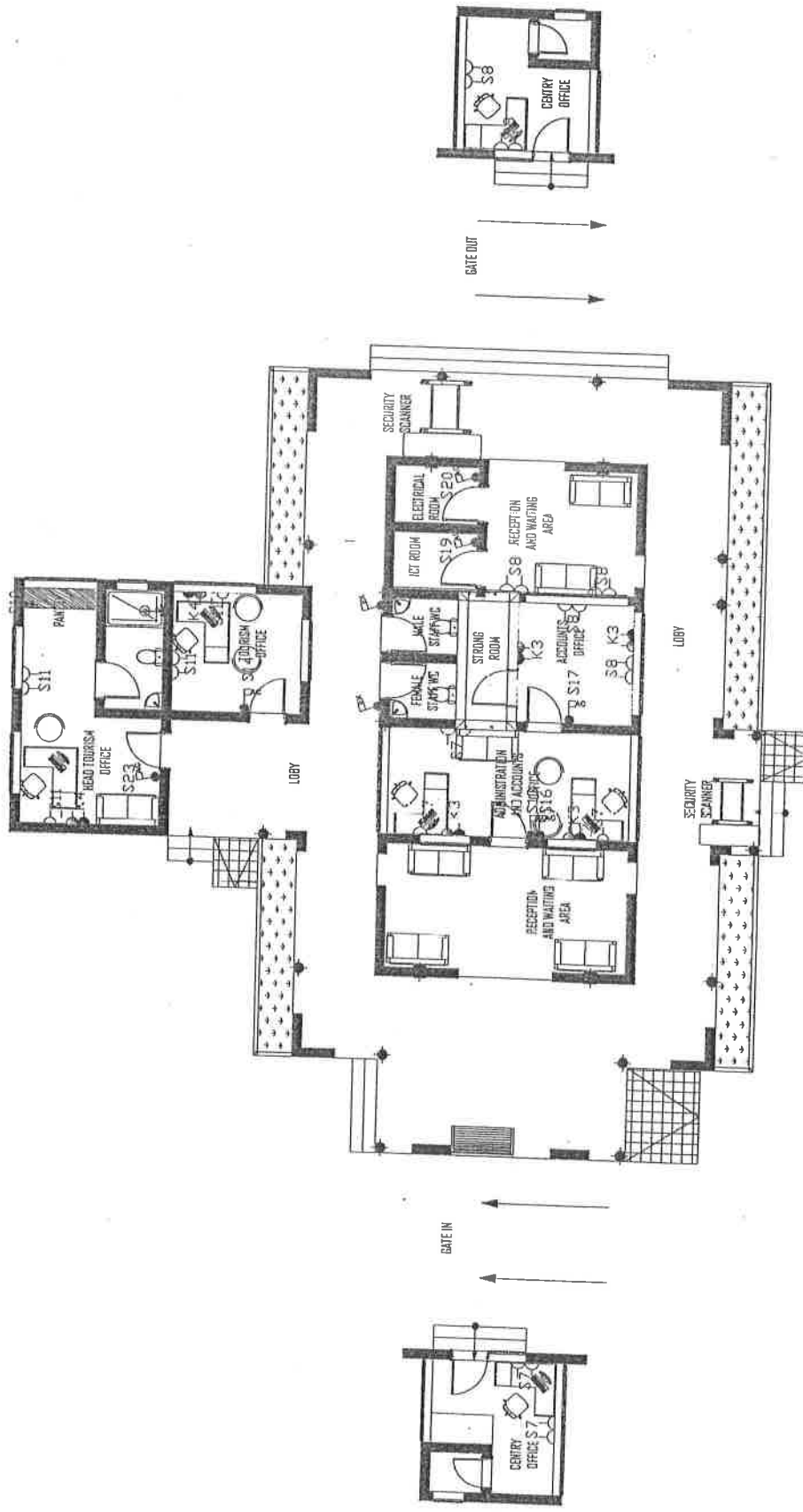
Drawing Title: SCHEMATICS DRAWINGS

Drawing NO: SC/TANAPA/EL-04



GROUND FLOOR PLAN

CLIENT NAME	PROJECT TITLE		Version	Date
TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.		Designed by: GILBERT V. Date: NOVEMBER, 2021	Drawing Title: LIGHTING LAYOUT DRAWINGS
			Drawn by: GILBERT V. Date: NOVEMBER, 2021	
			Checked by: B.J. Date: NOVEMBER, 2021	
			Scale: 1:25	
				Drawing NO: SC/TANAPA/EL-05



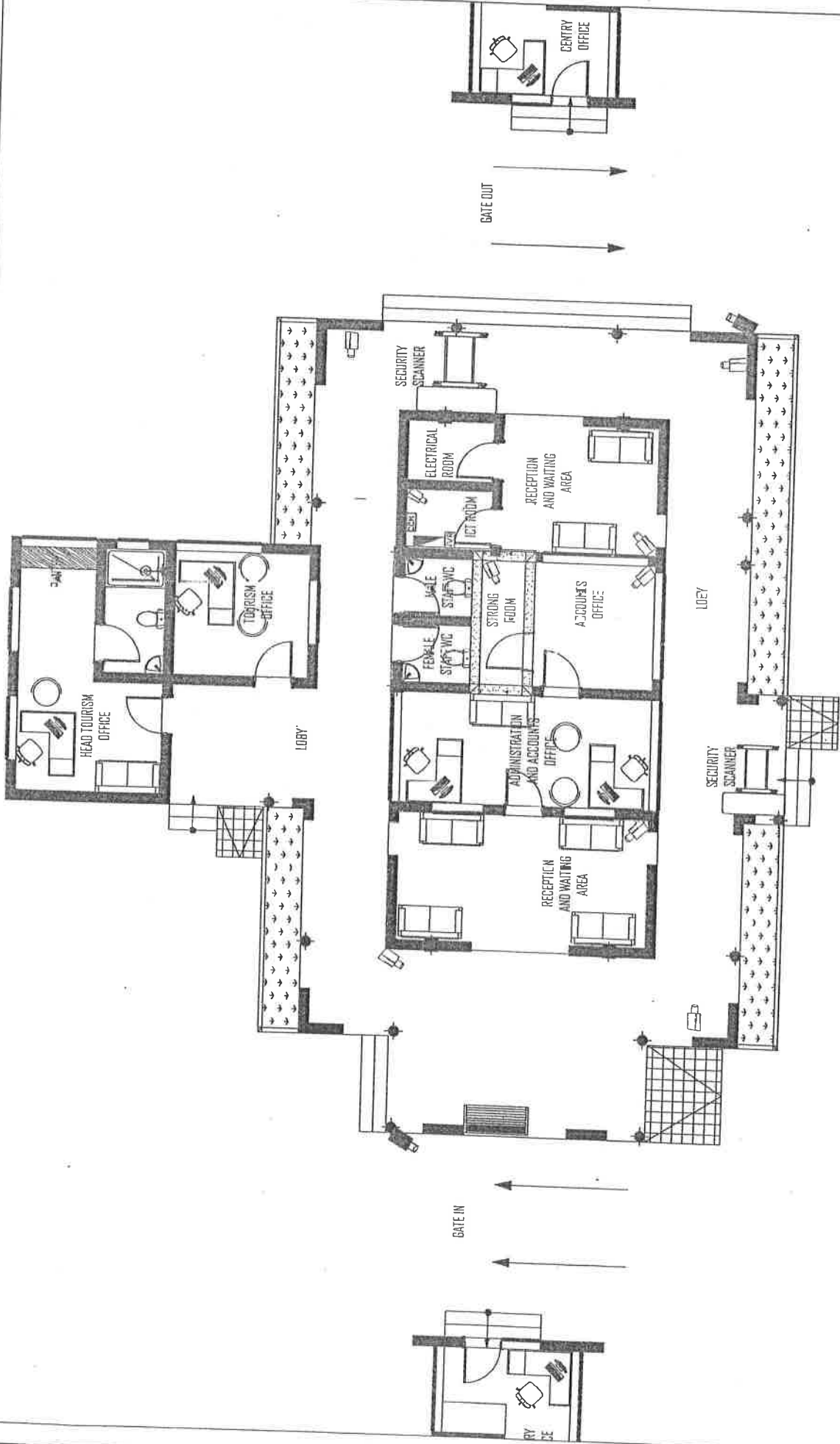
GROUND FLOOR PLAN

CLIENT NAME	TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.	PROJECT TITLE	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.
Drawing Title: POWER LAYOUT DRAWINGS	Date	Description	Date
Designed by: ELMC V.	Date: 10/01/2021	Reviewed by:	Date:
Drawn by: ELMC V.	Date: 10/01/2021	Checked by:	Date:
Checked by: BM	Date: 10/01/2021	Scale:	1:1
Drawing NO: SC/TANAPA/EL-06			

ICT LEGEND:

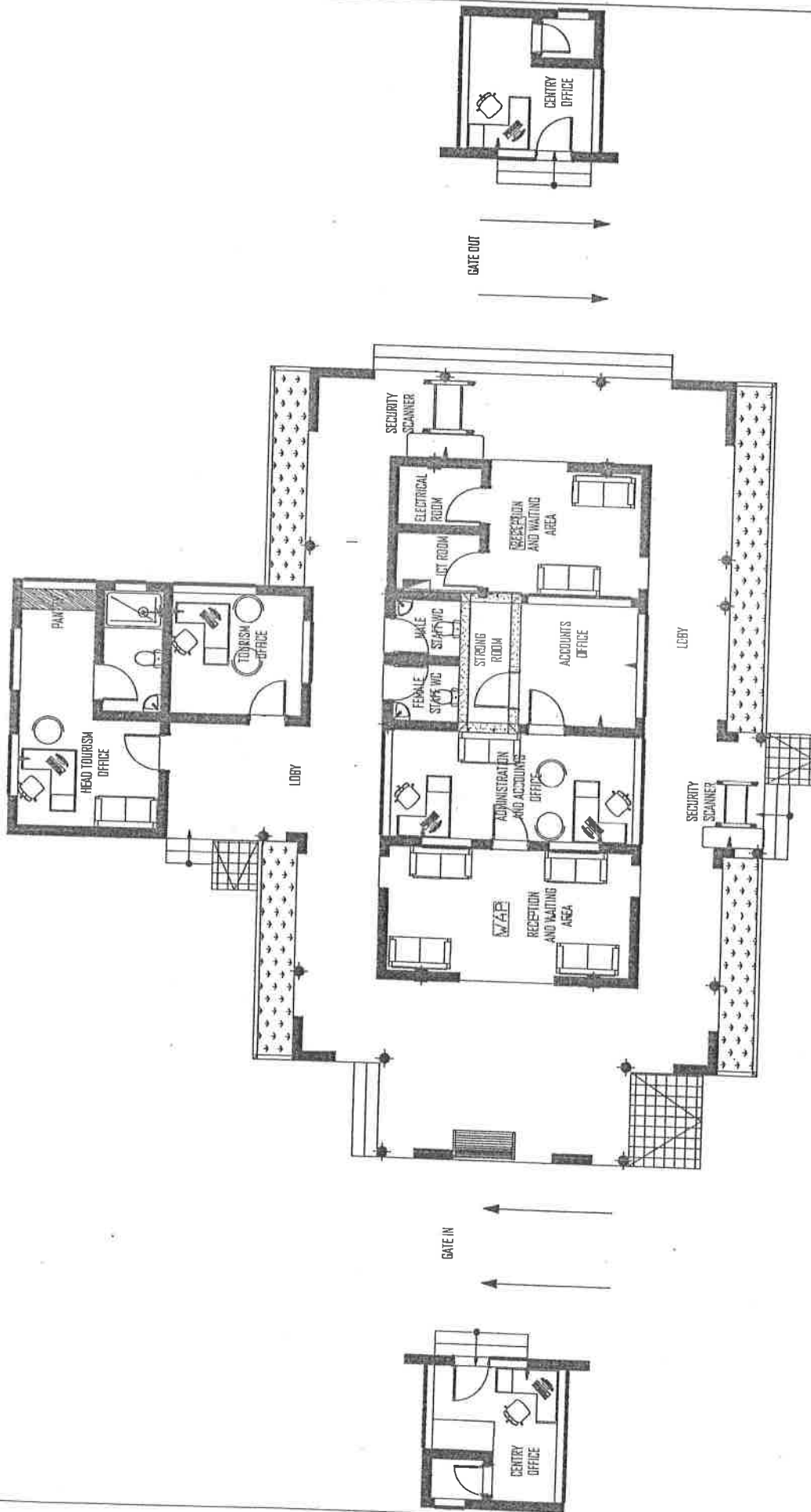
S.NO	SYMBOL	DESCRIPTION
01		DATA CABINET
02		NETWORK VIDEO RECORDER
03		CCTV MONITOR
04		DUAL RJ 45
05		WIRELESS ACCESS POINT
06		INDOOR CAMERA (CCTV)
07		OUTDOOR CAMERA (CCTV)
08		INTRUDER ALARM PANEL
09		MOTION SENSOR
10		VIBRATION SENSOR
11		KEYPAD
12		CARD READER
13		EMERGENCY BREAK GLASS
14		DOOR CONTACT WITH DOOR CLOSER
15		TV OUTLET POINT

CLIENT NAME TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.	PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.		Revision	Date
	Drawn by: NCHCT, F	Date: NOVEMBER 2021		
			Checked by: NCHCT, F	Date: NOVEMBER 2021
			Scale: 1:1	
			Drawing Title: LEGEND FOR ICT DRAWINGS	
			Drawing NO: FN/TANAPA/ICT-01	



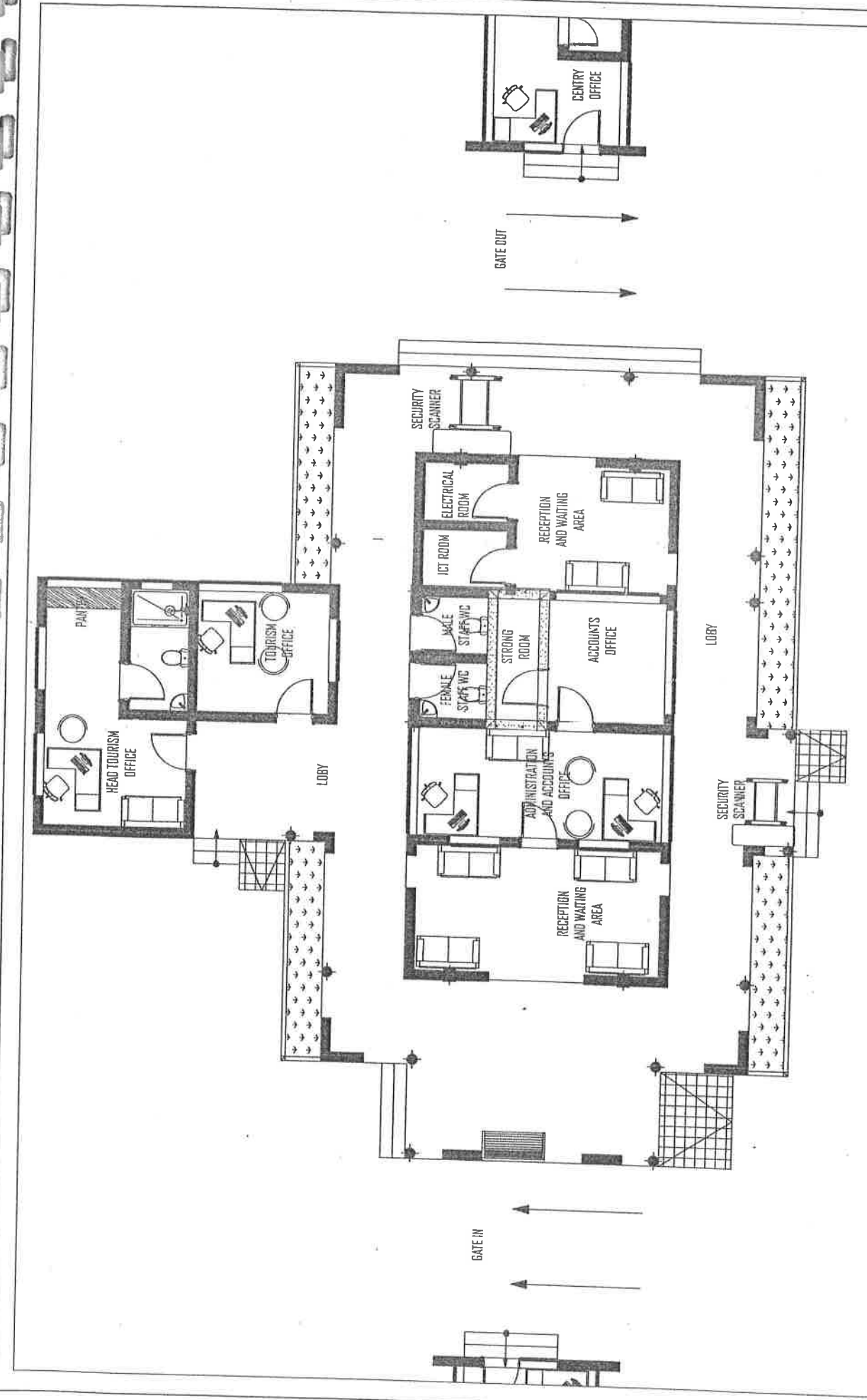
GROUND FLOOR PLAN

CLIENT NAME TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.	PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.		Drawing Title: FLOOR PLAN CCTV DRAWINGS	
	Prepared by: ARCHITECT Drawn by: ARCHITECT Checked by: ARCHITECT Scale: 1:100	Date: NOVEMBER, 2021 Date: NOVEMBER, 2021 Date: NOVEMBER, 2021	Description	Date
Drawing NO: FV/TANAPA/CCTV-02				



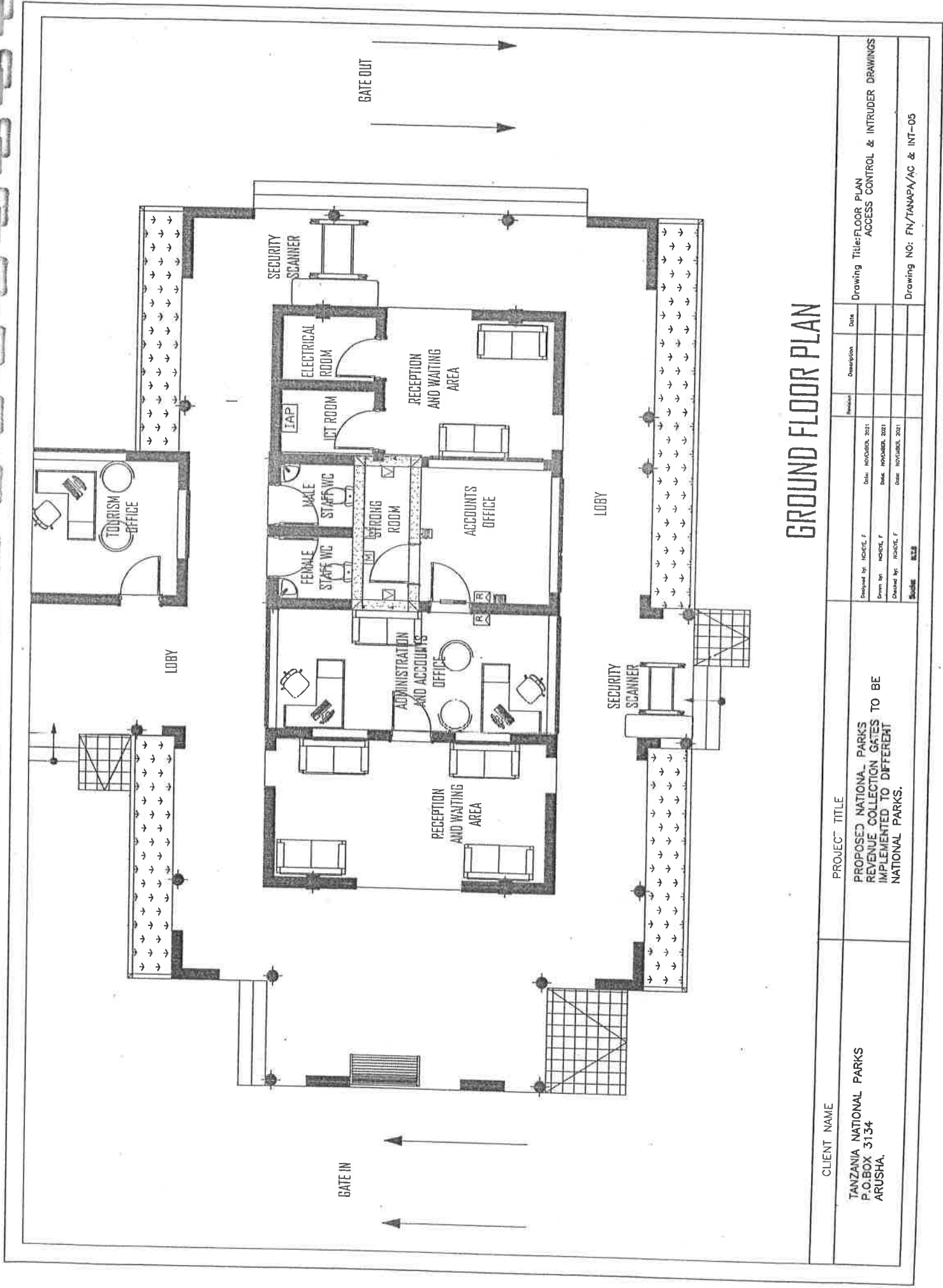
GROUND FLOOR PLAN

<p>CLIENT NAME TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.</p>	<p>PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.</p>
<p>Drawing Title: FLOOR PLAN DATA & VOICE DRAWINGS</p>	<p>Scale: 1:200</p>
<p>Designed by: MIBOTIC F Date: NOVEMBER 2021</p>	<p>Number: _____ Date: _____</p>
<p>Drawn by: MIBOTIC F Date: NOVEMBER 2021</p>	<p>Checked by: MIBOTIC F Date: NOVEMBER 2021</p>
<p>Scale: 1:200</p>	<p>Drawing NO: FN/TANAPA/DATA-03</p>



GROUND FLOOR PLAN

<p>CLIENT NAME</p> <p>TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.</p>	<p>PROJECT TITLE</p> <p>PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.</p>	<p>Drawing Title: FLOOR PLAN TV NETWORK DRAWINGS</p>	<p>Date</p>
<p>Request by: NORDIC, F Drawn by: NORDIC, F Checked by: NORDIC, F Scale: 1:250</p>	<p>Issue Date: NOVEMBER, 2021 Issue Date: NOVEMBER, 2021 Issue Date: NOVEMBER, 2021</p>	<p>Description</p>	<p>Date</p>
<p>Drawing No: FN/TANAPA/TV-04</p>			



GROUND FLOOR PLAN

<p>CLIENT NAME</p> <p>TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.</p>	<p>PROJECT TITLE</p> <p>PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.</p>	<p>Drawing Title: FLOOR PLAN ACCESS CONTROL & INTRUDER DRAWINGS</p>	<p>Drawing NO: FN/TANAPA/AC & INT-05</p>									
<p>Developed by: MARIKE F Date: NOVEMBER, 2021</p> <p>Drawn by: MARIKE F Date: NOVEMBER, 2021</p> <p>Checked by: MARIKE F Date: NOVEMBER, 2021</p> <p>Scale: 1:250</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">No.</th> <th style="width: 45%;">Description</th> <th style="width: 50%;">Date</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No.	Description	Date								
No.	Description	Date										

LEGEND

S/No.	DESCRIPTION	SYMBOLS	UNIT	QTY	MOUNTING
1.	Addressable fire control panel, 2 loops, 16 zones,		No.	01	1500mm AFFL
2.	Optical Smoke detectors as Od6-OPT, addressable complete with base		No.	15	OCL
3.	Breakglass, complete with surface -box as FML-200R		No.	05	1200mm AFFL
4.	Fireball, 6inch as ABB624		No.	03	300mm BCL
5.	Optical Heat detectors as Od6-OPT, addressable complete with base		No.	03	OCL

CLIENT NAME

TANZANIA NATIONAL PARKS
P.O.BOX 3134
ARUSHA.

PROJECT TITLE

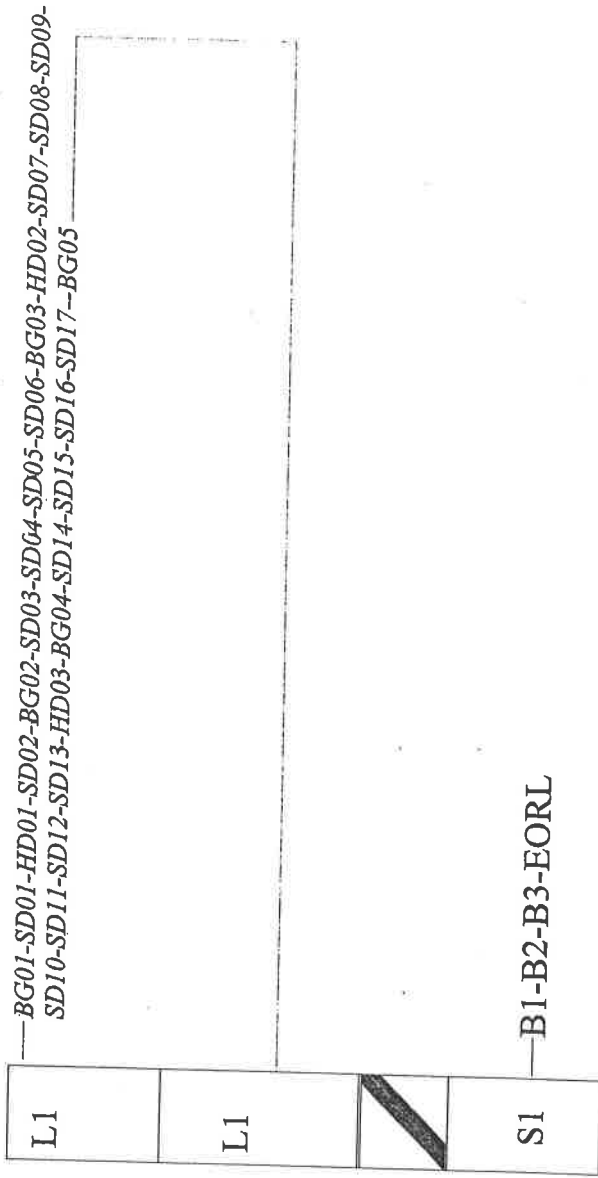
PROPOSED NATIONAL PARKS
REVENUE COLLECTION GATES TO BE
IMPLEMENTED TO DIFFERENT
NATIONAL PARKS.

Drawing Title: LEGEND FOR FIRE DETECTION AND
ALARM SYSTEM

Author	Description	Date
Designed by: ELIAS V.	Checked by: ALL	Date: NOVEMBER, 2021
Drawn by: DAVID V.	Scale: A3:1	Date: NOVEMBER, 2021
Checked by: ALL		Date: NOVEMBER, 2021

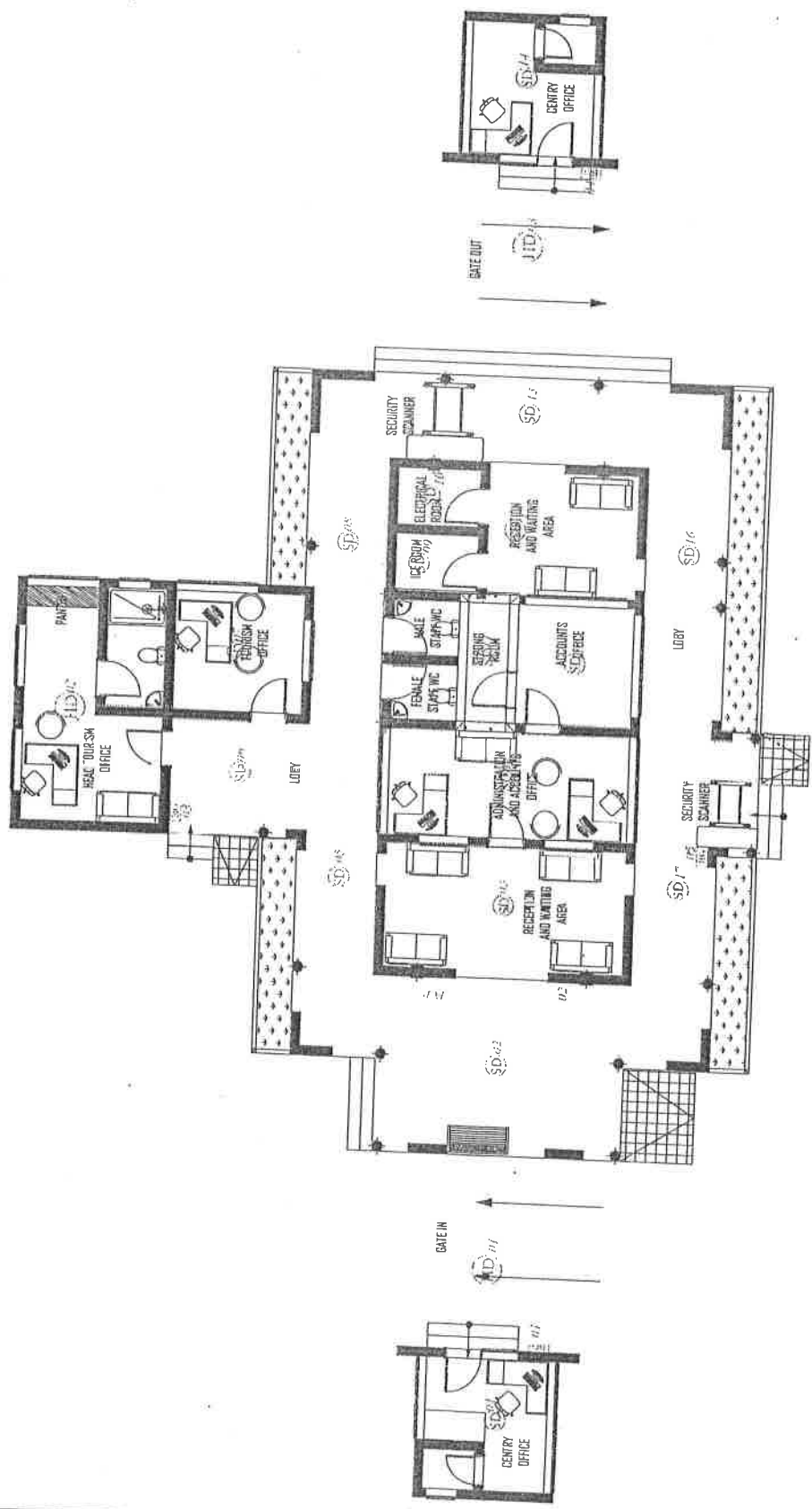
Drawing NO: SC/TANAPA/FA-01

SCHEMATIC



1 L00PS-16 ZONES ADDRESSABLE FIRE DETECTION AND ALARM PANEL SCHEMATIC

CLIENT NAME	PROJECT TITLE		Number	Description	Date
TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.	PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.				
	Designed by	DATE Y.	Date	NOVEMBER 2021	
	Drawn by	DATE Y.	Date	NOVEMBER 2021	
	Checked by	DATE	Date	NOVEMBER 2021	
	Scale	N.T.S.			
	Drawing Title: FIRE DETECTION AND ALARM SYSTEM LAYOUT				
	Drawing NO: SC/TANAPA/FA-02				



GROUND FLOOR PLAN

<p>CLIENT NAME TANZANIA NATIONAL PARKS P.O. BOX 3134 ARUSHA.</p>	<p>PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.</p>	<p>Designed by: DAVID V. Date: NOVEMBER, 2021 Drawn by: DAVID V. Date: NOVEMBER, 2021 Checked by: BAF Date: NOVEMBER, 2021 Scale: N.T.S.</p>	<p>Drawing Title: FIRE DETECTION AND ALARM SYSTEM DRAWINGS</p>	<p>Drawing NO: SC/TANAPA/FA-03</p>
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LEGEND:

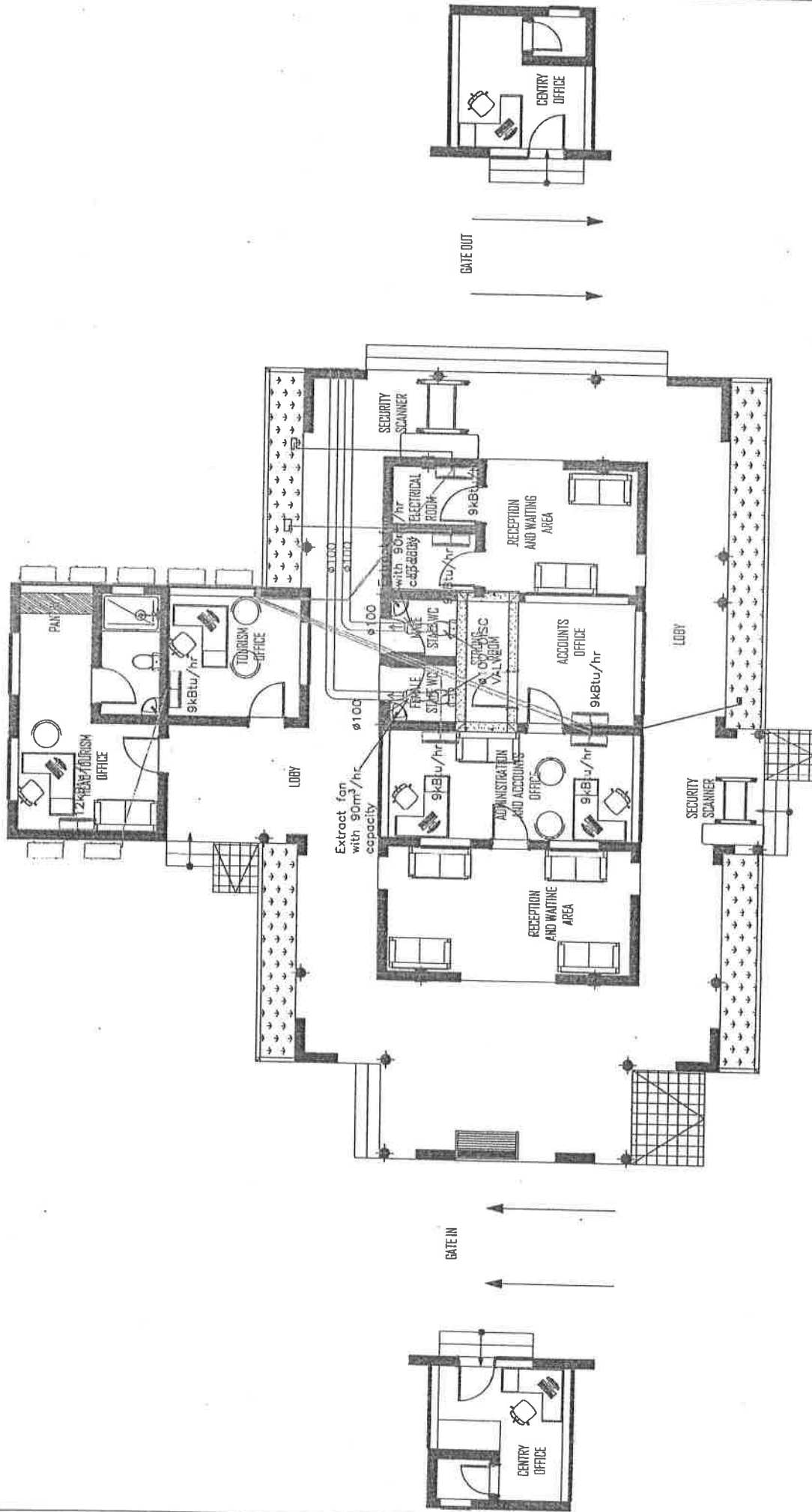
HVAC INSTALLATION SYMBOLS

S/No.	DESCRIPTION	SYMBOLS	MOUNTING
1.	Out door unit		as indicated
2	Wall mounted indoor unit		on wall
3	Drainage pipe	—	parallel to wall
4	Refrigerant pipe	—	parallel to wall/in ceiling
5	Extract air duct	—	through ceiling

GENERAL NOTES

1. INSTALLATION OF EQUIPMENT, PIPE AND FITTINGS SHALL BE CARRIED OUT BY SPECIALIST CONTRACTORS FOR AIR-CONDITIONING AND APPROVED BY CONTRACTOR REGISTRATION BOARD (CRB) OF TANZANIA; TO RELEVANT CODES OF PRACTICE AND STANDARDS IN ACCORDANCE WITH MANUFACTURERS' SPECIFICATIONS.
2. REFRIGERANT (LIQUID AND GAS) PIPES SHALL BE SEAMLESS COPPER TUBES TO BS 2871.
3. REFRIGERANT PIPES SHALL BE INSULATED AS RECOMMENDED BY MANUFACTURER.
4. REFRIGERANT PIPE INSULATION MATERIALS SHALL BE CHEMICAL CROSS LINKED FOAM POLYETHYLENE TYPE OR EQUIVALENT THICKNESS AS RECOMMENDED BY MANUFACTURER. VAPOUR BARRIER COMPOUND SHALL BE INCLUDED.
5. CONDENSING WATER DRAIN PIPES SHALL BE UPVC PIPE AND SHALL BE INSULATED. MATERIAL AS SPECIFIED AND THICKNESS 6mm.
6. PIPE WORK SHALL FOLLOW THE LINES OF WALLS ALONG THE PROVIDED SPACES. PROPER PROTECTION SLEEVES SHALL BE PROVIDED WHERE PIPES RUN THROUGH WALLS/GLASS. OUTDOOR PIPES SHALL BE RUN THROUGH WALLS/GLASS.
7. ALL REMOTE CONTROLLERS SHALL BE WIRELESS.
8. POSITIONS OF UNITS AND ROUTES FOR TRUNKING ARE JUST PROVISIONAL. EXACT POSITIONS AND ROUTES SHALL BE AGREED ON SITE.
9. ELECTRICAL INSTALLATION SHALL BE CARRIED OUT BY APPROVED CONTRACTOR AND IN ACCORDANCE WITH LATEST IEE REGULATIONS.
10. POWER SUPPLY TO THE OUTDOOR CONDENSING UNITS SHALL BE BY THE ELECTRICAL CONTRACTOR.
11. INTER-UNIT WIRING BETWEEN INDOOR AND OUTDOOR AIR CONDITIONING UNITS SHALL BE BY THE AIR CONDITIONING CONTRACTOR.
12. THE ENGINEER WILL NOT BE HELD RESPONSIBLE FOR DIMENSIONAL ERRORS IF NOTIFIED AT THE TIME OF COMMENCING WORK AT SITE.

CLIENT NAME TANZANIA NATIONAL PARKS P.O.BOX 3134 ARUSHA.	PROJECT TITLE PROPOSED NATIONAL PARKS REVENUE COLLECTION GATES TO BE IMPLEMENTED TO DIFFERENT NATIONAL PARKS.		Designed by: MWAHA.S.C	Date: NOVEMBER, 2021	Drawing Title: LEGEND FOR AIR CONDITIONING DRAWINGS
			Drawn by: MWAHA.S.C	Date: NOVEMBER, 2021	
			Checked by: M.E	Date: NOVEMBER, 2021	
			Scale: N.T.S		Drawing NO: SC/TANAPA/AC-01



CLIENT NAME
 TANZANIA NATIONAL PARKS
 P.O.BOX 3134
 ARUSHA.

PROJECT TITLE
 PROPOSED NATIONAL PARKS
 REVENUE COLLECTION GATES TO BE
 IMPLEMENTED TO DIFFERENT
 NATIONAL PARKS.

Drawing Title: FLOOR PLAN
 AIR CONDITIONING DRAWINGS

Rev/No	Description	Date
01	Developed by: MWAMBA, S.C	Date: NOVEMBER, 2021
02	Drawn by: MWAMBA, S.C	Date: NOVEMBER, 2021
03	Checked by: T.C	Date: NOVEMBER, 2021
04	Scale: N.T.S	

Drawing NO: SC/TANAPA/AC-02

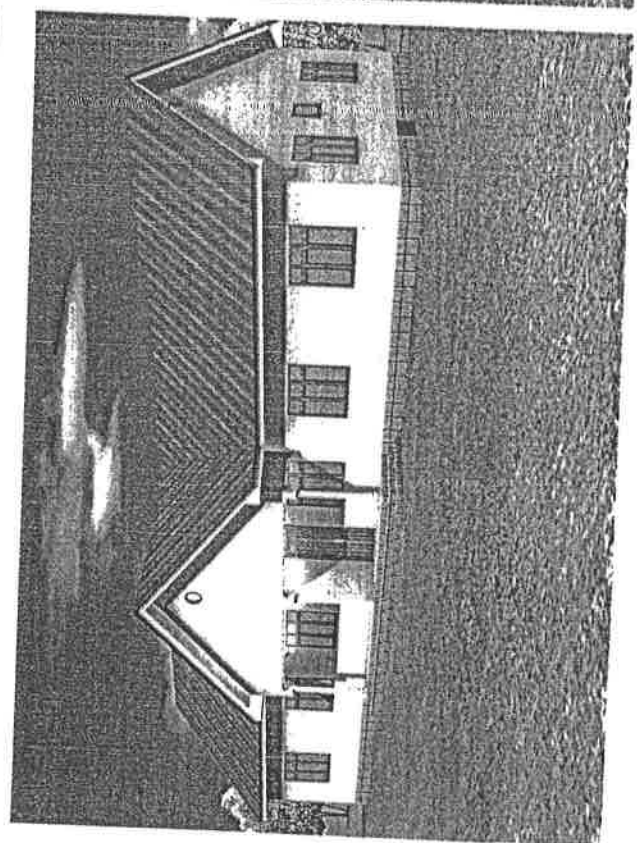
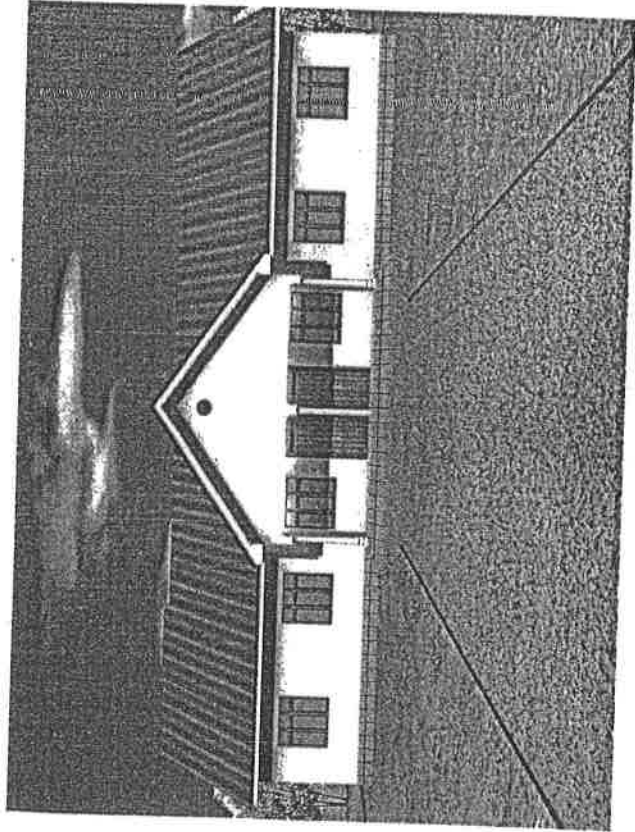
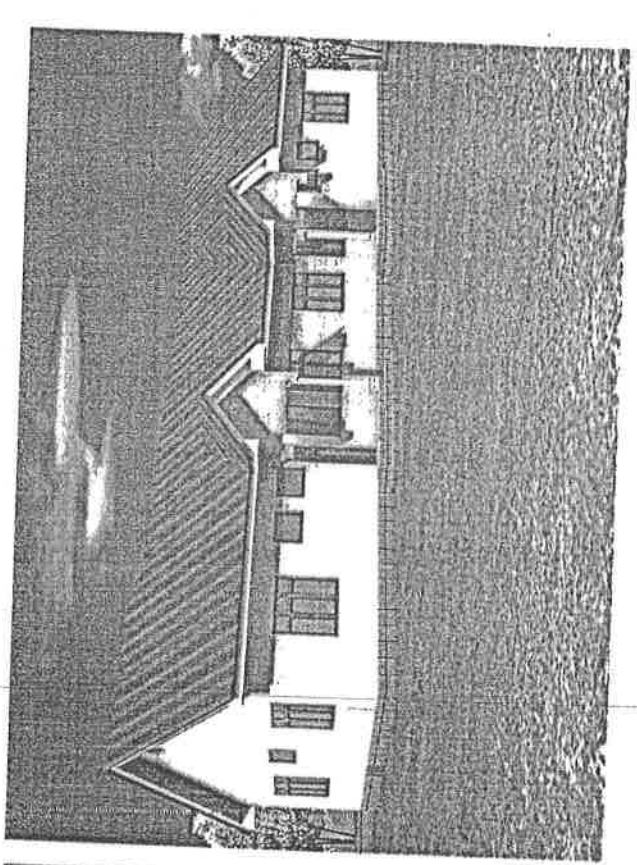
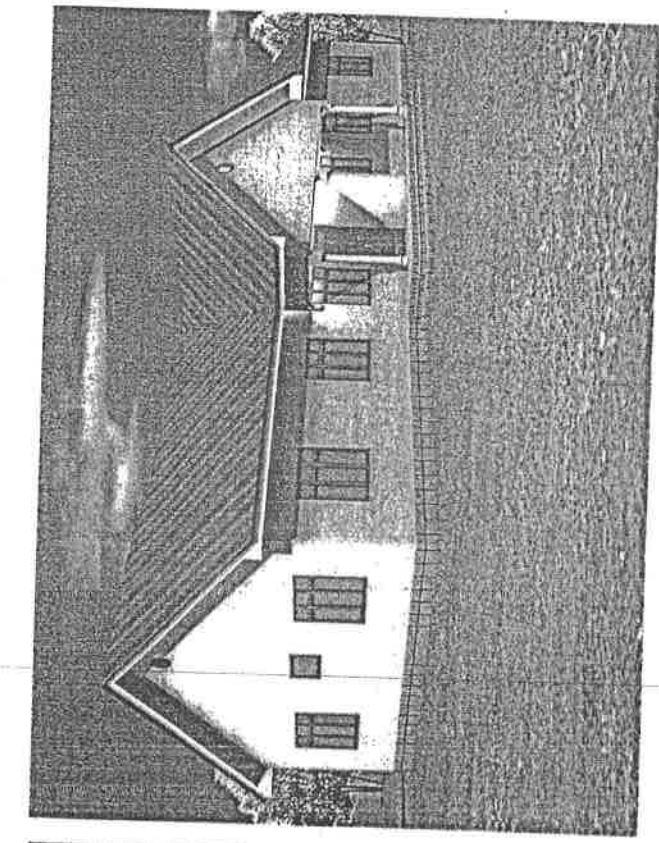
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 3184
ARUSHA

Title	3D'S PERSPECTIVES
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
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5. Building construction regulations are to be followed.

Project:

PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA

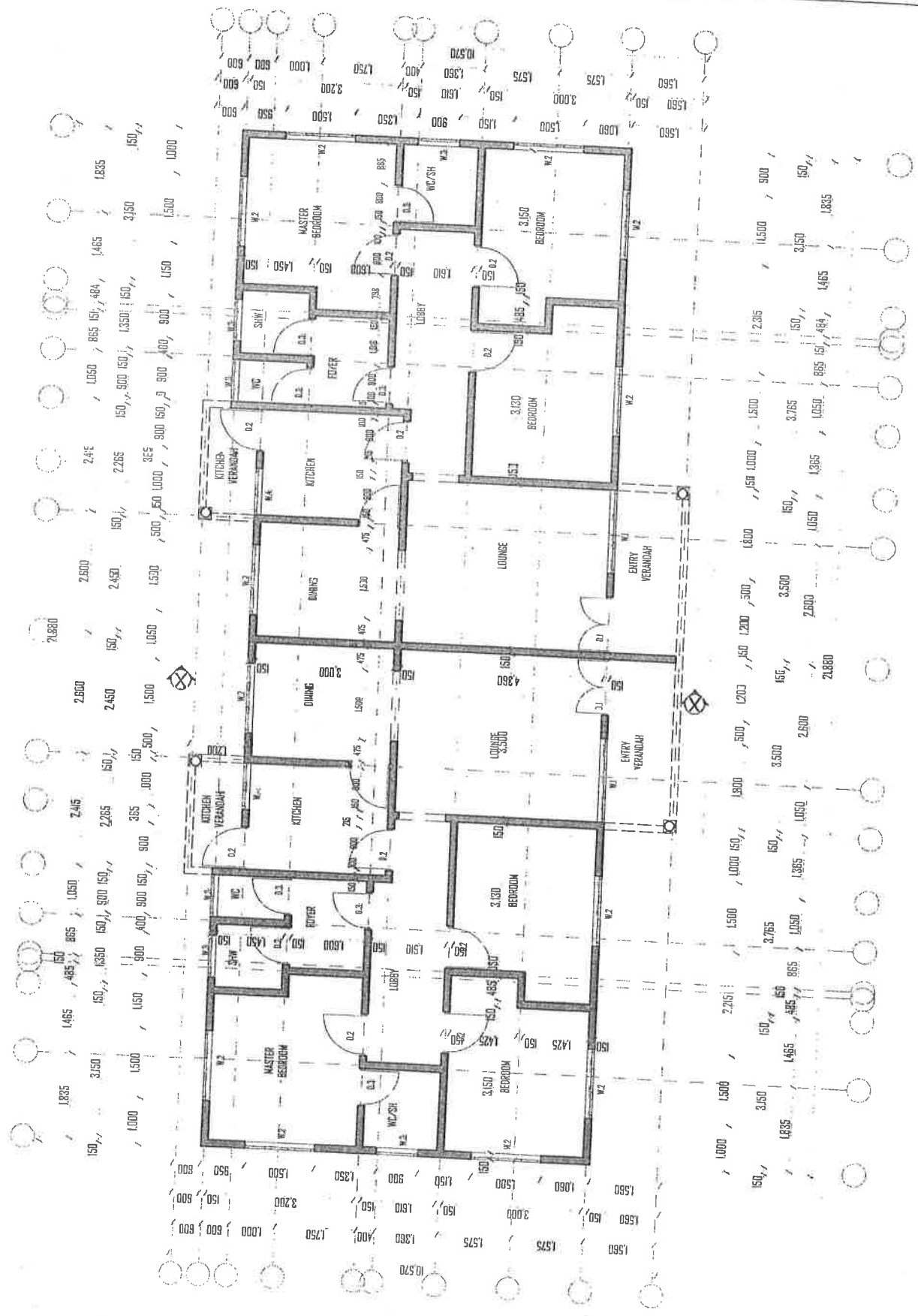
Title
FLOOR PLAN

Designed by:
FDK

Drawn by:
FDK

Checked by:
CONS. ENG. R.J. MATOLO

Scale
1:100



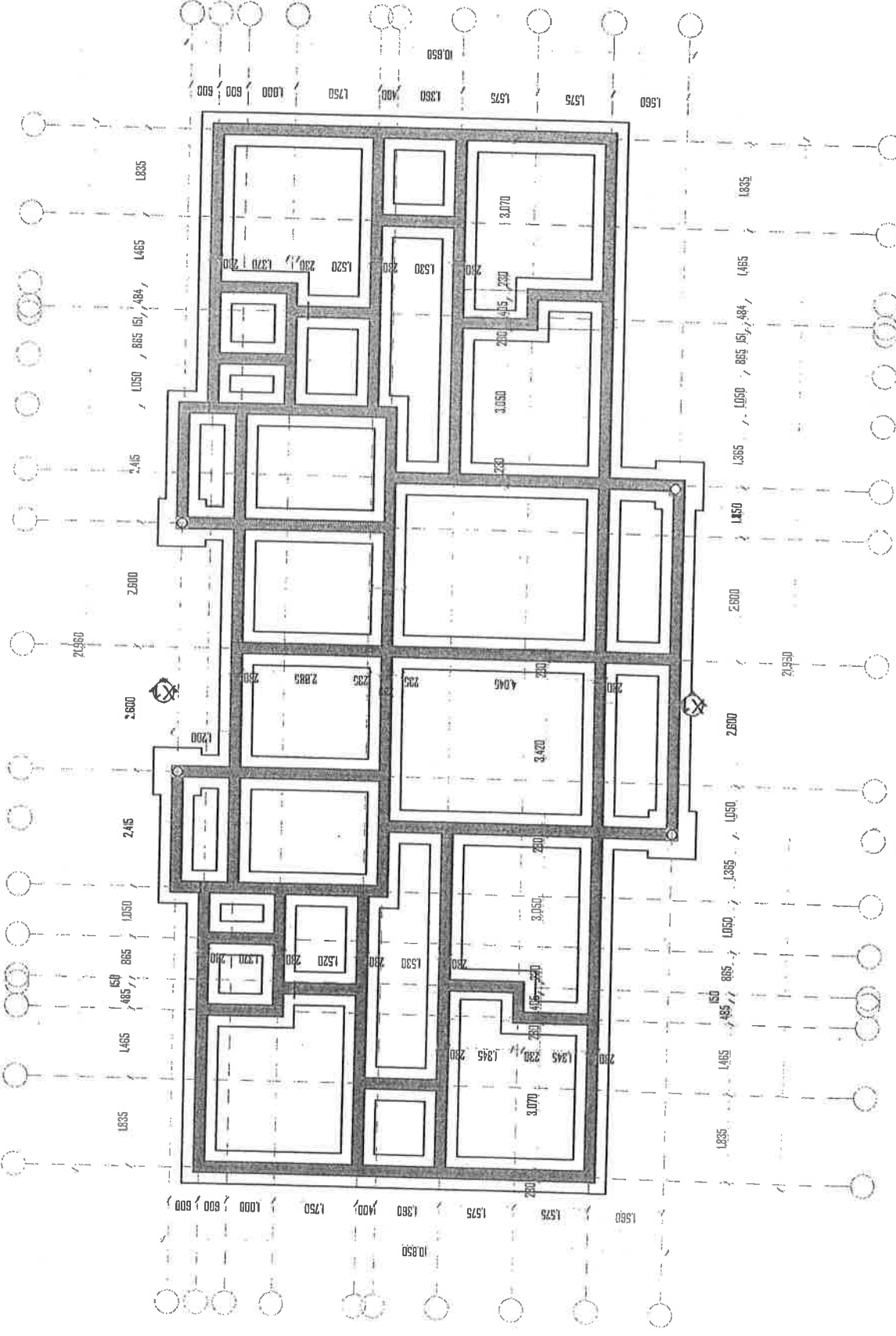
GENERAL NOTES

- 1. All dimension are in mm.
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Project
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA

Title	FOUNDATION PLAN
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



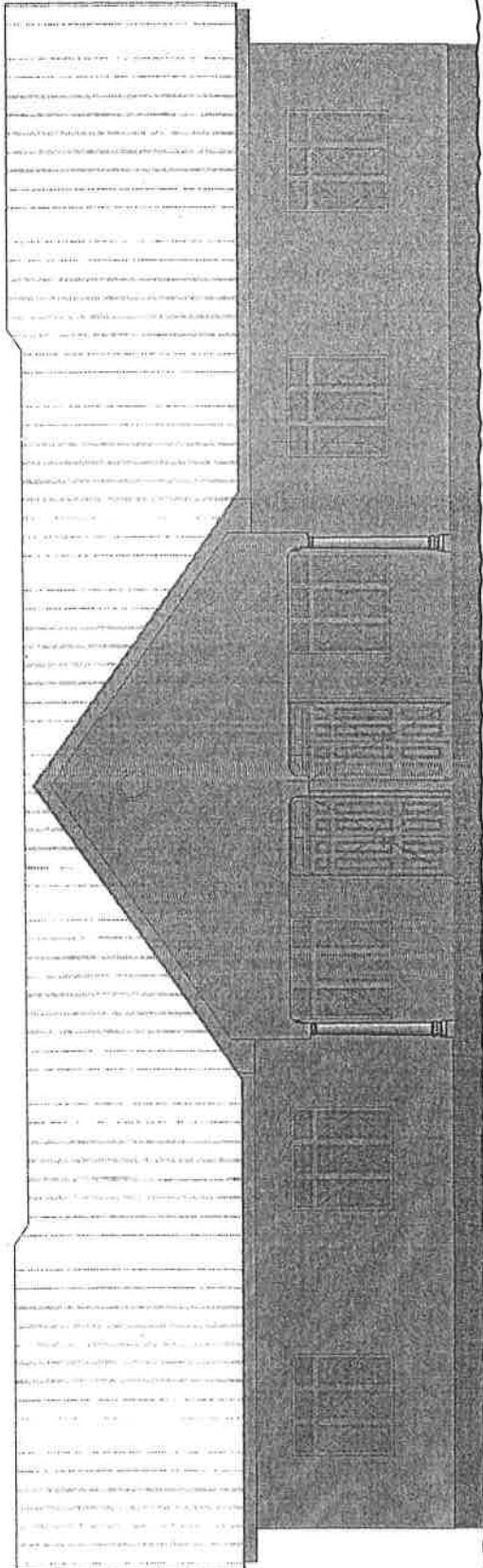
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
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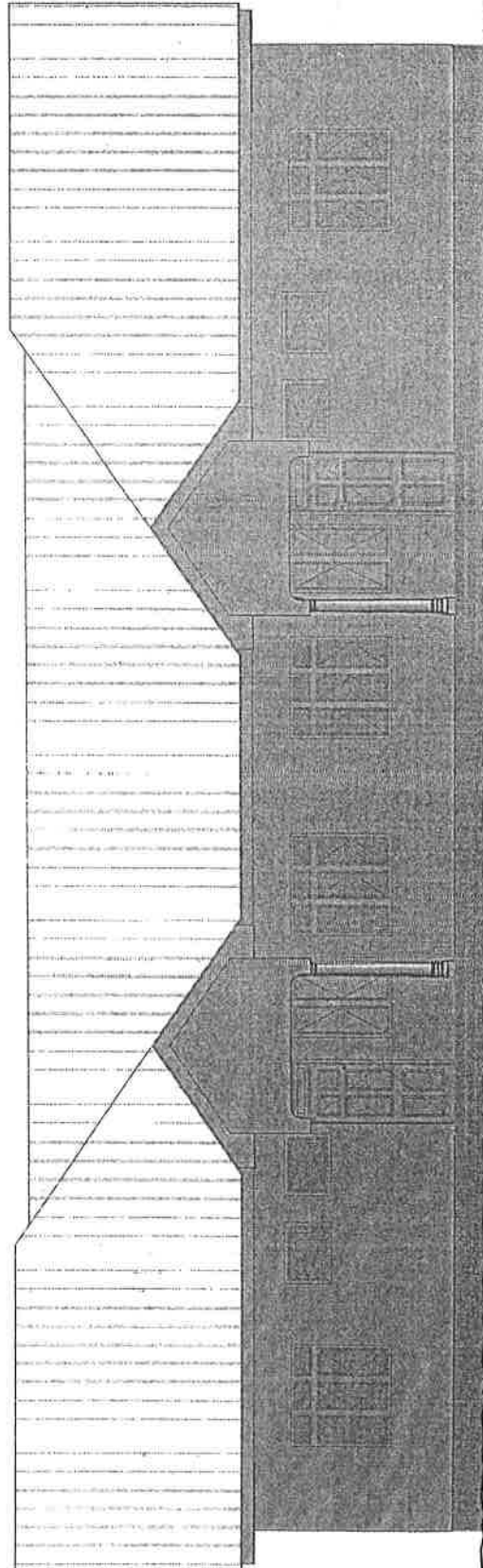
Project:
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 364
ARUSHA

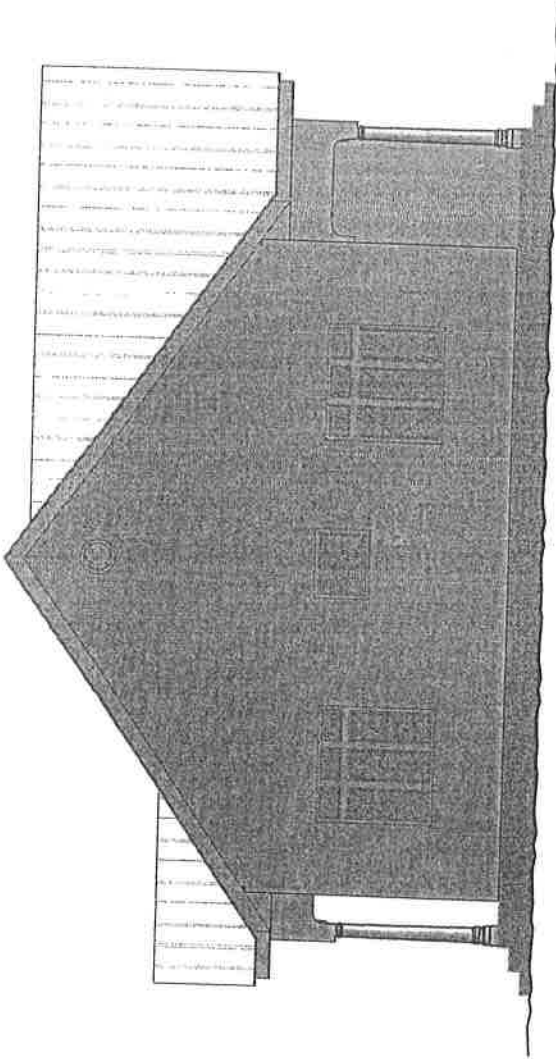
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Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100
Date	OCTOBER, 2021



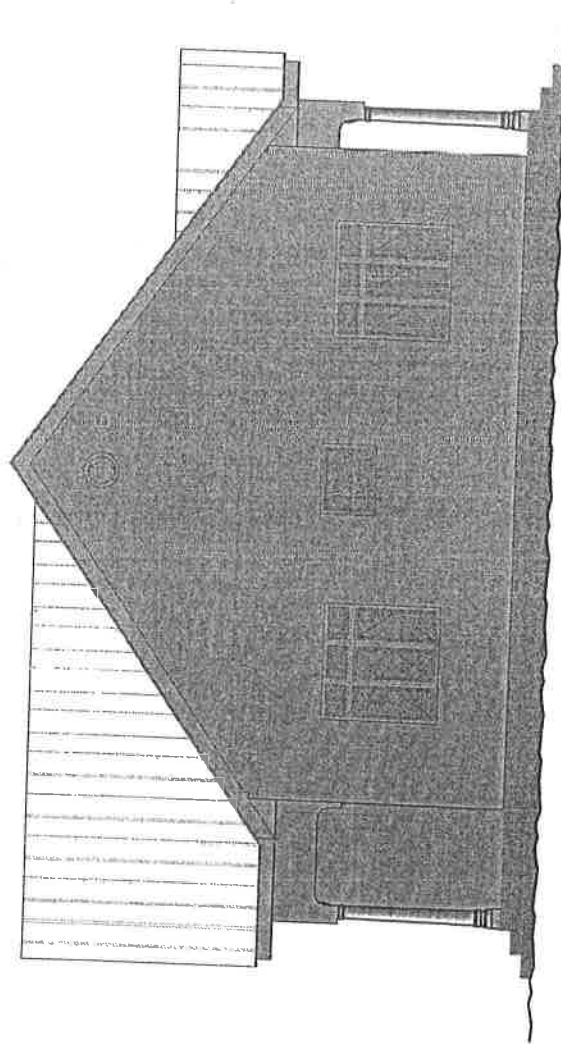
FRONT ELEVATION



REAR ELEVATION



RIGHT H. S. ELEVATION



LEFT H. S. ELEVATION

GENERAL NOTES

1. All dimensions are in mm.
2. Foundation walls are to be 230mm thick.
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Project

PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client

TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA

Title

ELEVATIONS

Designed by: FOK

Drawn by: FOK

Checked by: CONS. ENG. R.J. MATILO

Scale: 1:100

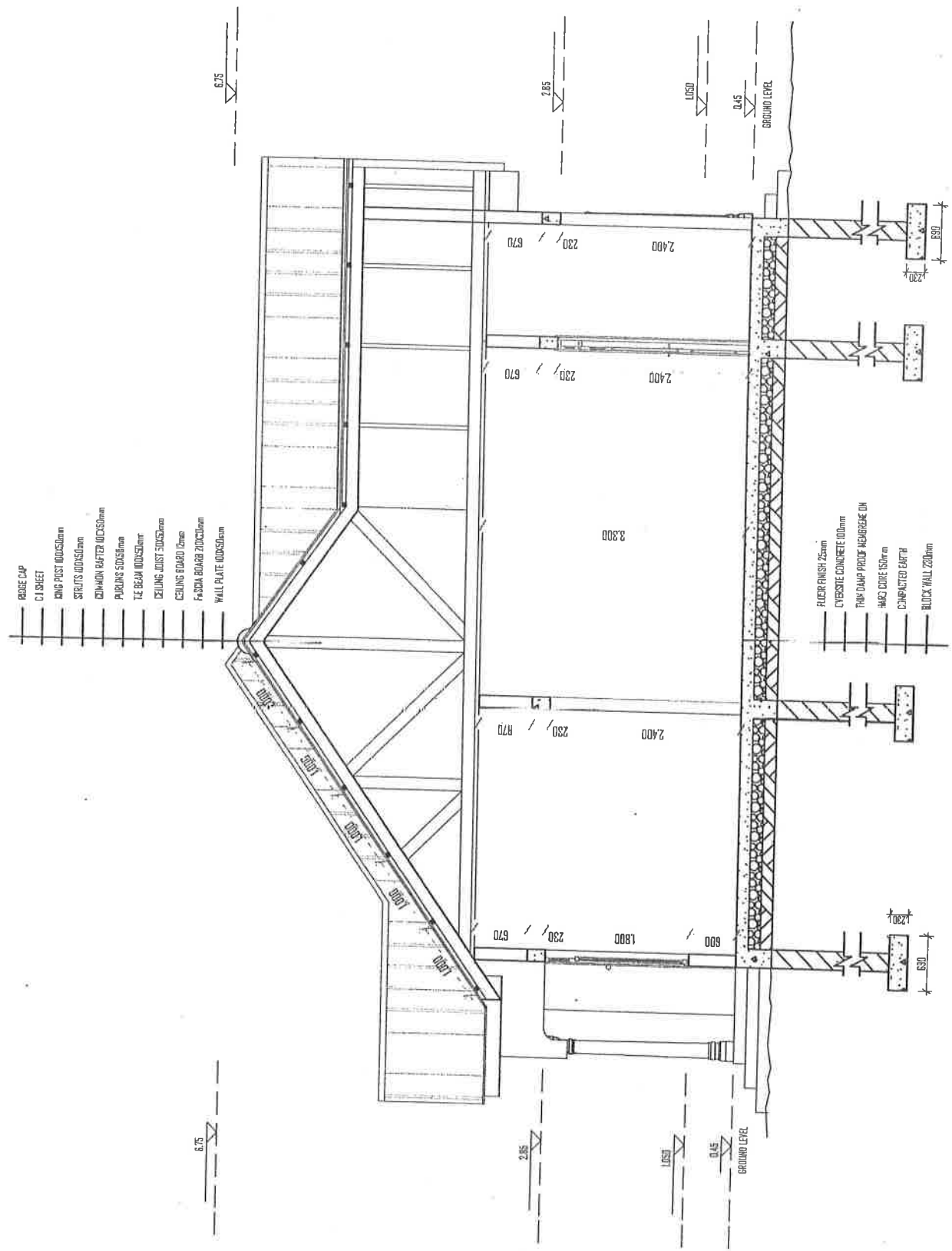
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

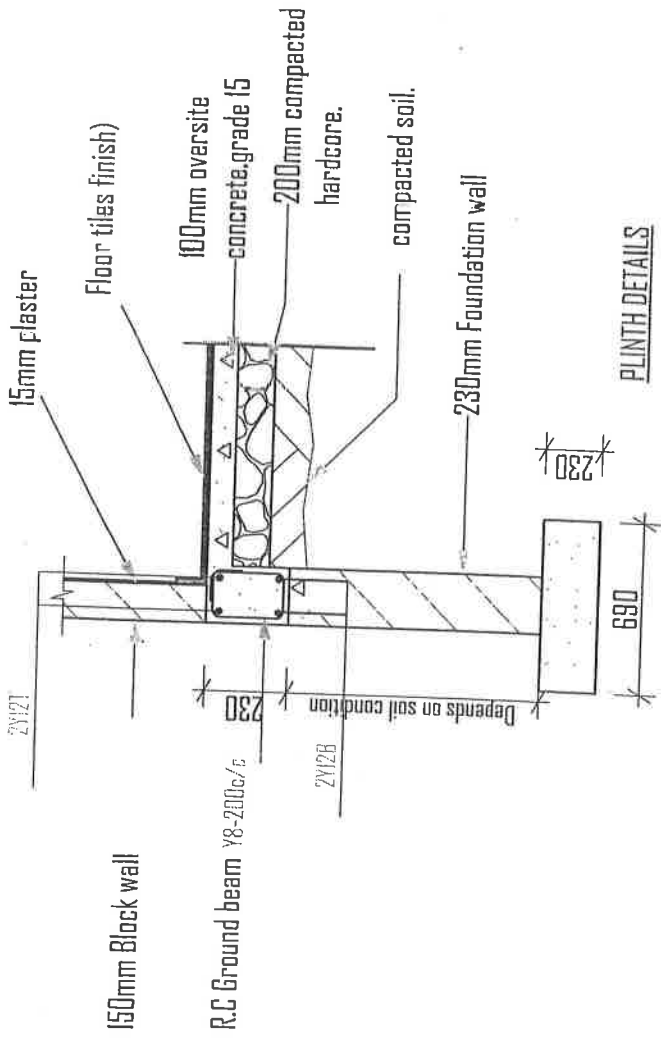
Project:
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA

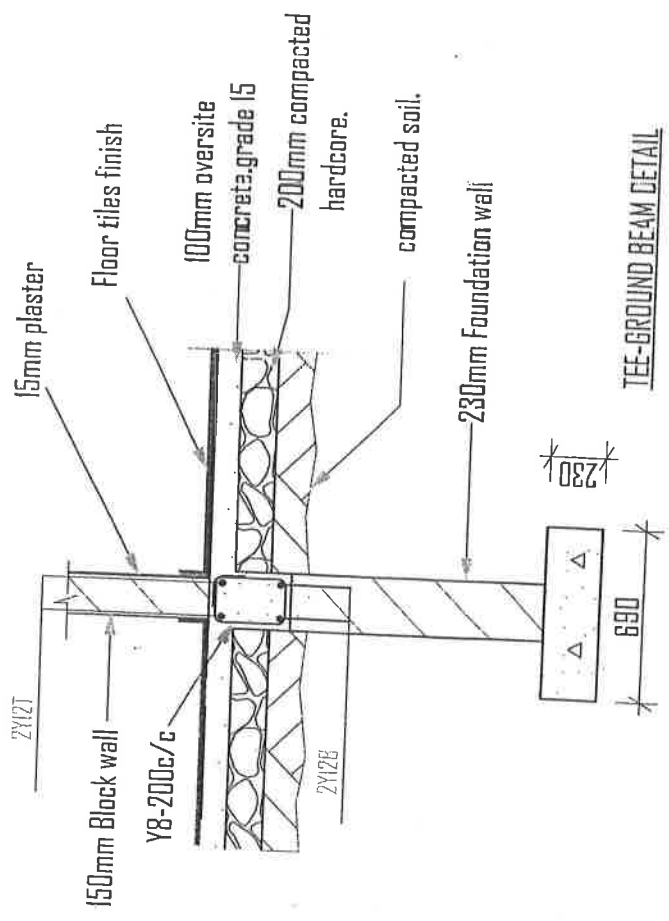
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Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



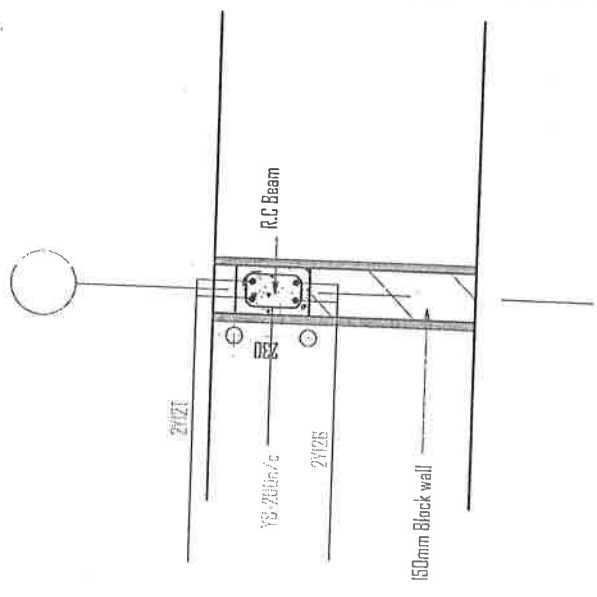
SECTION X-X'



PLINTH DETAILS



TEE-GROUND BEAM DETAIL



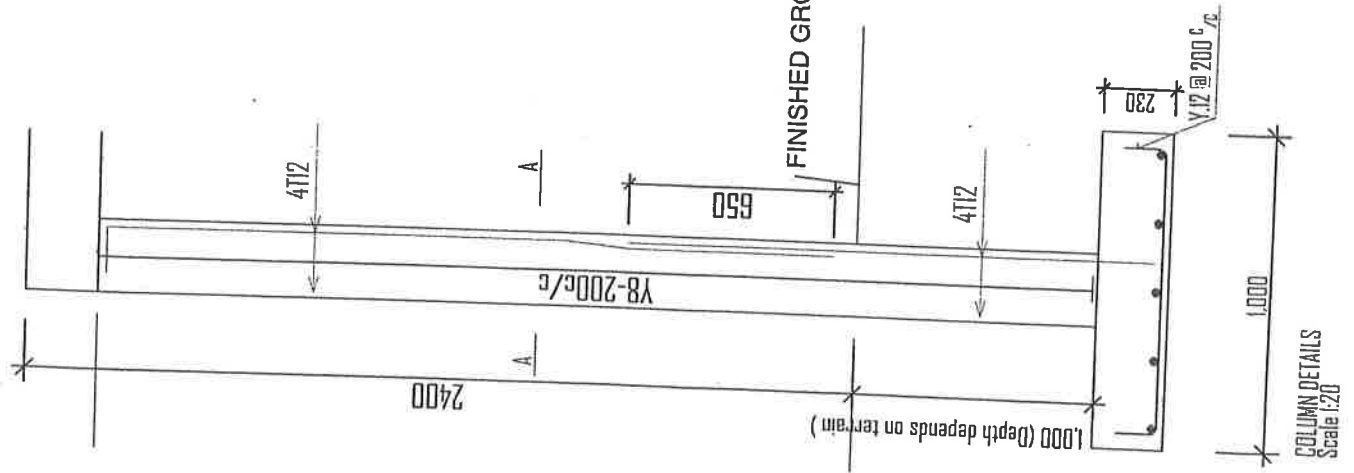
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
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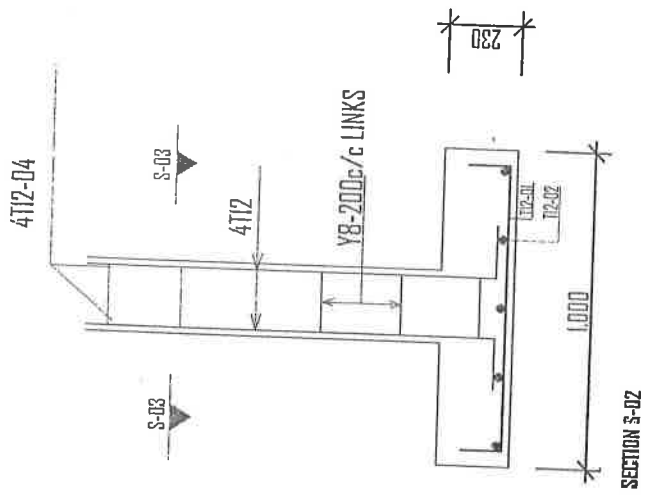
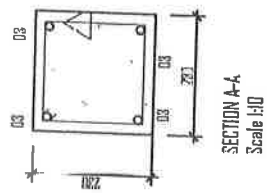
Project:
 PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF
 HOUSE IN TANZANIA NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS
 P.O. BOX 3134
 ARUSHA

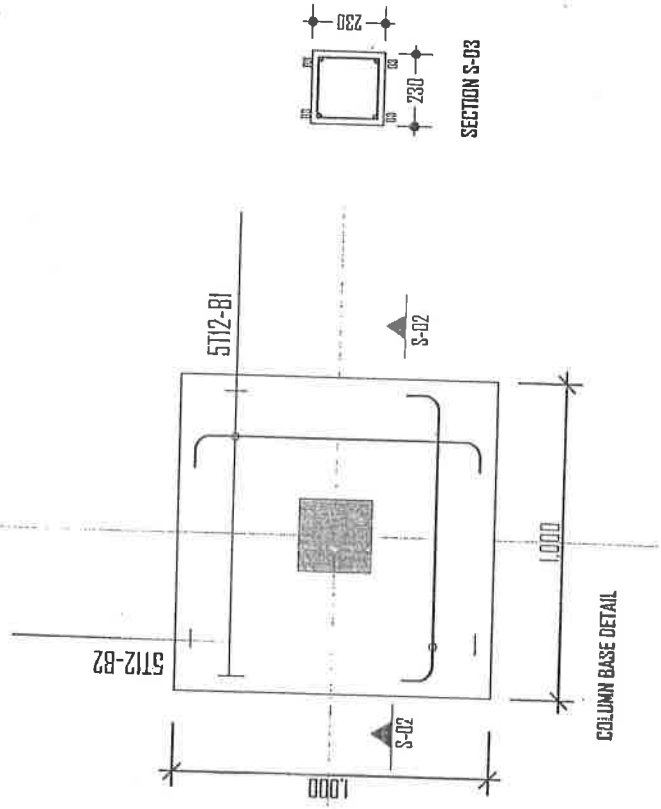
DETAILS	
Title	
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



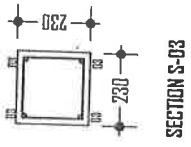
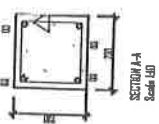
COLUMN DETAILS
Scale 1:20



SECTION S-02



COLUMN BASE DETAIL



SECTION S-03

GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
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4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF
HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 8134
ARUSHA

Title	DETAILS
Designed by:	FOK
Drawn by:	FOK
Checked by:	CDNS. ENG. R.J. MATOLO
Scale	1:100

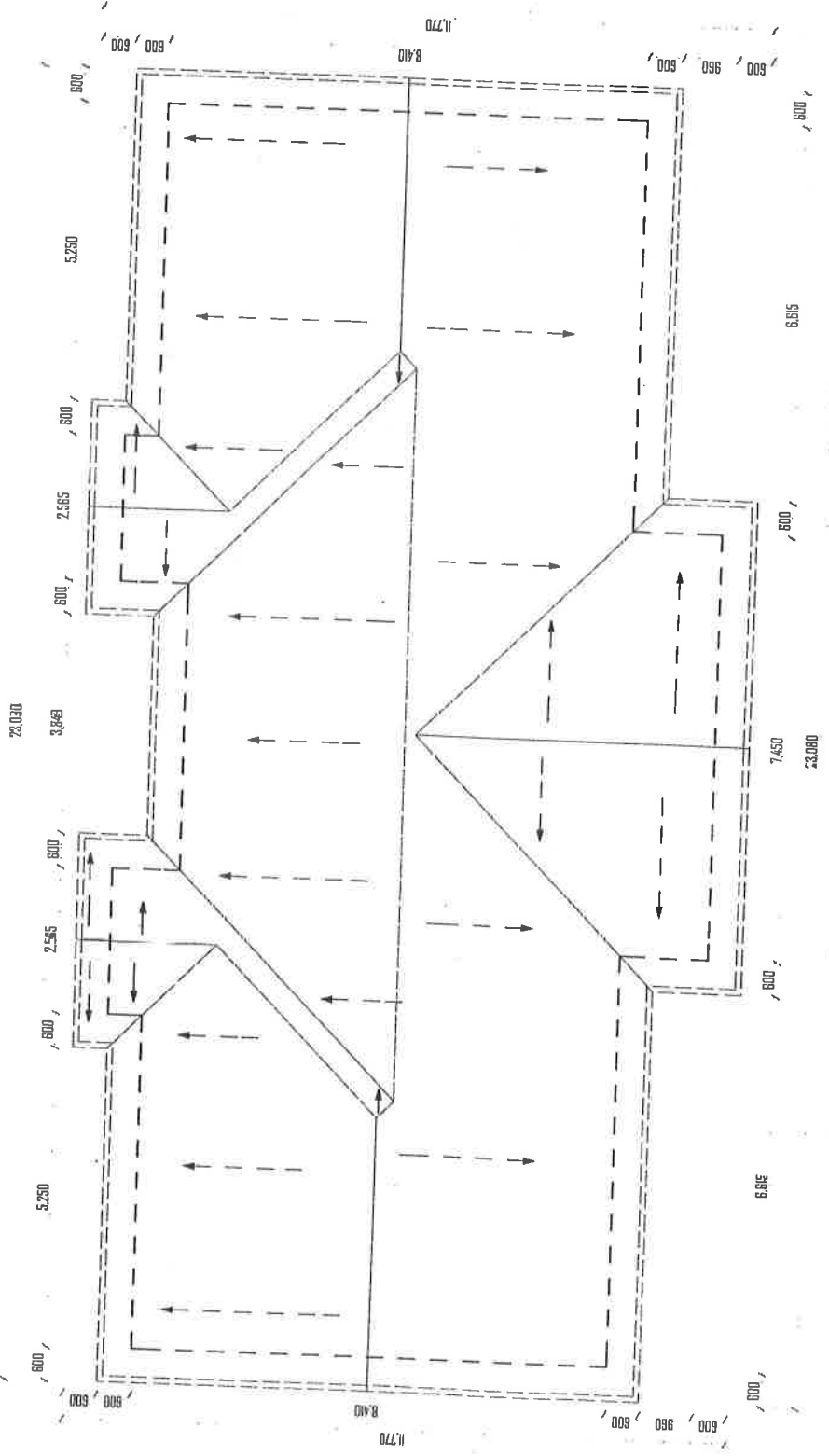
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
 P.O. BOX 3134
 ARUSHA

Title	ROOF PLAN
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



DOORS AND WINDOWS SCHEDULE

TYPE	No.	WIDTH	HEIGHT	REMARKS
D.1	2	1,200mm	2,400mm	Timbers panel doors
D.2	10	900mm	2,400mm	Timbers panel doors
D.3:	8	800mm	2,700mm	Timbers panel doors
W.1	2	1,800mm	1,800mm	Aluminium glazed windows
W.2	12	1,500mm	1,500mm	Aluminium glazed windows
W.3:	6	900mm	600mm	Aluminium glazed windows
W.4:	2	1,000mm	1,500mm	Aluminium glazed windows

GENERAL NOTES

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Project:

PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

Client:

TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA

Title	DOORS AND WINDOWS SCHEDULE
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100

GENERAL NOTES

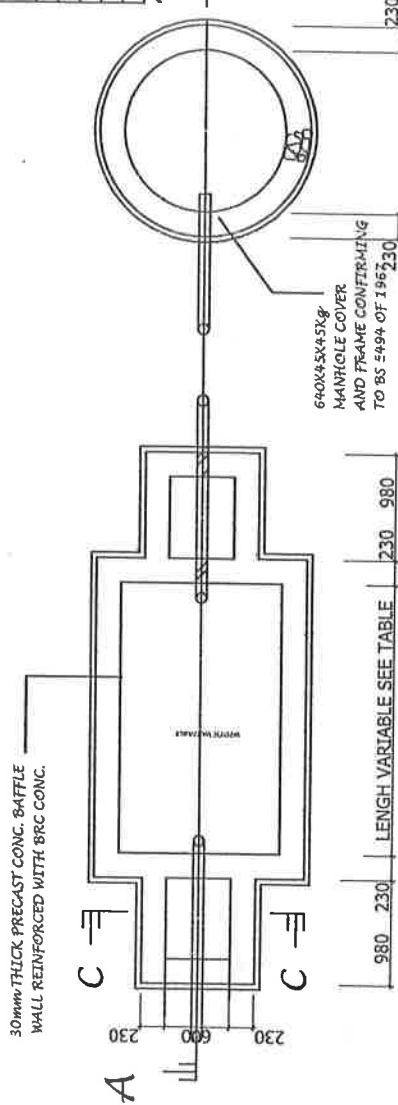
- All dimension are in mm.
- Foundation walls are to be 230mm thick.
- Superstructure walls are 150mm thick.
- Depth of foundation is to be determined on site.
- Building construction regulations are to be followed.

MINIMUM INTERNAL DIMENSIONS OF INSPECTION CHAMBER

TYPE	DEPTH TO INVERT (mm)	SIZE (mm)
A	0	450 x 450
B	450	450 x 600
C	900	600 x 700
D	Greater than 1500	700 x 1050

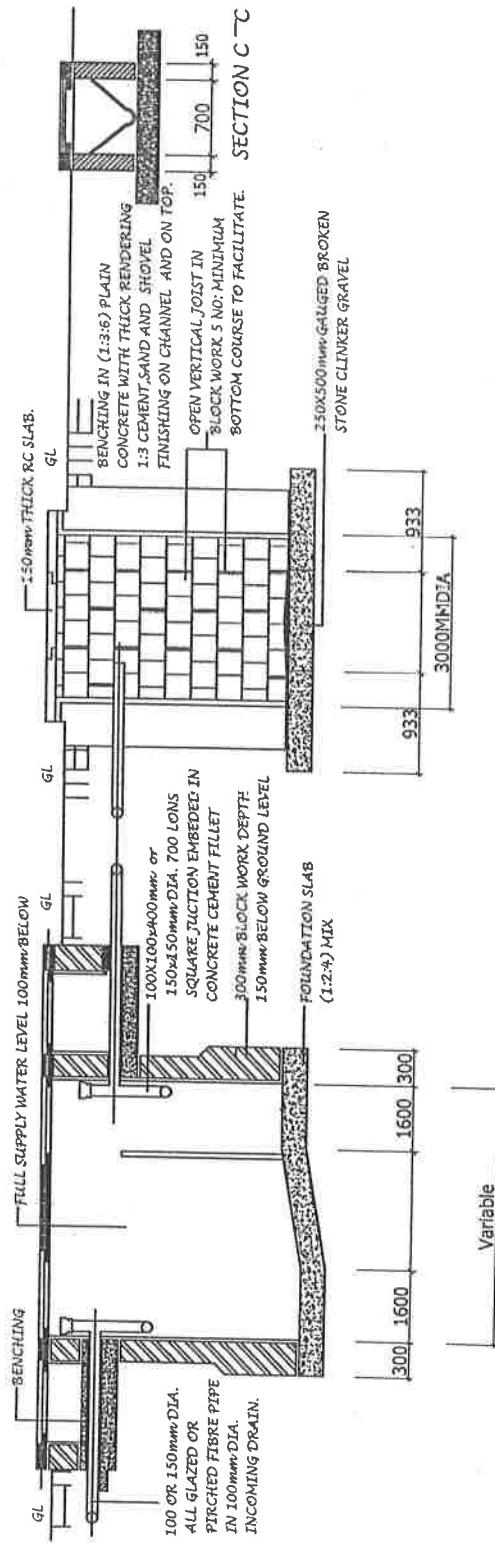
SEPTIC TANK SIZE

ALL WASTE	SOIL WASTE	DIMENSIONS		VOLUME M ³
		Length	Depth	
1	10	2.00	1.30	2.60
2	7	2.20	1.00	3.30
3	15	3.00	1.20	5.10
4	30	4.50	1.30	7.02
5	40	6.00	1.50	9.10
6	50	7.50	1.70	12.56
7	60	9.00	1.80	14.39



SEPTIC TANK

SOAKAGE PIT

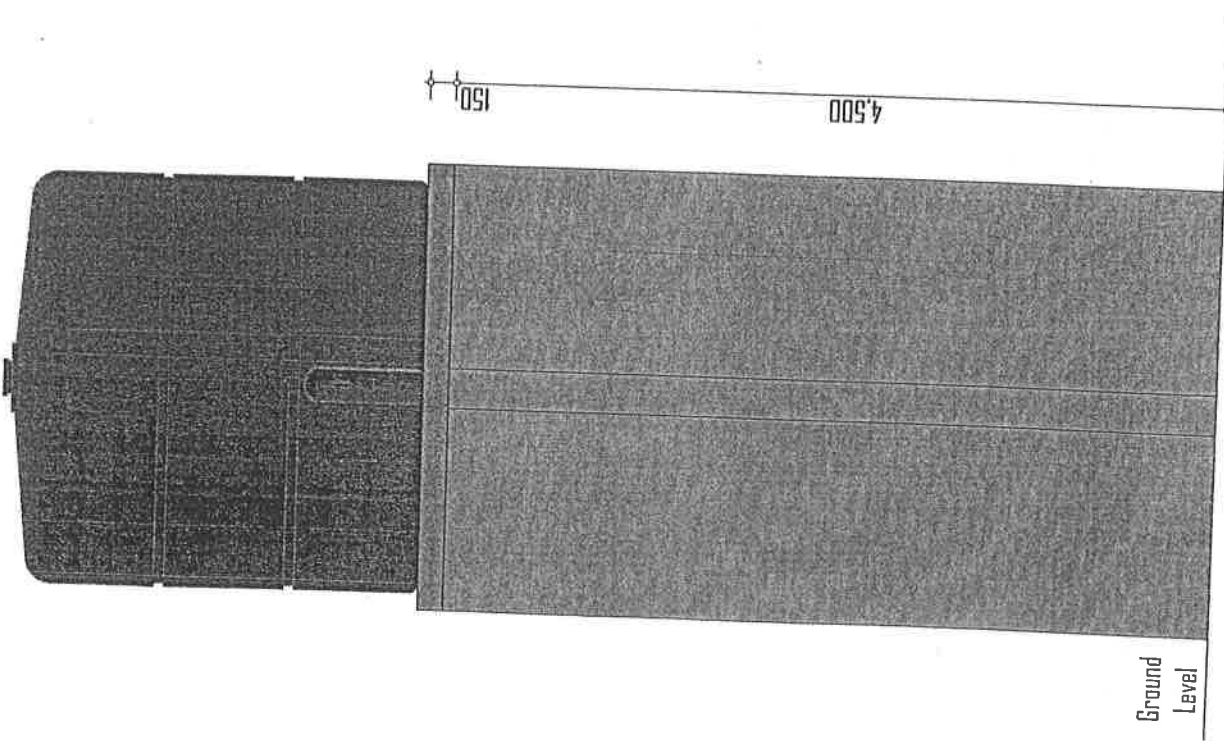


LONGITUDINAL SECTION A B

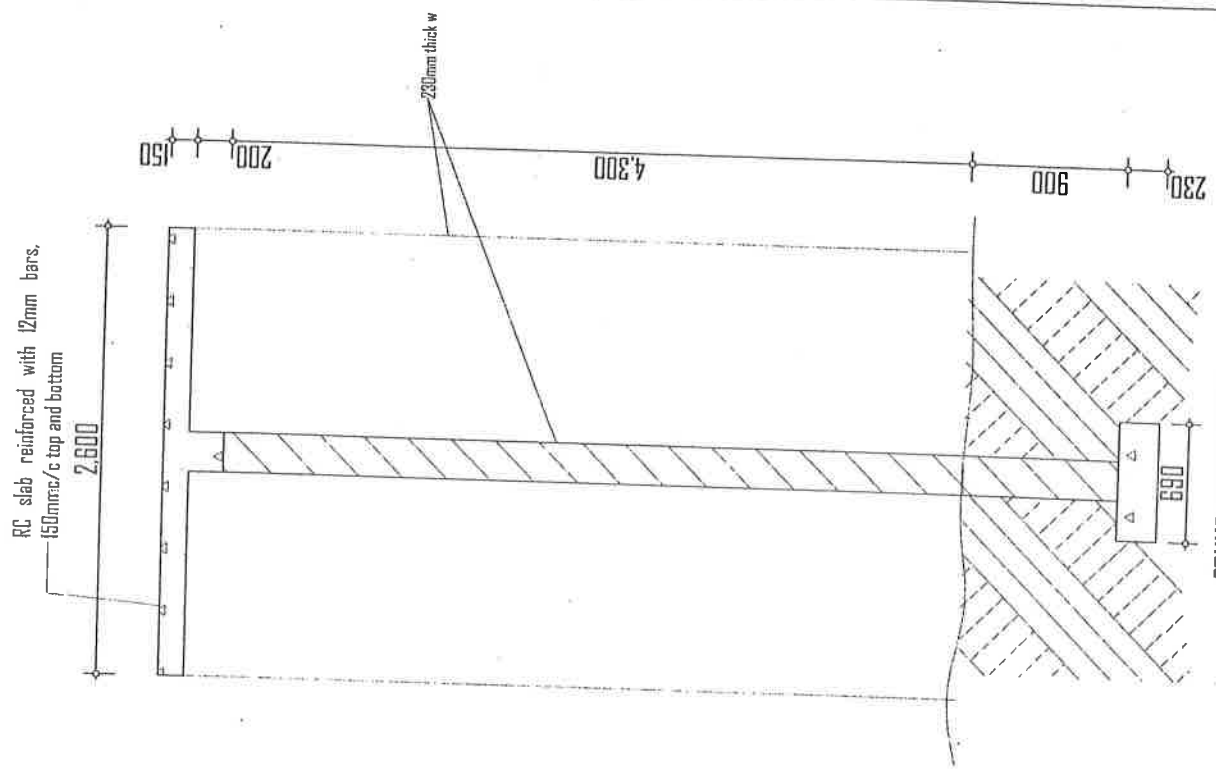
Project:
PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF
HOUSE IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS
P.O. BOX 3134
ARUSHA

Title	SEPTIC AND SOAKAWAY PITS
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100
Date	07/10/2021



TYPICAL ELEVATION



FOUNDATION LAYOUT

GENERAL NOTES

1. All dimension are in mm.
2. All walls are to be 230mm thick.
3. Depth of foundation is to be determined on site.
4. Building construction regulations are to be followed.

Project:
 PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF
 HOUSE IN TANZANIA NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS
 P.O. BOX 3124
 ARUSHA

Title	RAISED WATER TANK
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100

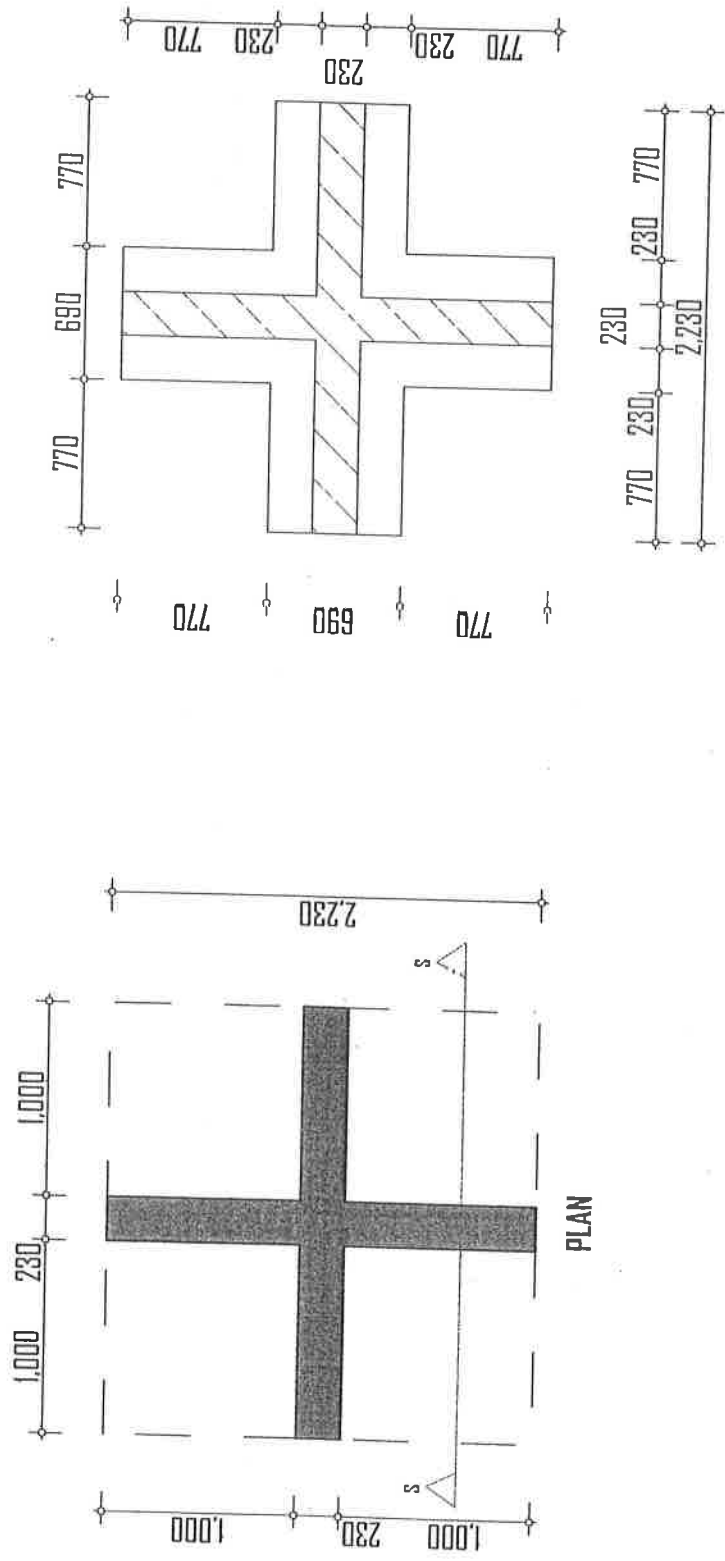
GENERAL NOTES

1. All dimension are in mm.
2. All walls are to be 230mm thick.
3. Depth of foundation is to be determined on site.
4. Building construction regulations are to be followed.

Project:
 PROPOSED CONSTRUCTION OF A 2 IN 1 STAFF HOUSE IN TANZANIA NATIONAL PARKS

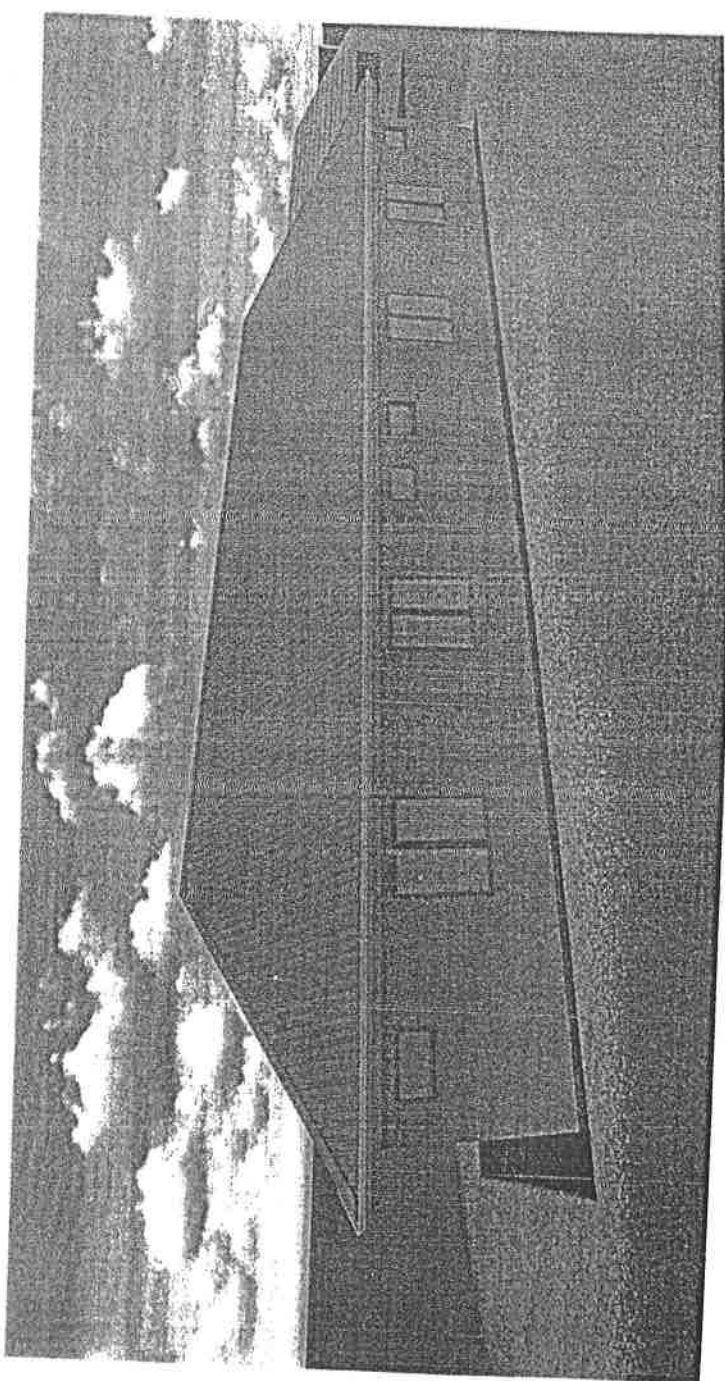
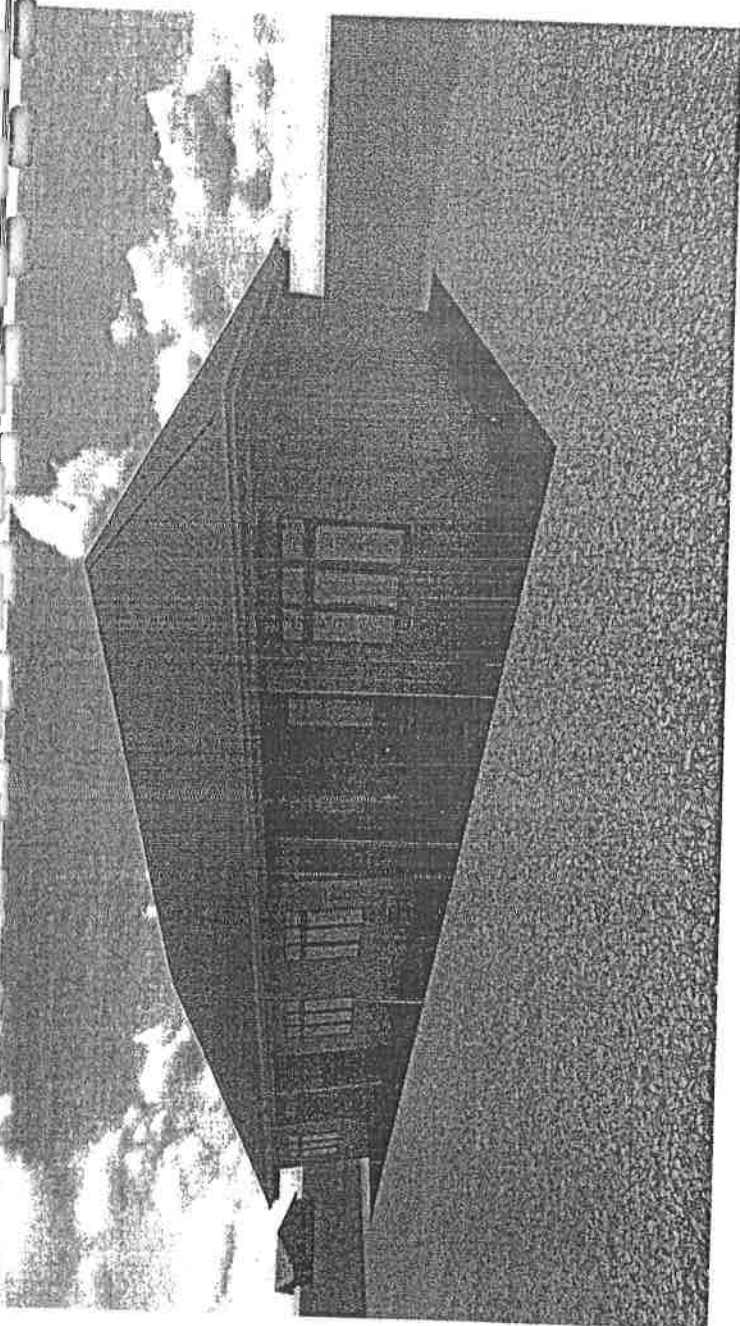
Client:
 TANZANIA NATIONAL PARKS
 P.O. BOX 3164
 ARUSHA

Title	RAISED WATER TANK
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



FOUNDATION LAYOUT

PLAN



GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
 PROPOSED CONSTRUCTION OF 4 IN 1 STAFF
 HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS.
 P.O. BOX 3034
 ARUSHA

Title	3D'S PERSPECTIVES
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. G.J. MATOLO
Scale	1:450

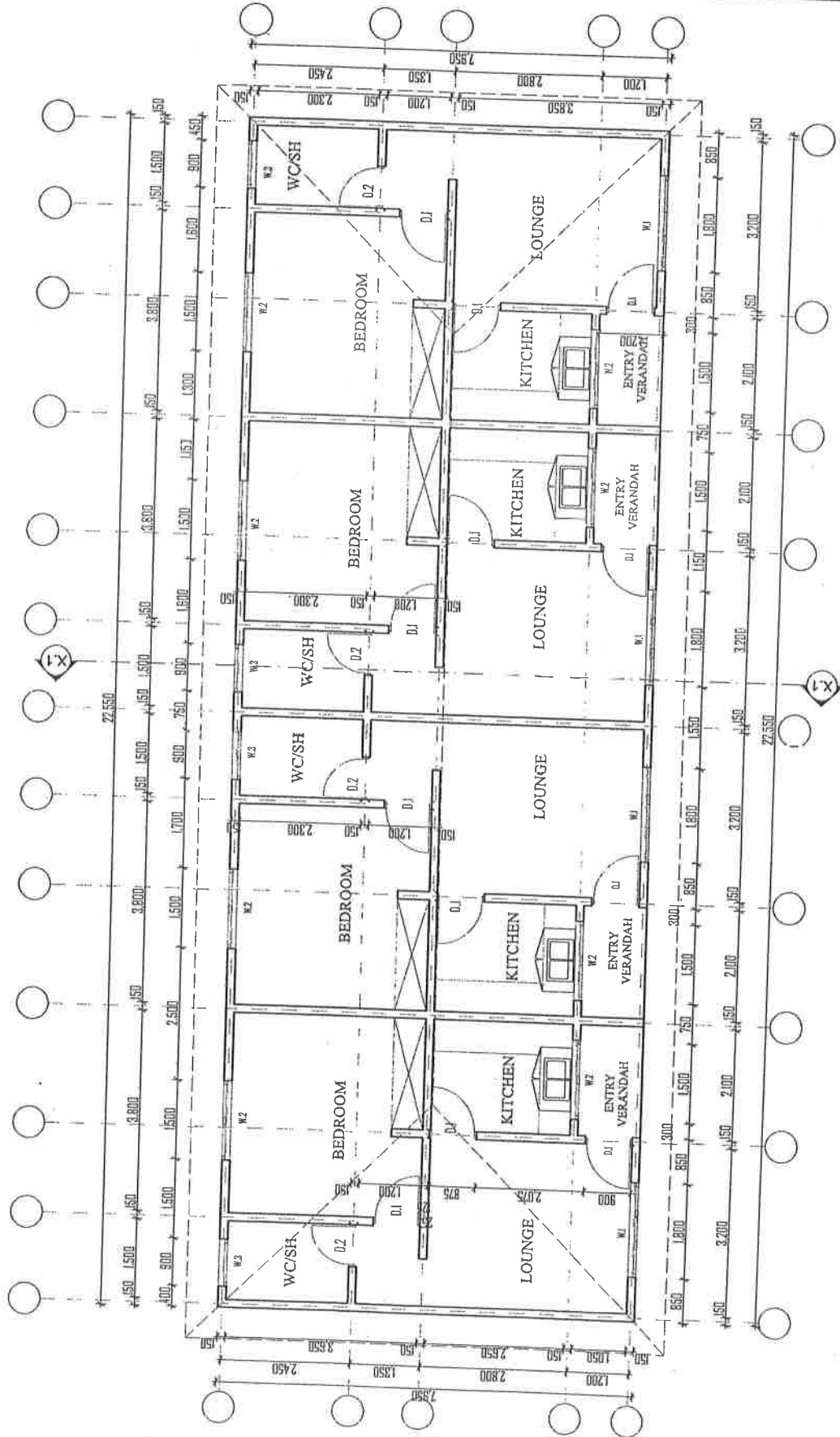
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
**TANZANIA NATIONAL PARKS,
 P.O. BOX 9164
 ARUSHA**

Title	FLOOR PLAN
Designed by:	FOK
Drawn by:	FOK
Checked by:	GDMS. ENG. R.J. MATOLO
Scale	1:100



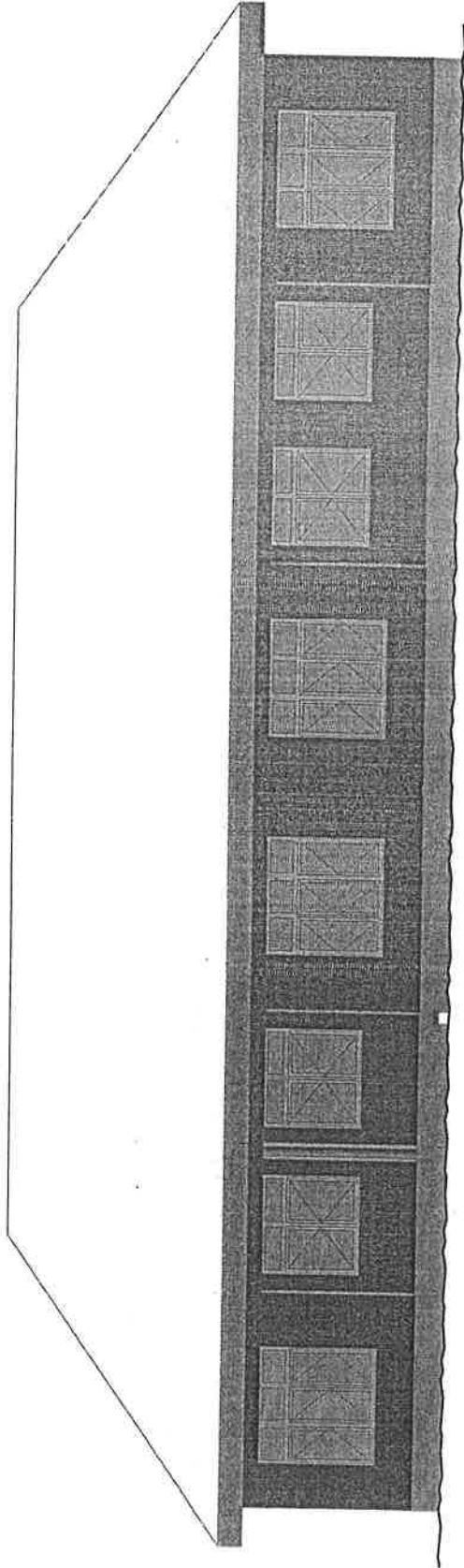
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

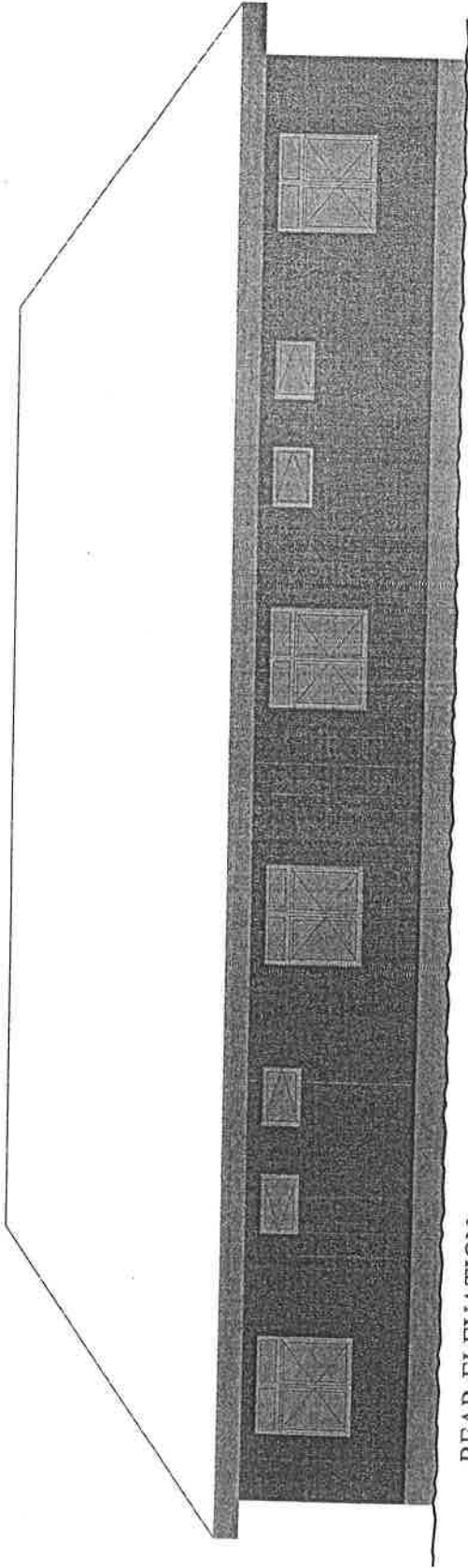
Project:
PROPOSED CONSTRUCTION OF 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS,
P.O. BOX 3184
ARUSHA

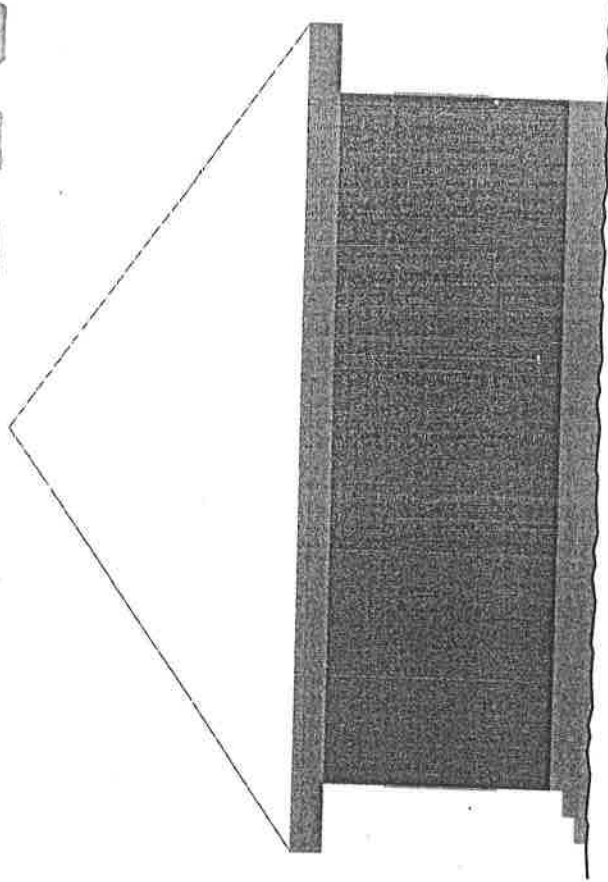
Title	ELEVATIONS
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



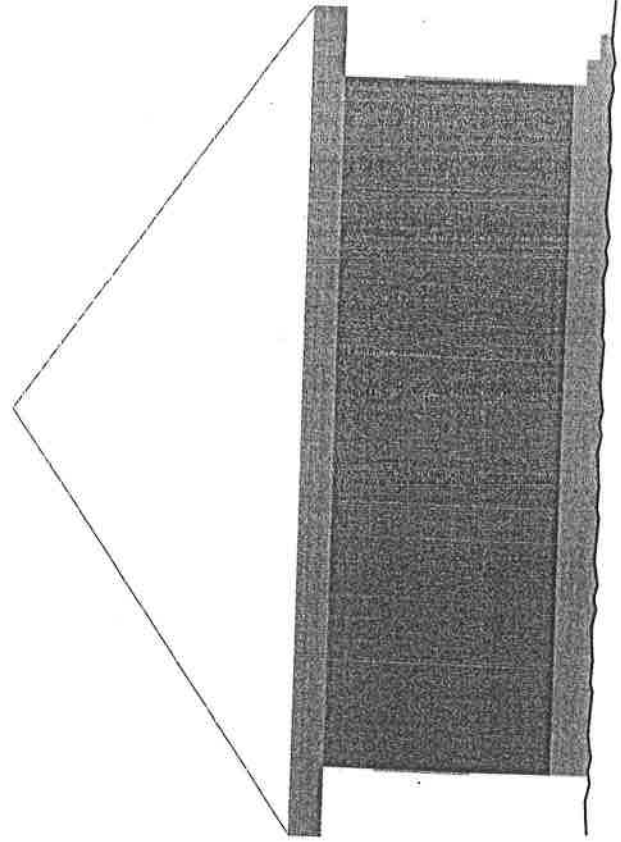
FRONT ELEVATION



REAR ELEVATION



RIGHT H. SIDE ELEVATION



LEFT H. SIDE ELEVATION

GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
**TANZANIA NATIONAL PARKS,
 P.O. BOX 3134
 ARUSHA**

Title	ELEVATIONS
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100

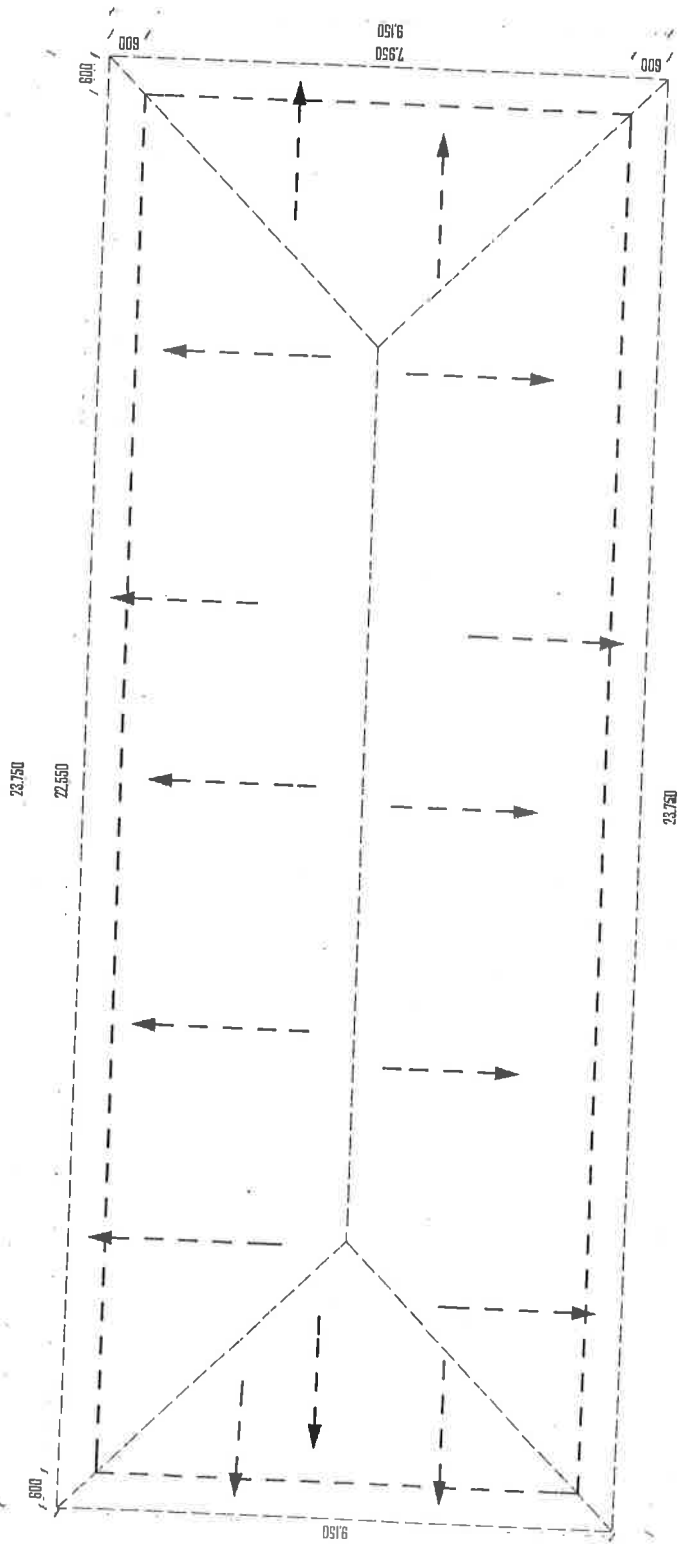
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
 PROPOSED CONSTRUCTION OF A 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS,
 P.O. BOX 3134
 ARUSHA

Title	ROOF PLAN
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. K.J. MATOLEO
Scale	1:100



0516

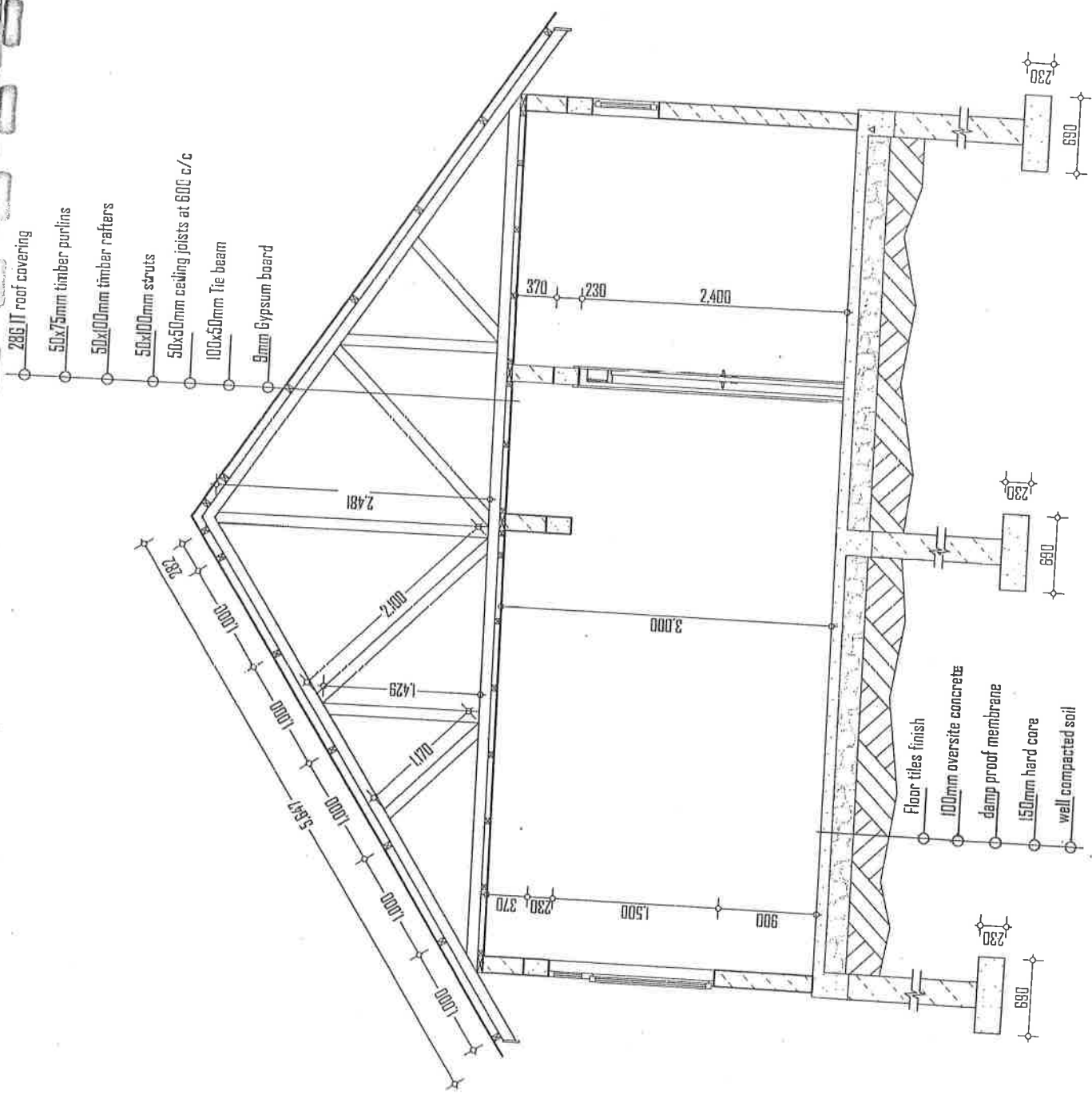
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS.
 P.O. BOX 3134
 ARUSHA

Title	SECTION
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale:	1:100



SECTION XI

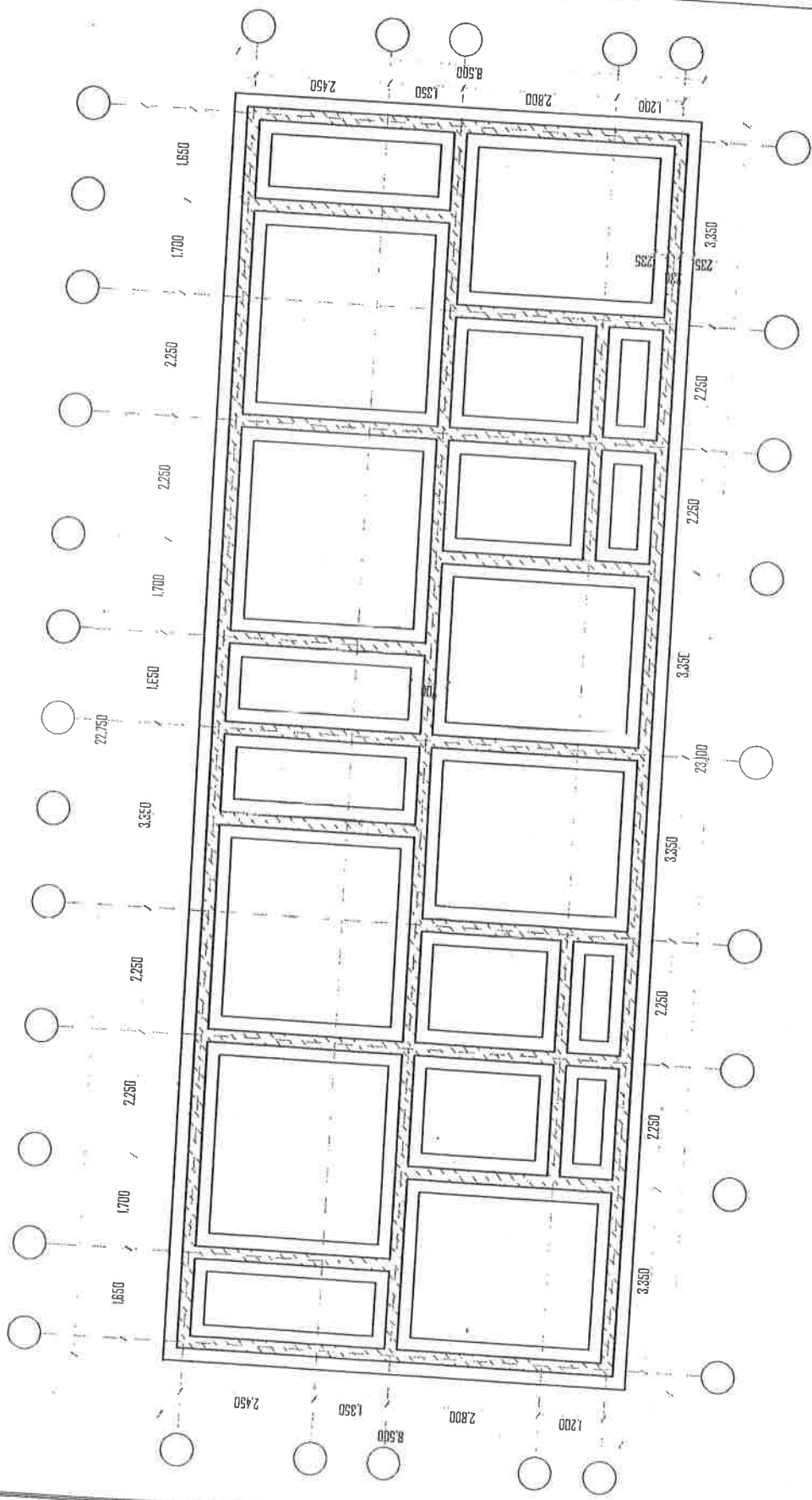
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS,
 P.O. BOX 3134
 ARUSHA

Title	FOUNDATION PLAN
Designed by:	FDK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATILO



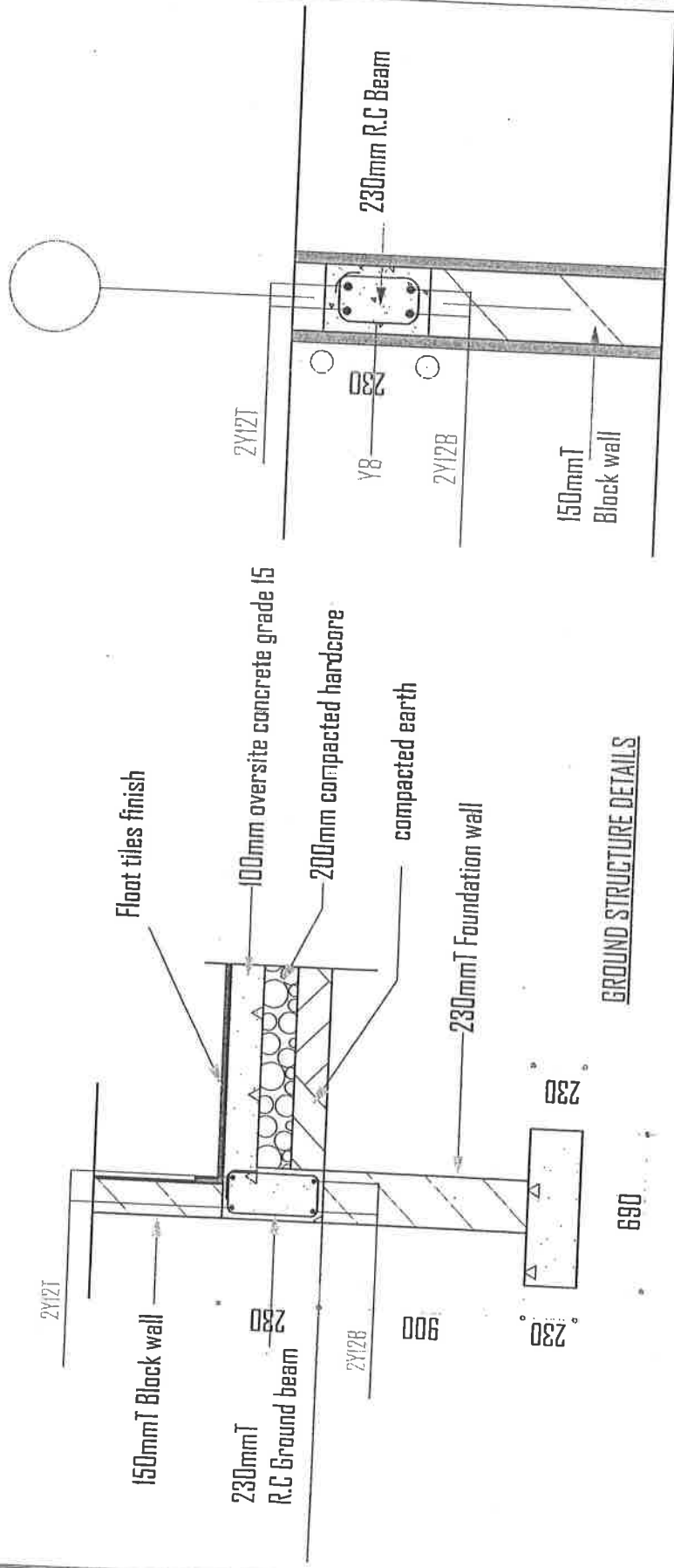
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF 4 IN 1 STAFF HOUSE TO RANGEP POSTS IN NATIONAL PARKS

Client:
**TANZANIA NATIONAL PARKS,
 P.O. BOX 3134
 ARUSHA**

Title	DETAILS
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



GROUND STRUCTURE DETAILS

DOORS AND WINDOWS SCHEDULE

TYPE	No.	WIDTH	HEIGHT	REMARKS
D.1	12	900mm	2,400mm	Timbers panel doors
D.2	4	800mm	2,400mm	Timbers panel doors
W.1	4	1,800mm	1,800mm	Aluminium glazed windows
W.2	8	1,500mm	1,500mm	Aluminium glazed windows
W.3:	4	900mm	600mm	Aluminium glazed windows

GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building econstruction regulations are to be followed.

Project:

PROPOSED CONSTRUCTION OF 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:

TANZANIA NATIONAL PARKS,
P.O. BOX 3034
ARUSHA

DOORS AND WINDOWS SCHEDULE	
Title	
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100

GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
 PROPOSED CONSTRUCTION OF 4 IN 1 STAFF HOUSE TO RANGER POSTS IN NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS,
 P.O. BOX 9134
 ARUSHA

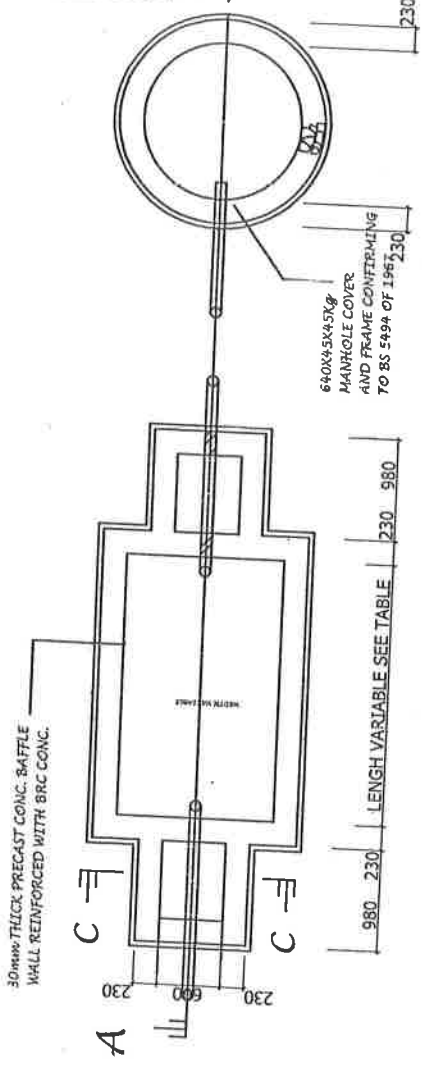
Title	SEPTIC TANK AND SOAK AWAY PIT
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100

MINIMUM INTERNAL DIMENSIONS OF INSPECTION CHAMBER

TYPE	DEPTH TO INVERT (mm)	SIZE (mm)	450 x 450
A	150		
B	450	500	450 x 600
C	900	1500	600 x 700
D	Greater than 1500		700 x 1050

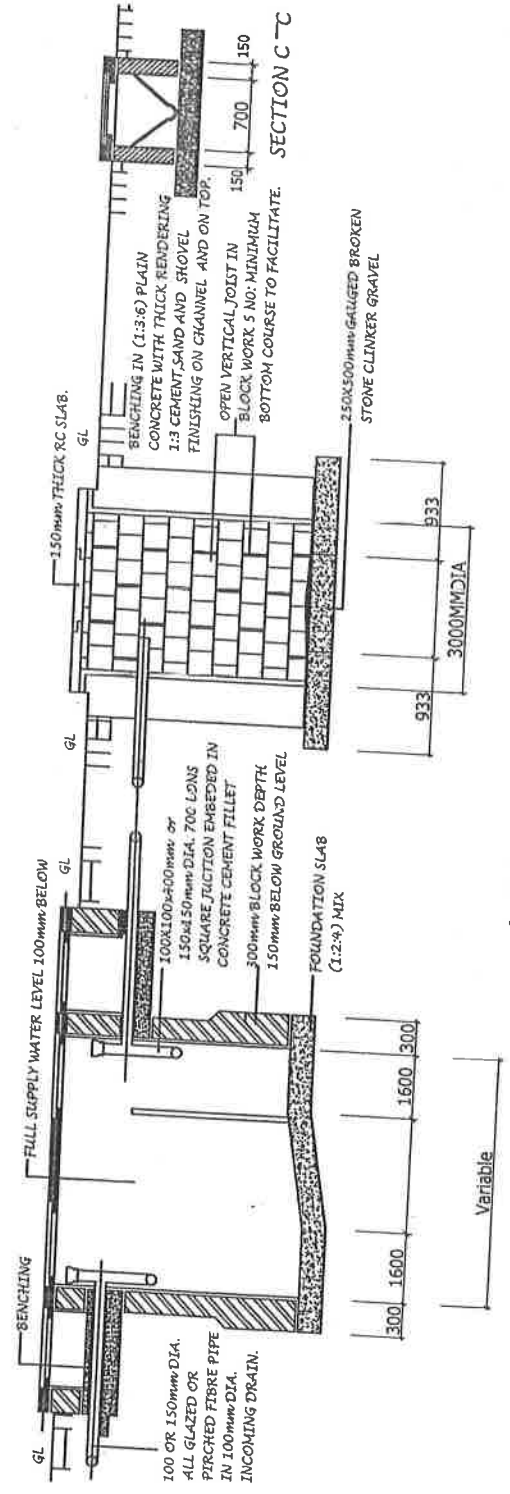
SEPTIC TANK SIZE

ALL WASTE	SOIL	DIMENSIONS		VOLUME M ³
		Length	Depth	
1	10	2.00	1.00	2.00
2	7	2.20	1.50	3.30
3	15	2.50	1.70	5.10
4	30	3.00	1.80	7.02
5	40	3.80	1.80	9.10
6	50	4.20	1.80	12.56
7	60	4.20	1.80	14.39



SOAKAGE PIT

SEPTIC TANK



LONGITUDINAL SECTION A B

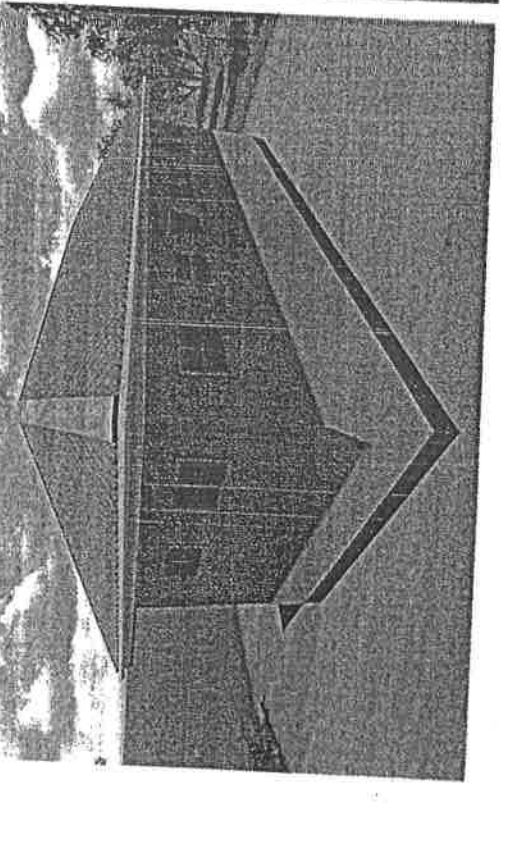
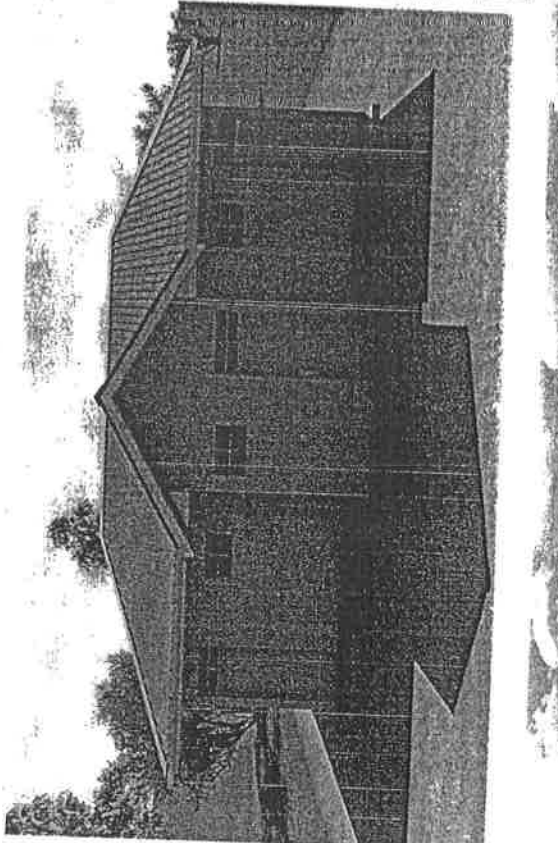
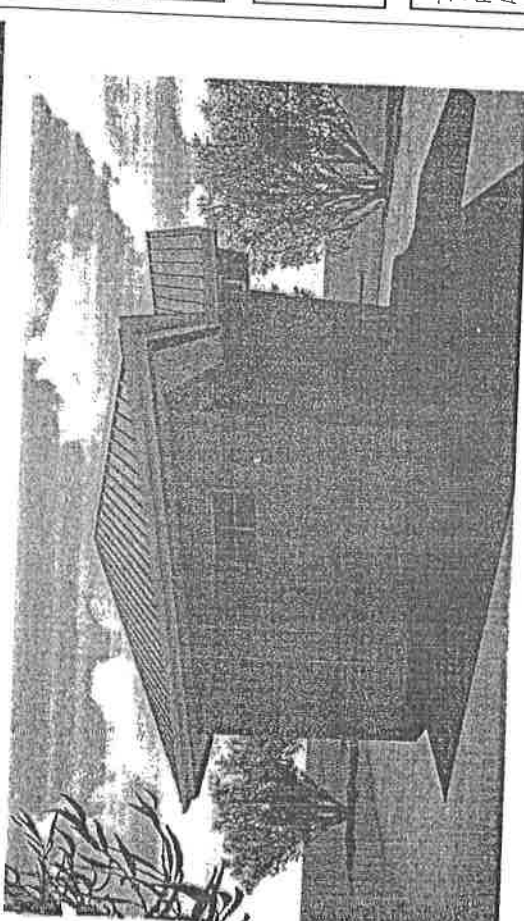
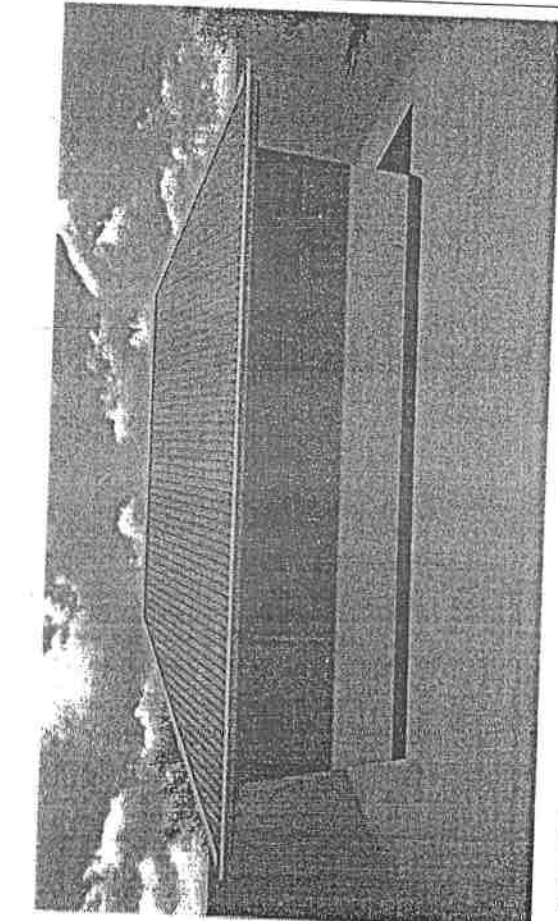
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A VISITORS' TOILET IN TANZANIA NATIONAL PARKS

Client:
**TANZANIA NATIONAL PARKS,
 P.O. BOX 3134
 ARUSHA**

Title	3D IMAGES
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



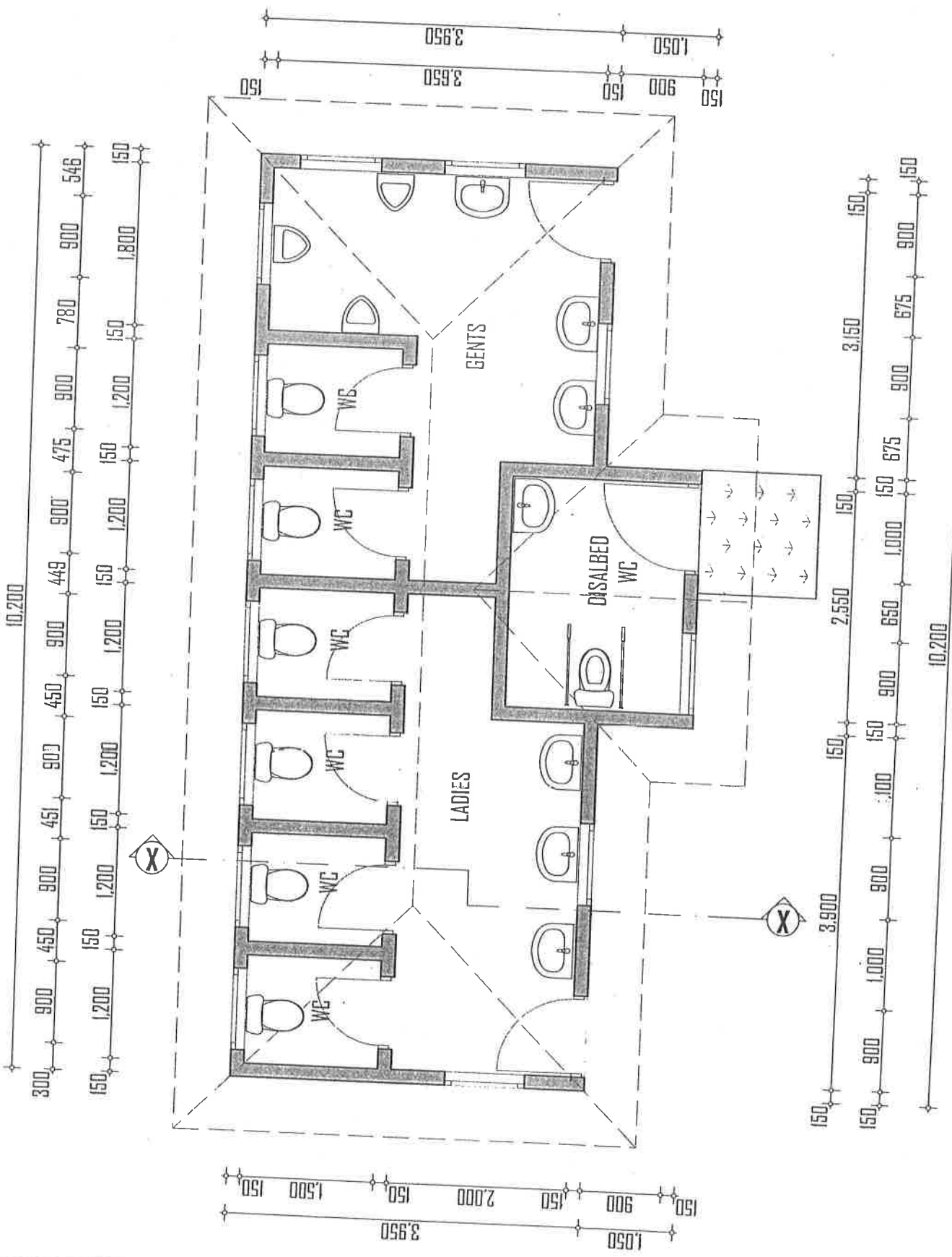
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A VISITORS'
TOILET IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS,
P.O. BOX 3134
ARUSHA

Title	FLOOR PLAN
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. N.J. MATOLO
Scale	1:100



10,200

300 900 450 900 450 900 449 900 475 900 780 900 546 150 1,200 150 1,200 150 1,200 150 1,200 150 1,200 150 1,200 150 1,800 150

1,050 900 150 2,000 150 3,950 150 900 150

150 3,900 150 2,550 150 3,150 150 10,200

150 900 1,000 900 1,100 650 1,000 150 675 900 675 900 150

GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project

PROPOSED CONSTRUCTION OF A VISITORS' TOILET IN TANZANIA NATIONAL PARKS

Client:

TANZANIA NATIONAL PARKS
P.O. BOX 8134
ARUSHA

Title

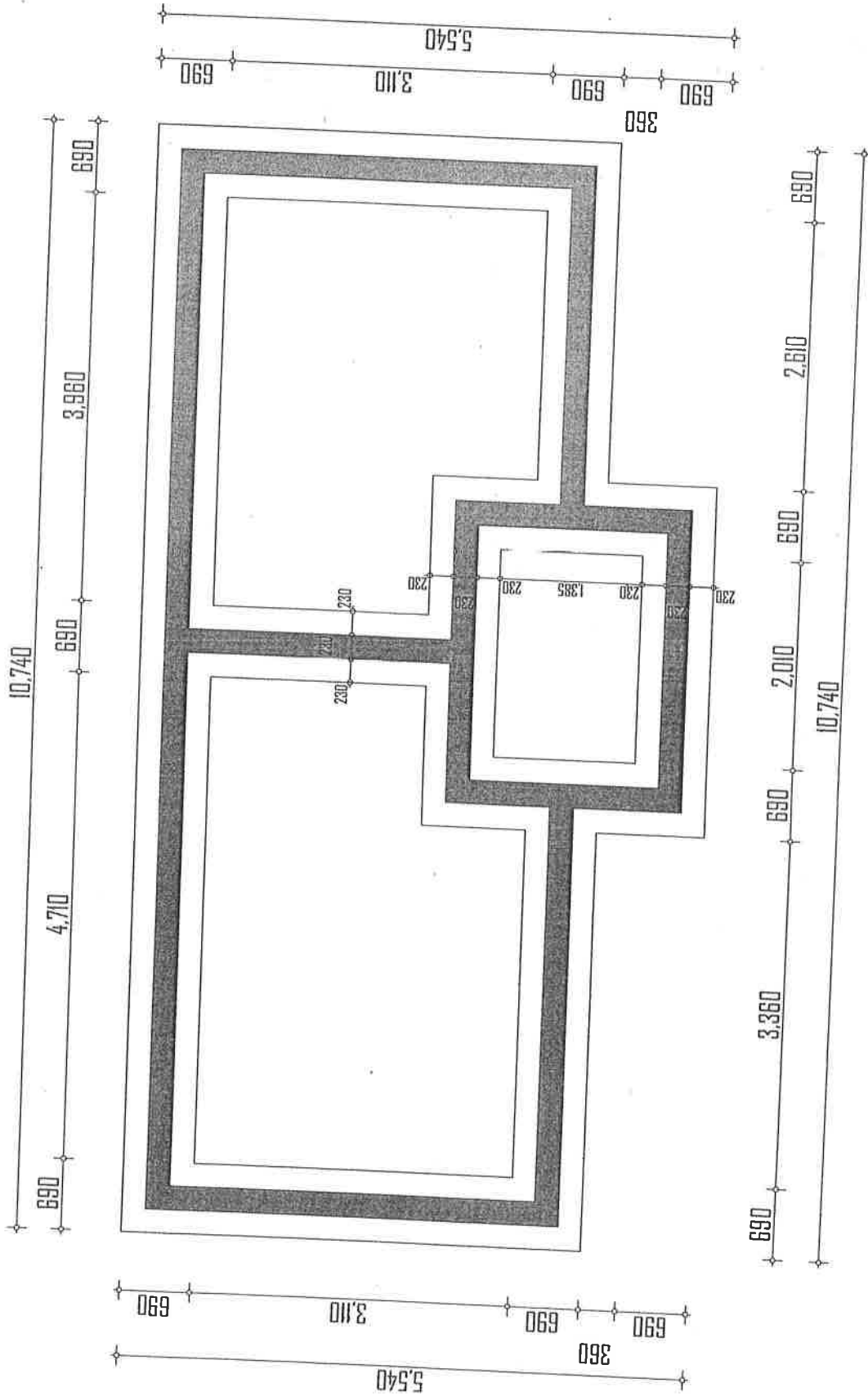
FOUNDATION PLAN

Designed by: FOK

Drawn by: FOK

Checked by: CONS. ENG. R.J. MATOLO

Scale: 1:100



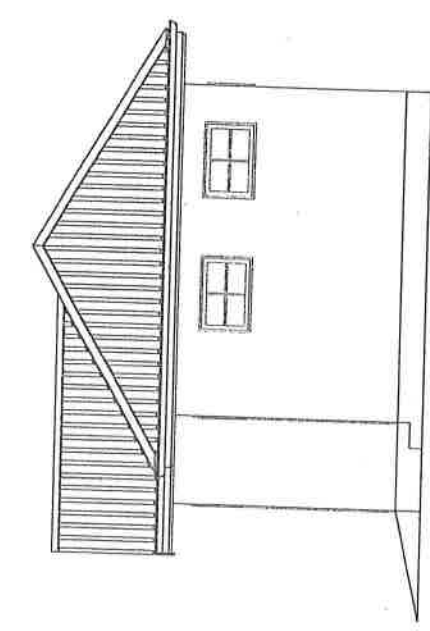
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

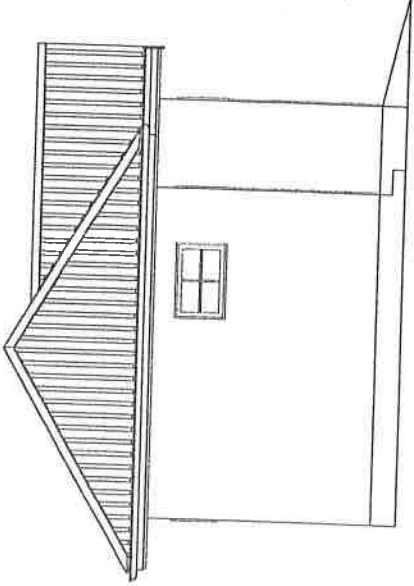
Project:
PROPOSED CONSTRUCTION OF A VISITORS TOILET IN TANZANIA NATIONAL PARKS

Client:
 TANZANIA NATIONAL PARKS,
 P.O. BOX 3134
 ARUSHA

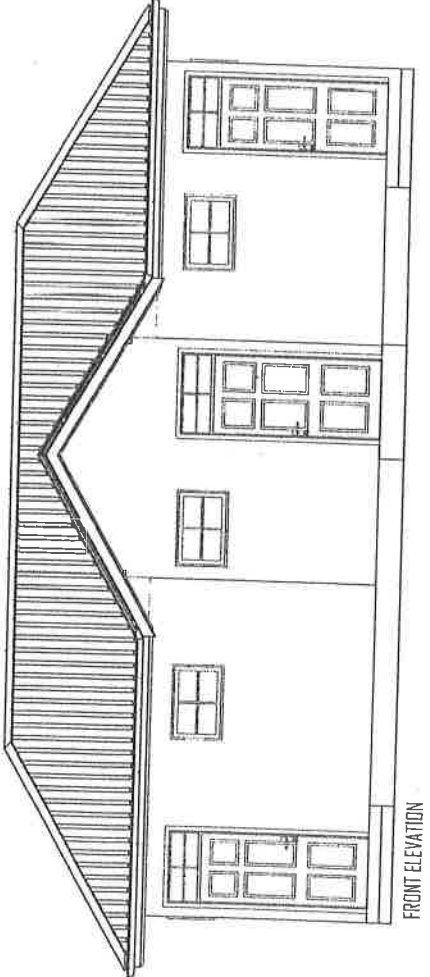
Title	ELEVATIONS
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



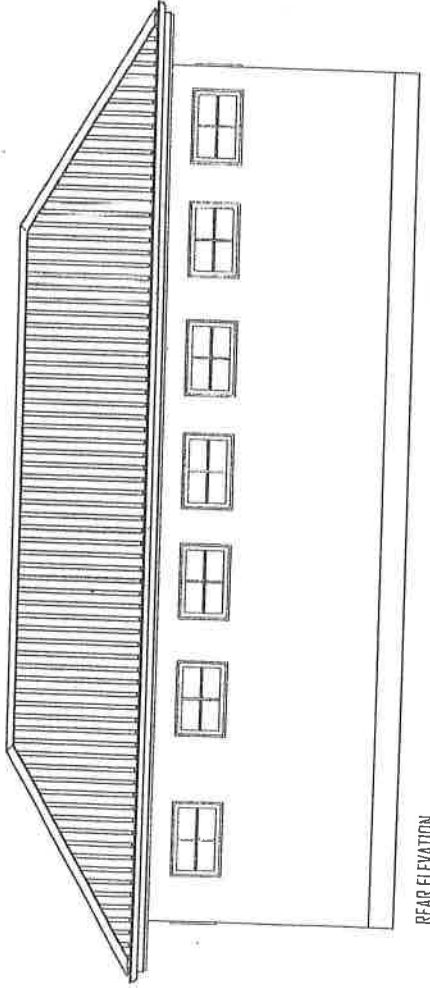
RIGHT SIDE ELEVATION



LEFT SIDE ELEVATION



FRONT ELEVATION



REAR ELEVATION

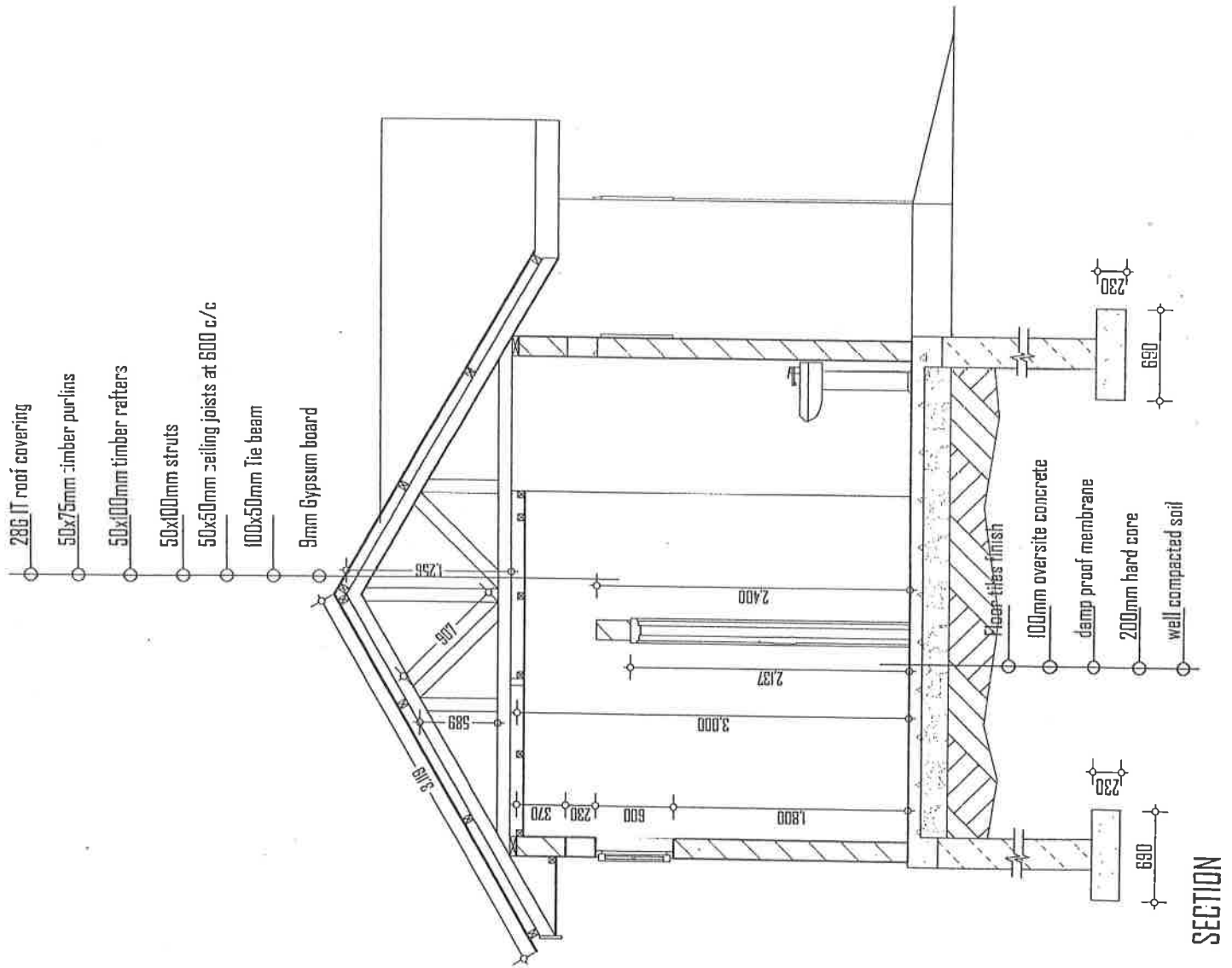
GENERAL NOTES

1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A VISTOTO'S
TOILET IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS,
P.O. BOX 3134
ARUSHA

Title	SECTION
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100
Date	OCTOBER 2021



SECTION

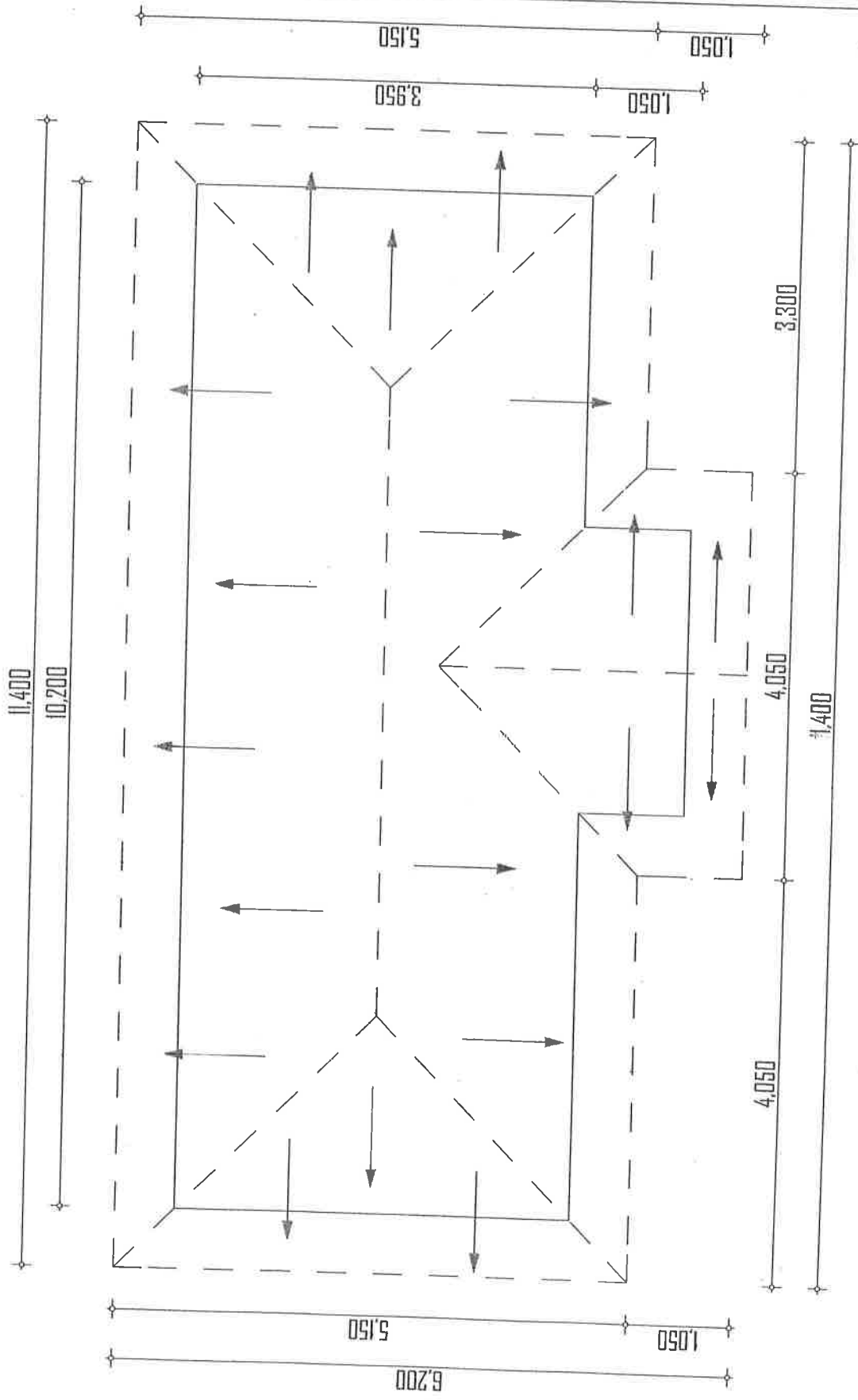
GENERAL NOTES

- 1. All dimension are in mm.
- 2. Foundation walls are to be 230mm thick
- 3. Superstructure walls are 150mm thick.
- 4. Depth of foundation is to be determined on site.
- 5. Building construction regulations are to be followed.

Project:
PROPOSED CONSTRUCTION OF A VISITORS'
TOILET IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS,
P.O. BOX 3134
ARUSHA

Title	ROOF PLAN
Designed by:	FDK
Drawn by:	FDK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100



GENERAL NOTES

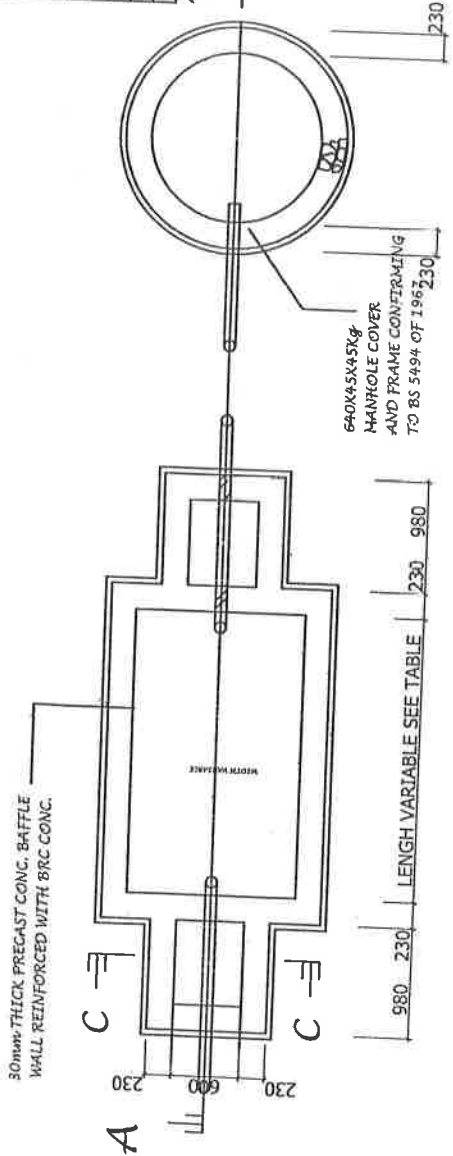
1. All dimension are in mm.
2. Foundation walls are to be 230mm thick.
3. Superstructure walls are 150mm thick.
4. Depth of foundation is to be determined on site.
5. Building construction regulations are to be followed.

MINIMUM INTERNAL DIMENSIONS OF INSPECTION CHAMBER

TYPE	DEPTH TO INVERT (mm)	SIZE (mm)
A	150	450 x 450
B	450	450 x 600
C	900	600 x 700
D	Greater than 1500	700 x 1050

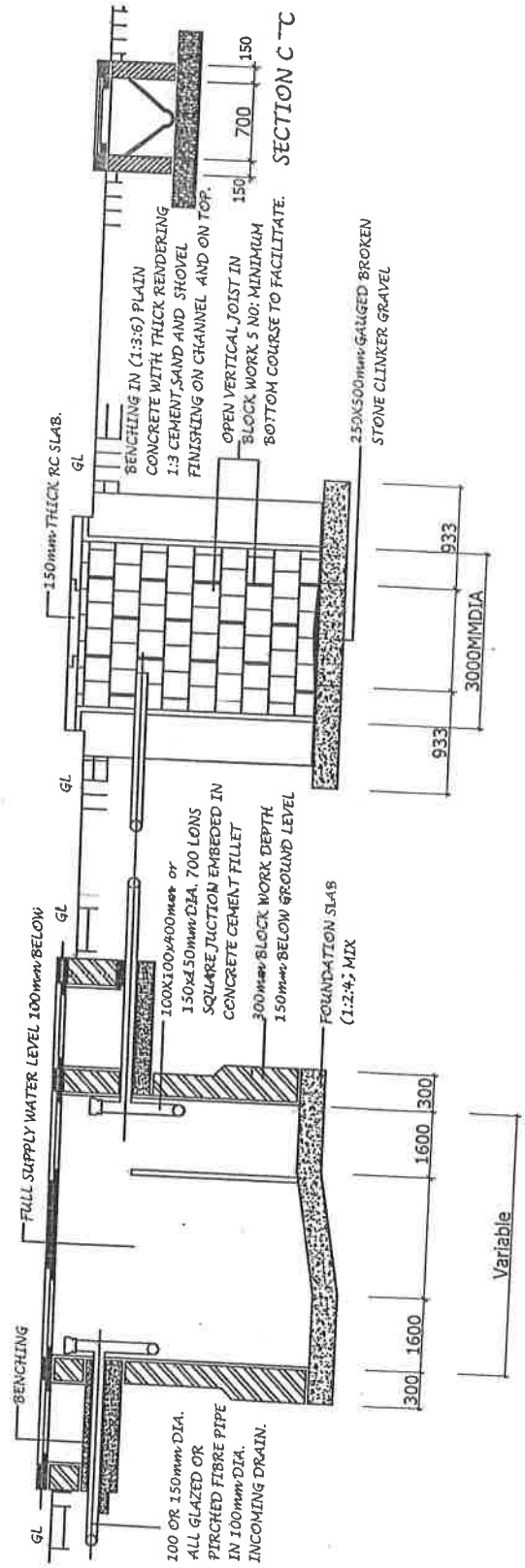
SEPTIC TANK SIZE

ALL WASTE	SOIL WASTE	DIMENSIONS		VOLUME M ³
		Length	Depth	
1	10	2.00	1.00	1.30
2	7	2.20	1.00	1.50
3	15	3.00	1.20	1.70
4	30	4.50	1.30	1.80
5	40	6.00	1.50	1.80
6	50	7.50	1.70	1.80
7	60	9.00	1.80	1.80



SEPTIC TANK

SOAKAGE PIT



LONGITUDINAL SECTION A B

Project:
PROPOSED CONSTRUCTION OF A VISITORS' TOILET IN TANZANIA NATIONAL PARKS

Client:
TANZANIA NATIONAL PARKS.
P.O. BOX 3184
ARUSHA

Title	SEWAGE SYSTEM
Designed by:	FOK
Drawn by:	FOK
Checked by:	CONS. ENG. R.J. MATOLO
Scale	1:100

GENERAL NOTES:

All drawing dimensions are in mm unless specified otherwise. This drawing to be read in conjunction with the relevant structural drawings, electrical drawings and mechanical drawings where applicable. Consultant to resolve any conflicts between drawings.

REINFORCED CONCRETE NOTES:

1. All Reinforced Concrete Grade C30 (ratio 1:1.5:3)
2. All Main Concrete Grade C20 (ratio 1:2:4)
3. Reinforcement to BS 4449, Hot Rolled High Yield - 450 N/mm²
4. Reinforcement to BS 4449, Hot Rolled High Yield - 450 N/mm²
5. Cover to Reinforcement:
 - 30mm in Columns,
 - 20mm in Foundations,
 - 20mm in Beams
6. Aggregate Maximum size 20mm in Beams table 4 BS 85: 1983 for all structural members.
7. All masonry concrete blocks to BS 6825, 200mm min. cr. strength 10.4 N/mm², 150 & 100mm min. cr. strength 7.3 N/mm²

WORKING DRAWINGS

DATE	ISSUED TO	FOR
23/10/2021	Client	Construction

DATE	REVISION	BY

Project
PROPOSED GATE LAYOUT PLAN

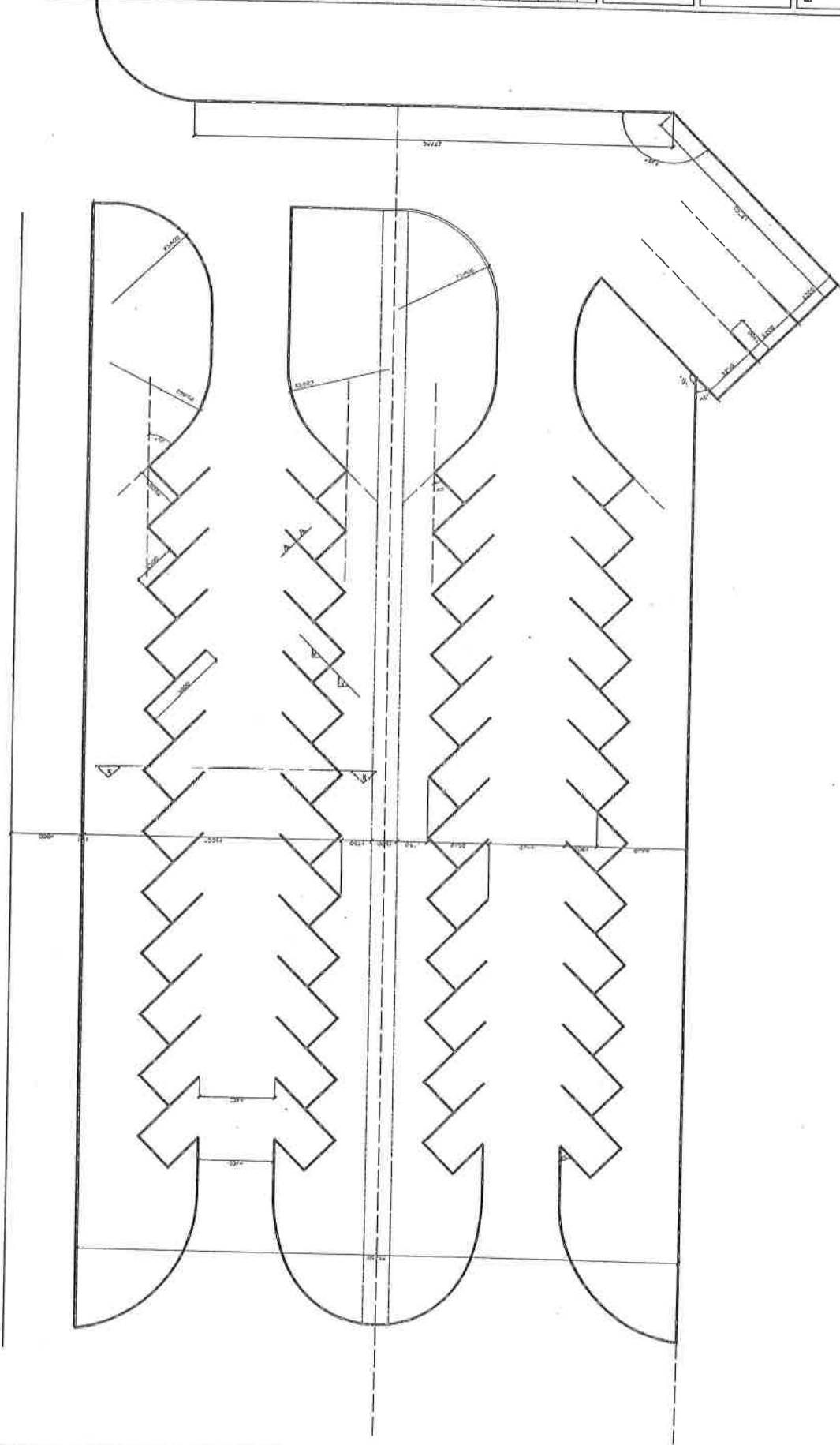
Client
TANZANIA NATIONAL PARKS (TANAPA)
P. O. BOX 3134
ARUSHA, TANZANIA

Engineer
TANZANIA NATIONAL PARK

Drawing Title
PARKING ARRANGEMENT

Drawing Number
S - 2 0 2 1 - 0 1
A2

Scale: 1 @ A3
1:50
Designed by: INFRA/JUNIT
Drawn by: M.K.K



GENERAL NOTES:
 All drawing dimensions are in mm unless specified otherwise. This drawing to be read in conjunction with architectural drawings, electrical drawings and mechanical drawings where applicable. Consultant to resolve any conflicts between drawings.

REINFORCED CONCRETE NOTES:

1. All Reinforced Concrete Grade C30 (ratio 1:1.5:3)
2. All Plain Concrete Grade G20 (ratio 1:2:4)
3. Concrete Mixes to BS 5329 Part 2
4. Reinforcement to BS 4449, Hot Rolled High Yield - 460 N/mm²
5. Cover to Reinforcement:
 40mm in Foundations,
 30mm in Columns,
 25mm in Beams,
 20mm in Slabs.
6. All masonry concrete blocks to BS 6074 members.
 230mm min. cr. strength
 10.4N/mm²
 150 & 100mm min. cr. strength
 7.3 N/mm²

WORKING DRAWINGS

DATE	ISSUED TO	FOR
25/10/2021	Client	Construction

DATE	REVISION	BY

Project:
 PROPOSED GATE LAYOUT PLAN

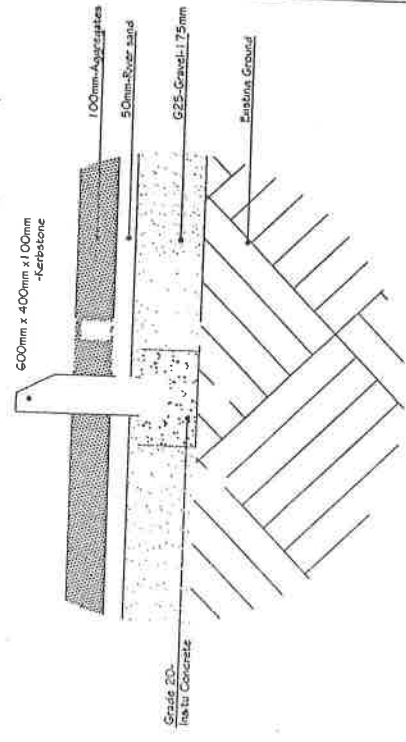
Client
 TANZANIA NATIONAL PARKS (TANAPA)
 P. O. BOX 3134
 ARUSHA, TANZANIA

Engineer
 TANZANIA NATIONAL PARK

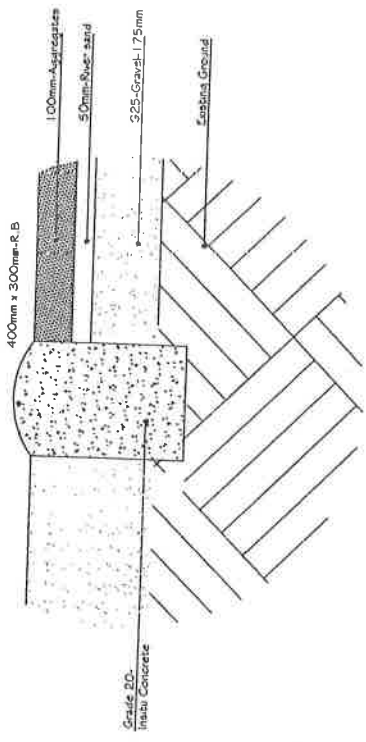
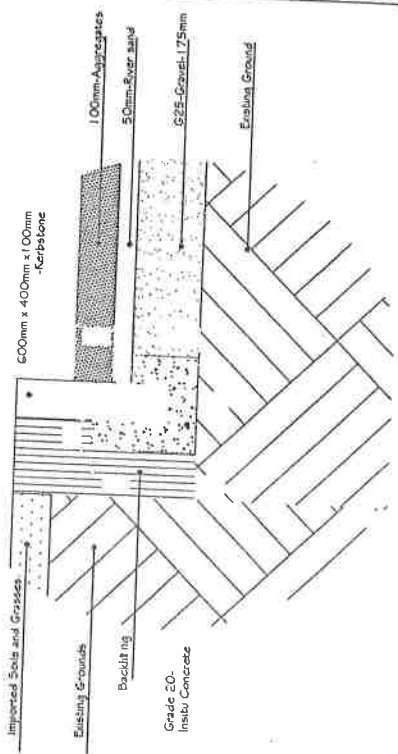
Drawing Title
 DETAILS

Drawing Number
 S - 2 0 2 1 . 0 1

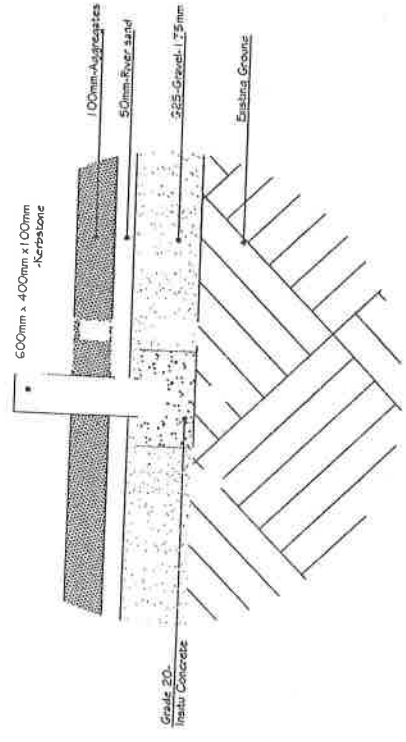
Scale (@ A3)
 designed by INFRAJUNIT



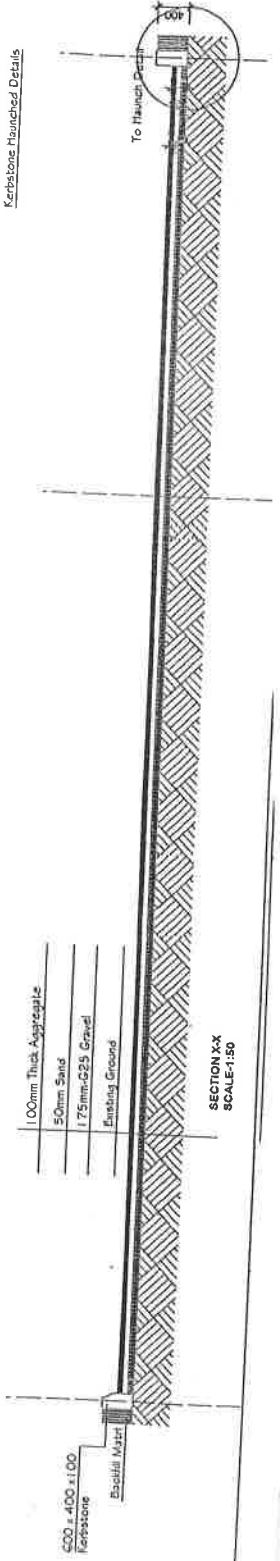
SECTION 3-3



Retain Beam Details



SECTION 2-2



SECTION X-X
 SCALE: 1:50

VIII. BILL OF QUANTITIES



TANZANIA NATIONAL PARKS

**PROPOSED CONSTRUCTION OF ENTRY/EXIT GATE, 2NO. SEMI-
DETACHED (2 IN 1) SENIOR STAFF HOUSE, 1NO. SEMI-DETACHED
(4 IN 1) RANGER POST, 2NO. TOILETS, ENTRY AND EXIT CAR
PARKING**

BILLS OF QUANTITIES

Nov-21

GENERAL SUMMARY PAGE

PROPOSED CONSTRUCTION OF GATE COMPLEX AND OTHER FACILITIES FOR TANZANIA NATIONAL PARKS

GENERAL SUMMARY		PAGE	TZS
a.	BILL NUMBER ONE - PRELIMINARIES	SP	80,500,000
b.	BILL NUMBER TWO - MEASURED WORKS ALL FACILITIES	GSALL	1,582,923,530
c.	BILL NUMBER THREE - PROVISIONAL AND P.C SUMS	SPC	137,545,000
<u>Conditions of Contract Clause 13</u>			
e.	Allow for costs of insurance against injury to persons and property and insurance of the works against fire, etc	Sum	2,000,000
<u>Conditions of Contract Clause 54.</u>			
f.	Allow for providing sureties of 10% of Contract Sum	Sum	2,000,000
g.	<u>Value Added Tax (VAT)</u> SUB-TOTAL	TZS	1,804,968,530
h.	Add: 18% for Value Added Tax	18%	324,894,335
I	ESTIMATED PROJECT COST	TZS	2,129,862,865.4

SIGNED (AUTHORIZED REPRESENTATIVE)



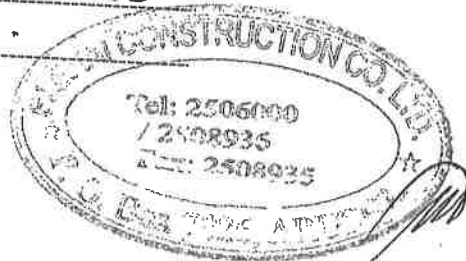
ADDRESS

P.O. BOX 7026 ARUSHA

ELERA CONSTRUCTION CO. LTD

DATE

8TH DECEMBER 2021.



PRELIMINARY PARTICULARS

B.1 Plant, Tools and Vehicles

The contractor shall be responsible for the provision of all plant, tools, and vehicles and workmen required for the Works except in so far as may be stated otherwise herein or except for such items specifically and only required for use of and provided by Nominated Sub contractors as described herein no timber used for scaffolding, formwork or similar purpose shall be used afterwards in the permanent work.

10,000,000.00

B.2 Safety, health and Welfare of the work people

The contractor shall be responsible for and shall ensure the safety and welfare of his work people, and those of his Sub contractors, Nominated Sub contractors, Nominated Suppliers and persons employed directly by the Employer. Allow for providing and maintaining on site adequate medical facilities and approved first aid equipment kept fully replenished and in an accessible position.

2,000,000.00

B.3 Notices and Fees

The contractor shall give all notices in accordance with the Conditions of Contract.
The contractor shall pay all fees and charges required in the Conditions of Contract, the amount of all such fees and charge shall be deemed to be included in the Contract Sum.
Those in respect of the following items are included elsewhere in this Document if applicable to the Works.

- Rates on temporary buildings
- Hoardings
- Temporary telephones
- Water for the work
- Works to be carried out by Local Authorities or Statutory Undertakings.

B.4 Setting out the Works

The Contractor shall set out the Works in accordance with the dimensions and levels shown on the Drawings and shall be responsible for the correctness of all dimension and levels so set out by him and will be required to amend all errors arising from inaccurate setting out at his own cost and expense. In event of any error or discrepancy in the dimensions or levels marked on the Drawings being discovered such errors or discrepancies must be reported by the Contractor to the Project Manager/ Architect for his immediate attention.

No work shall be commenced by the Contractor until he has received written instructions from the Project Manager/ Architect to adjust such discrepancies which may be proved. Upon receipt of such instructions the Contractor shall there upon be responsible for the accurate setting out of works, giving effect to the adjustments necessary to comply with such instructions, and claim for extra expense based on any discrepancy or error in the dimensions or levels shown on the Drawings may be made thereafter.

General Conditions

and Preliminaries

(1/10) To Summary

12,000,000.00

SP



Gate Complex and other facilities

Preliminaries

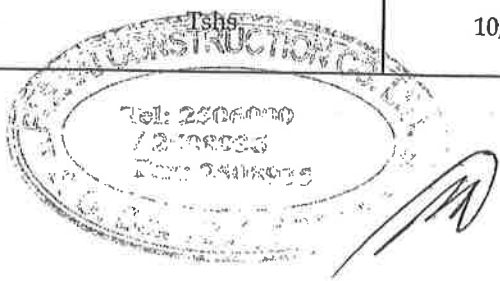
<p>B.5 Contractor's Supervision The Contractor shall provide full and adequate supervision during the progress of the works and shall keep a competent and authorised Agent or General foreman, approved by the Project Manager/ Architect (which approval may be withdrawn at any time) constantly on the works. Such authorised Agent or General Foreman shall give his whole time to the supervision of the works and must be able to receive and act upon (on behalf of the Contractor) all instructions, directions, or orders issued by the architect or his representative. No work shall be carried out at night or on gazetted holidays unless authorised by the Project Manager/ Architect in writing.</p>	
<p>B.6 Labour and fair wages The Contractor shall provide all labour and shall include for all costs arising from the current Government regulations regarding annual leave and passages, medical facilities, public holidays, overtime, training levy, income tax, housing, travelling allowances, wages and salaries, and any other statutory requirement current at the date of tender. The Contractor shall pay rates of wages observe hours and conditions of labour not less favourable than the minimum rates of remuneration and minimum conditions of employment applicable in the district in which the work is carried out as laid down by the Regulations of Wages and Conditions of Employment Act, Building and Construction Industry Wages Council. The relevant notice must be kept posted upon the site where it can be conveniently read by the employees concerned.</p>	
<p>B.7 Watching and Lighting The Contractor shall provide all watching and lighting and everything else necessary by day and night for the due protection and Security of the Works and the public and other persons. He shall provide all barriers, notices, watchmen to prevent access of authorised persons into the site. The contractor will be liable for all consequences of theft from the site of his own or Sub contractors or Suppliers materials or equipment. Any such theft will not relieve the Contractor of his liability for completion on time.</p>	<p>6,000,000.00</p>
<p>B.8 Maintenance of public and private roads and services. The Contractor shall be responsible for all damages to roads, (Whether public or private), crossover, services and the like arising out of, or in the course of, or by reason of, the execution of the works and shall be responsible for observing any laws or other regulation imposed by a competent authority regarding the keeping of such roads free from mud, filth, etc, arising as aforesaid.</p>	<p>2,000,000.00</p>
<p>B.9 Police regulations The Contractor shall at all times observe any police regulations including those regarding the loading or unloading or any waiting by vehicles on the public highway and the Contract Sum shall be deemed to include for strictly compliance therewith.</p>	
<p><u>General Conditions and Preliminaries</u> (2/10) To Summary</p>	<p>8,000,000.00</p>



<p>B.10 <u>Progress chart, progress reports and progress photographs.</u> Immediately after signing the Contract the Contractor is to prepare a time and progress chart showing the time and order in which he proposes to carry out the works within the total construction time stated in the Contract. The chart shall show in detail the construction time and order in which each section of the work is to be carried out and be subdivided into trades or tasks. Where the contract is made up of individual buildings a separate chart shall be provided for each. Upon the letting of Subcontracts the Contractor is to incorporate similar times and details of each separate Subcontractor's work (which information is to be provided by the Sub Contractor) and the chart shall be so designed to accommodate this information. At the end of each week the Contractor is to mark on the chart, in a different colour, the actual time taken to complete the respective stages and sections of the work. The Contractor shall also show upon the chart the anticipated weekly labour strength required upon the site (divided into labourers and craftsmen) and shall similarly mark up the actual numbers employed. Copies of the completed chart are to be supplied to the Project Manager/ Architect.</p>	<p>500,000.00</p>
<p>B.11 <u>Checking schedules, drawings, etc</u> The Contractor shall be responsible for checking all schedules and drawings supplied by the Project Manager/ Architect and all shop drawings approved by the Project Manager/ Architect. In event of any discrepancy being found between such schedules and drawings or if the contractor considers that additional detail at least 28 days before the works concerned are to be executed. The Contractor shall ascertain from the drawings or otherwise any holes, recesses, or plugging, etc, which may be required in time to form these as the works proceed. No extra payment will be allowed for cutting or forming such holes, recesses, or plugging, Subsequently. The contractor's attention is drawn to the requirements for the submission of samples, shop drawings, certificates & guarantee contained in previous or subsequent items of this Document.</p>	
<p>B.12 <u>Samples</u> Samples of proposed materials and workmanship shall, if required by the Project Manager/ Architect, be submitted for approval, and those samples will be left on site by the Project Manager/ Architect who shall have power to reject all such materials and condemn such workmanship that does not correspond with the approved sample.</p>	<p>5,000,000.00</p>
<p>B.13 <u>Tests</u> The Project Manager/ Architect may, whenever he considers it desirable, test any materials before they leave the maker's premises as well as after delivery on site, and the Project Manager/ Architect shall be at liberty to reject any materials after delivery should he considers them unsatisfactory, notwithstanding the preliminary test and approval of materials at the maker's premises. The costs of these tests are to be borne by the Contractor.</p>	<p>5,000,000.00</p>
<p><u>General Conditions and Preliminaries</u> (3/10) To Summary</p>	<p>Tshs. 10,500,000.00</p>



<p><u>Tests (cont'd)</u></p> <p>When directed by the Architect, samples of materials (the sample being taken by approved sampling methods) are to be supplied by the Contractor for laboratory tests and shall be delivered by the contractor at his own cost to the project manager/ architect office or as otherwise directed.</p> <p>The Contractor shall, whenever so instructed by the Project Manager/ Architect, cut out sections of work executed or samples of materials incorporated therein and shall deliver them where directed for purpose of testing.</p> <p>All work disturbed shall be made good forthwith by the Contractor. all costs incurred in cutting out, making good and delivering as aforesaid, shall be borne by the contractor unless the result of the test shows that the materials etc, are in accordance with this contract.</p> <p>B.14 <u>Disposal of water for all sections of the works</u></p> <p>Allow for keeping the site and buildings free from water arising from whatsoever cause. The Contractor shall notify the Project Manager/ Architect as soon as water percolation or water logging becomes apparent and he shall obtain the written permission of the Project Manager/ Architect before carrying out any continuous pumping or other method of removal of water which may lower the water levels on adjoining sites. The contractor shall ensure that no nuisance is caused by the out fall of pumped water and shall obtain the necessary permission before connection with such work shall be deemed to be included in the contract sum.</p> <p>B.15 <u>Site levels</u></p> <p>Before commencing work the Contractor must arrange for and agree with the Project Manager/ Architect the existing site levels and similarly established and agree a bench mark.</p> <p>The levels and bench mark thus agreed will then be used for the duration of works for all purposes.</p> <p>The contractor shall allow in his tender the need to attain a leveled ground by cut and fill method from mid point of the site.</p> <p>B.16 <u>Interruption of work</u></p> <p>The contractor shall allow herein for all costs incurred by the interruption of work owing to public parades, processions and the like.</p> <p>B.17 <u>Overtime</u></p> <p>The contractor shall allow in his tender for any extra costs for overtime working he considers will be necessary in order to complete the work by the contract date for completion.</p> <p><u>General Conditions</u></p> <p>and Preliminaries (4/10) To Summary</p>	<p>10,000,000.00</p> <p>10,000,000.00</p>
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<p><u>Overtime (cont'd)</u> If during the course of the contract overtime is worked for a specific purpose in accordance with a written instruction issued by the project manager/architect the contractor will be reimbursed in respect of such overtime to the extent only of the additional net cost of unproductive time payable over and above the basic hourly rates as laid down in the regulations affecting the wages and conditions of employment, etc. in the construction industry but excluding any bonuses, profits and overheads.</p>	<p>3,000,000.00</p>
<p>B.18 <u>Housing labour on the site</u> No labour, with the exception of watchmen, may be housed on the site and the contractor must allow for all costs in moving labour to and from the site at such times and by routes approved by the police and local authorities.</p>	
<p>B.19 <u>Area to be occupied by the contractor.</u> The area of the site which may be occupied by the Contractor for use as storage and for the purpose of erecting workshops, etc, shall be agreed between the Project Manager Architect and the Contractor.</p>	
<p>B.20 <u>Stamp Charges</u> Allow for paying all stamp charges in connection with the surety bond and the contractor agreement.</p>	<p>2,000,000.00</p>
<p>B.21 <u>Details to be Private and Confidential</u> The drawings, bills of quantities and the contract documents applicable to this contract are retracted by the copyright. The Contractor shall treat the details of this contract as private and confidential for his own information only and shall not publish or disclose the details of the contract in any trade or technical paper or elsewhere (except as necessary for the purpose hereof) without the previous consent in writing of the employer.</p>	
<p>B.22 <u>Water for the Works</u> The site has no piped water within the vicinity. The contractor shall at his own expense use whatever means at his disposal, provide on the site plentiful, suitable and clean water for use of the works. The contract sum shall be deemed to include for all costs and charges of whole water to be used in the works.</p>	
<p>B.23 <u>Temporary lighting and power for the works</u> The contractor shall provide all artificial lighting, electric power and the energy required for the execution of the work. The provision of light and, where appropriate, power for the nominated sub contractors, local authorities is included in the items of general and special attendance in provisional and P.C. Sums. The Contract Sum shall be deemed to include for all fees and charges for all temporary services and clearing away on completion, and for the cost of all electricity consumed for the works.</p>	<p>5,000,000.00</p>
<p><u>General Conditions and Preliminaries</u> (5/10) To Summary</p>	



Gate Complex and other facilities

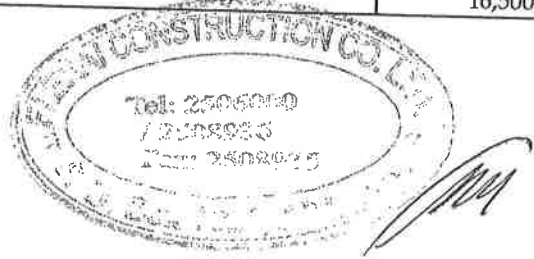
Preliminaries

<p>B.24 <u>Protection of persons and property</u></p>	<p>The Contractor shall provide for efficient of the public, the employer's servants and property and all other persons occupying or using the premises, also of adjoining or neighbouring property during the progress of the works included in or required to be done on connection with the contract.</p>	<p>8,000,000.00</p>
<p>B.25 <u>Trespass and Nuisance</u></p>	<p>All reasonable means shall be used to avoid inconveniencing adjoining owners and occupiers. No workmen or plant employed on the works shall be allowed to trespass upon adjoining properties. If the execution of the works requires that workmen or plant must enter upon adjoining property, the necessary permission shall be first obtained by the contractor who shall see that these instructions are carried out. The contractor shall indemnify the employer against any claim or action for damages on account of any trespass or other misconduct of the contractor's employees. The contractor shall not obstruct any public way or otherwise do or suffer to be done anything which may amount to a nuisance or annoyance, and shall not interfere with any right of way or right to adjoining property, and any notice received by him or left upon the site requiring the discontinuance or suspension of any part of the works shall at once be forwarded by him to the Architect or, if given verbally, shall at once be communicated by him to the architect in writing and the contractor shall keep the employer indemnified against any claim or loss consequent upon any act, neglect or omission of the contractor, his agents, servants or workmen in this respect.</p>	
<p>B.26 <u>Temporary works generally</u></p>	<p>The Contractor shall provide all temporary roads, tracks, hardstandings, crossing and the like to ensure satisfactory and efficient access to the works. The cost of such temporary works shall be deemed to be included in the contract sum</p>	
<p>B.27 <u>Temporary roads</u></p>	<p>Prior to execution of such temporary works the contractor shall submit his proposals to the Architect for approval.</p>	
<p>B.28 <u>Temporary buildings for use by the Contractor</u></p>	<p>The Contractor shall, at his own cost, supply and erect all temporary buildings, sheds, messrooms and stores with floors at least 150mm above ground level. No office, stores or other temporary buildings shall be erected on site without first obtaining the consent of the Project Manager/ Architect as to the type of temporary building to be supplied and the position in which they are to be erected.</p>	<p>2,000,000.00</p>
<p>B.29 <u>Temporary latrines</u></p>	<p>Temporary latrines shall be provided, maintained and removed on completion by the contractor to the satisfaction of the Project Manager/ Architect and local Authorities.</p>	
<p><u>General Conditions and Preliminaries</u></p>	<p>(6/10) To Summary</p>	<p>10,000,000.00</p>
	<p>Tshs.</p>	

SP



<p>B.30 Temporary facilities for use by persons acting on behalf of the Employer. The Contractor shall provide, erect and maintain where convenient an approved lock up office building for the the sole use of the Project Manager/ Architect with a floor are of not less than 50 square metre. The office is to be furnished with locable steel cabinet, a table and chairs, of sufficient size and number for site meetings, a plan chest and pin -up boards. The contractor shall also supply cleaning and attendance on the above mentioned accomodation as required. The Contractor shall allow for providing transport for the consultant whenever they are in town for official duties at site. Transport shall be provided from the time they arrive at the Airport, Railway Station or Bus Station and shall involve all movement connected with the Works up to the time they leave the town for their respective stations.</p>	
<p>B.31 Rates on temporary buildings The Contractor shall be responsible for the payment of all rates and taxes in respect of huts or other temporary buildings erected anywhere for the purposes of of the works. The Contractor shall also be responsible for agreeing or otherwise dealing with notice of assessment, demand note or other like documents which may be received in respect of such huts or temporary buildings. The contract sum shall be deemed to include for the aforesaid and for payment of any expenses incurred by the Contractor in connection with such assessment.</p>	
<p>B.32 Temporary telephone The Contractor shall arrange for, provide and maintain a telephone connection to the offices from the commencement to completion of the contract and shall pay all charges in connection therewith including local calls made by the Project Manager/ Architect.</p>	
<p>B.33 Sign board The Contractor shall unless otherwisedirected, obtain any necessary consent or license from local auhtority and immediately upon commencement of the works the Contractor shall, in accordance with the details supplied by the Project Manager/ Architect make and erect a signboard showing the name of the employer and such other information as shall be directed and approved by the Project Manager/ Architect.</p>	2,000,000.00
<p>B.34 Temporary hoarding The works shall be enclosed by the Contractor with a fence not less than 2.40m high neat and uniform in appearance to the approval of the architect. The fence shall be a sufficient obstacle to prevent the ingress of unauthorised persons or children and shall be complete with all necessary padlocked entrance gates, fans and screens as may be requisite to ensure the safety of the public or adjoining owners and of the works.</p>	14,500,000.00
<p>General Gonditions and Preliminaries (7/10) To Summary</p>	Tsbs 16,500,000.00



<p><u>Temporary hoarding (cont'd)</u> The Contractor shall maintain the fence, gates, and screens, obtain all necessary licenses and pay all fees in connection therewith, the amounts of which shall be deemed to be included in the contract sum. The Contractor shall allow for moving or adapting the fencing as and when required during the progress of the works and shall dismantle and remove at completion of the work, but not until all danger to the public has passed and shall make good all work disturbed.</p>	
<p>B.35 <u>General scaffolding</u> Provide all scaffolding, (tubular steel or similar), that may be required for the works.</p>	8,000,000.00
<p>B.36 <u>Prime cost (P.C) items</u> The word "prime cost" (or the initials ("PC") wherever appearing in these bills of Quantities, shall mean net cost exclusive of any trade, cash or other discount whatsoever but inclusive of the cost of packing, carriage and delivery, such cost shall be the sums due to the subcontractor or supplier after adjustment where applicable in respect of measurements or rates.</p> <p>Any increases or decreases in these prime cost sums resulting from the adjustments and property paid by the contractor, shall be added to or deducted from the contract sum in the final account. In substantiation the contractor will be required to produce to the project manager/architect all quotations, invoices and receipted accounts as shall be necessary to show the details of the sums actually paid.</p> <p>Any sum added by the contractor in these Bills of Quantities in respect of profit upon any prime cost sum will be deducted at the final settlement of accounts and a sum will be added, the amount of which will bear the same proportions to the sum added as the net amount properly expended bears to the original P.C Sum.</p>	
<p>B.37 <u>Particulars to be supplied when inviting quotation under P.C.Sums.</u></p> <p>When inviting quotations for the supply of goods or the execution of work described under P.C. sums, full particulars as contained herein (except the sums provided), and shown on the drawings in respect of the goods or work in question shall in all cases be supplied by the contractor to the persons, firms or companies quoting.</p> <p>All such invitations shall contain a stipulation that the quotations must state a guaranteed time for delivery or fixing, as the case may be, from the date when the particulars are supplied, in the case of materials to be delivered on the site in bulk, the person, firm or company quoting musts guarantee the delivery of the quantity required, (uniform with the approved samples), by and at the time required to suit the progress of the building operations. The contractor shall, with such invitations, supply full details guaranteed times may be stated.</p>	
<p><u>General Conditions</u> and Preliminaries (8/10) To Summary</p>	Tshs 8,000,000.00



<p>B.38 <u>Protection of works</u></p> <p>The contractor shall allow for and provide and /or maintain during the execution of the works all shoring, strutting, needling and other supports and shall take allm other precautions and adopt such expedients as may be necessary to preserve the stability of buildings, structures, fences, walls, land and property, roads and footpaths, sewers, drains, gullies and other services (including those of adjoining owners) that may in any way be affected by the work to be executed under the contract immediately he has taken possession of the site and until completion of the works. The contractor shall hold the employer completely indemnified against all or any claim for damage or losses accruing from any settlement resulting from such shoring and strutting or lack thereof and the striking and removal of same.</p> <p>Any damage and/or settlement that may be caused aridsing out of or directly or indirectly consequent upon the aforesaid protective measures or lack thereof or the carrying out of the works is to be made good by the contractor at his own expense to the satisfaction of the architect and all other parties concerned.</p> <p>The contractor shall cover up and protect all finished work liable to damage including provision of temporary roofs, gutters, drains, etc until the completion of the works. The entire responsibility in respect of all matters mentioned or referred to in this clause shall rest with the contractor not withstanding any approval given by the architect to, or concurrence in, the action taken or proposed to be taken by the contractor, in pursuance of his obligations.</p>	
<p>B.39 <u>Removal of plant, rubbish, etc</u></p> <p>The Contractor shall ,upon completion of the works remove and clear away all temporary buildings, plant, rubbish and unused materials, a nd shall leave the whole of the site of the works in a clean and tidy state to the satisfaction of the project manager/architect. he shall also temove all rubbish and dirt from the site at weekly intervals or as directed by the Project Manager/ Architect.</p>	<p>500,000.00</p>
<p>B.40 <u>Final cleaning of buildings and site.</u></p> <p>Before handing over any building the contractor shall properly clean all floors and finished surfaces, clean glass inside and outside and leave all sanitary and other appliances in full working order. He shall also cut and weed all grassed areas, clean down external steps, paths and roads and leave the whole in perfect condition ready for occupation.</p>	
<p><u>General Gonditions</u></p> <p>and Preliminaries (9/10) To Summary</p>	<p>Tshs. 500,000.00</p>

SP



<u>SUMMARY</u>	
Page 1/10	12,000,000.00
Page 2/10	8,000,000.00
Page 3/10	10,500,000.00
Page 4/10	10,000,000.00
Page 5/10	5,000,000.00
Page 6/10	10,000,000.00
Page 7/10	16,500,000.00
Page 8/10	8,000,000.00
Page 9/10	500,000.00
<u>TOTAL BILL NO.1</u> <u>GENERAL CONDITIONS</u> <u>AND PRELIMINARIES</u> (10/10) TO General Summary Tshs.	80,500,000.00



Gate Building

Measured Works

**BILL NUMBER TWO - MEASURED WORKS (GATE BUILDING,
SENIOR STAFF HOUSE, RANGER POST, TOILETS AND CAR
PARKING)**

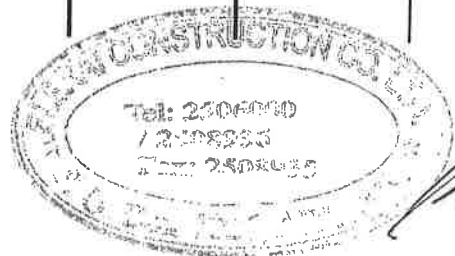
	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER ONE</u>				
<u>SUBSTRUCTURE</u>				
<u>SITE PREPARATION</u>				
<u>Removing bushes, scrub, trees, etc</u>				
Clearing site; grubbing up roots; removing from site				
a. bushes, scrub, undergrowth or the like, small trees not exceeding 600mm girth	363	sm	2,000	726,000
<u>Preserving vegetable top soil</u>				
Excavating average 150mm deep				
b. depositing in temporary spoil heaps; re-use for landscaping	363	sm	2,000	726,000
<u>EXCAVATION</u>				
<u>Excavating</u>				
Trenches; to receive foundations; starting from formation level				
c. not exceeding 1.50m deep	132	cm	7,000	924,000
Pits; to receive foundations; starting from striped level				
d. not exceeding 1.50m deep	62	cm	7,000	434,000
Extra over all kinds of excavations; irrespective of depth for				
e. breaking up rocks (provisional)	29	cm	35,000	1,015,000
<u>Disposal</u>				
Excavated material				
f. backfilling; depositing and compacting in layers maximum 250mm thick	125	cm	12,000	1,500,000
To Collection			TZS	5,325,000
2/1/1				



	QTY	UNIT	RATE	AMOUNT
Surplus excavated material				
a. removing from site	69	cm	12,000	828,000
<u>DISPOSAL OF WATER</u>				
<u>Generally</u>				
Keeping excavations free from				
b. general water	-	Item	500,000	500,000
<u>PLANKING AND STRUTTING</u>				
<u>Generally</u>				
Sides of excavations				
c. generally	-	Item	500,000	500,000
<u>HARDCORE OR THE LIKE</u>				
<u>Selected fill materials; approved by the Engineer; preferably sand</u>				
Filling in making up levels				
d. 200mm thick deposited an well compacted	211	sm	15,000	3,165,000
<u>Hardcore</u>				
Beds				
e. 200mm thick; compacting; leveling; blinding	211	sm	15,000	3,165,000
<u>ANTI-TERMITE TREATMENT</u>				
<u>Gammalin 20 EC solution or equivalent</u>				
At the rate of 7 litres per square metre				
f. to hardcore beds and tops of foundation walls	256	sm	3,000	768,000
At the rate of 80 litres per cubic metre				
g. to backfilling	125	cm	8,000	1,000,000
To Collection			TZS	9,926,000
2/1/2				



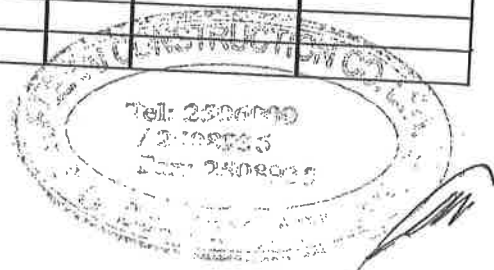
	QTY	UNIT	RATE	AMOUNT
<u>INSITU CONCRETE; PLAIN</u>				
<u>Normal class 10/25</u>				
Blinding				
a. 50 mm thick	25	sm	26,000	650,000
<u>INSITU CONCRETE; REINFORCED</u>				
<u>Normal; class 20/20; vibrated</u>				
Beds				
b. 100mm thick	256	sm	30,000	7,680,000
c. 100mm thick; ramp	8	sm	30,000	240,000
Foundations in trenches				
. irrespective of thickness	14	cm	300,000	4,200,000
Foundations to isolated stanchions or the like				
e. irrespective of thickness	7	cm	300,000	2,100,000
Ground beams				
f. irrespective of sectional area	9	cm	300,000	2,700,000
Columns; vertical or sloping exceeding 15 degrees from horizontal				
g. irrespective of sectional area.	1	cm	300,000	300,000
Steps, staircase or strings				
h. generally	1	cm	300,000	300,000
<u>REINFORCEMENT</u>				
<u>Fabric; B.S. 4483</u>				
Reference No. A252; mesh 200 x 200mm; weight 3.95kg per square metre; 200mm end laps; 200mm side laps				
i. in any location	401	sm	12,000	4,812,000
			TZS	22,982,000
				2/1/3



	QTY	UNIT	RATE	AMOUNT
<u>Bars; high yield steel; cold worked; B.S. 4466</u>				
In any location				
a. various sizes	2,938	kg	3,500	10,283,000
<u>FORMWORK TO INSITU CONCRETE</u>				
<u>Formwork generally</u>				
Sides; vertical or battering				
b. foundations or the like	25	sm	18,000	450,000
c. columns or the like	9	sm	18,000	162,000
d. columns or the like; curved mean radius 75mm	11	sm	18,000	198,000
Edges of beds or the like				
e. 225 mm to 300 mm wide	103	lm	5,400	556,200
Sides or risers of steps or staircases				
f. 75 mm to 150 mm wide	51	lm	2,700	137,700
<u>CONCRETEWORK SUNDRIES</u>				
<u>Generally</u>				
Wall ties; mild steel bars; one end cast into concrete; other end built into joints of blockwork				
g. 6 mm diameter x 450 mm long	145	No.	21,000	3,045,000
<u>BLOCKWORK</u>				
<u>Concrete blocks; B.S. 6073; type A; 7.0 N per square millimetre; solid in cement mortar (1:3); including 6mm mild steel bars to alternating courses</u>				
Walls				
h. 230 mm thick	200	sm	40,000	8,000,000
To Collection			TZS	22,831,900
2/1/4				



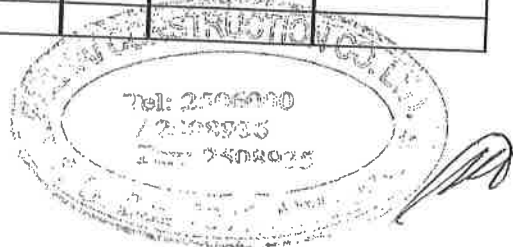
	QTY	UNIT	RATE	AMOUNT
<u>DAMP PROOF COERCES</u>				
<u>B.S. 743; type A; bitumen Hessian base; 150 mm laps</u>				
Horizontal				
a. 230 mm wide	196	lm	2,000	392,000
<u>Polythene; 500 gauge; 150 mm laps</u>				
Horizontal				
b. over 300 mm wide	211	sm	3,000	633,000
<u>INSITU FINISHINGS</u>				
<u>Plaster; 12mm first coat of cement and sand (1:3)</u> <u>3mm second coat of cement and lime putty (1:5)</u> <u>steel trowelled; external</u>				
15 mm one coat work; to concrete or blockwork base generally to				
c. walls	46	sm	8,000	368,000
<u>TOUCHING UP MANUFACTURER'S PRIMING COAT; TWO UNDERCOAT; ONE COAT OIL PAINT FULL GLOSS FINISH</u>				
<u>Wood floated rendered surfaces</u>				
Walls				
d. over 300mm girth	46	sm	8,000	368,000
To Collection			TZS	1,761,000
2/1/5				



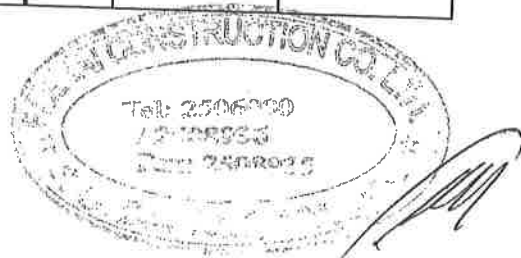
Gate Building

Measured Works

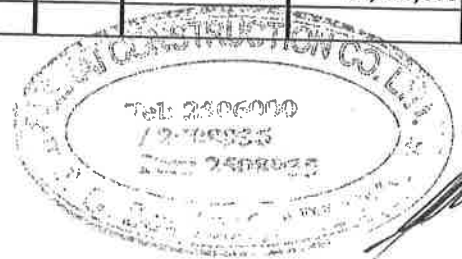
	QTY	UNIT	RATE	AMOUNT
<u>COLLECTION</u>				
2/1/1			TZS	5,325,000
2/1/2			TZS	9,926,000
2/1/3			TZS	22,982,000
2/1/4			TZS	22,831,900
2/1/5			TZS	1,761,000
TO SUMMARY OF BILL NUMBER TWO			TZS	62,825,900
2/1/6				



	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER TWO</u>				
<u>REINFORCED CONCRETE</u>				
<u>SUPERSTRUCTURE</u>				
<u>INSITU CONCRETE; REINFORCED</u>				
Normal; class 20/20; vibrated				
Suspended floors or the like; horizontal				
a. 150mm thick	11	sm	45,000	495,000
Beams; horizontal or sloping not exceeding 15 degrees from horizontal				
b. irrespective of sectional area	14	cm	300,000	4,200,000
Columns; vertical or sloping exceeding 15 degrees from horizontal				
c. irrespective of sectional area	3	cm	300,000	900,000
Walls; vertical or sloping exceeding 15 degrees from horizontal				
d. 230mm thick	22	sm	69,000	1,518,000
<u>REINFORCEMENT</u>				
<u>Bars; high yield steel; cold worked; B.S. 4466</u>				
In any location				
e. various sizes	4,149	kg	3,500	14,521,500
<u>FORMWORK TO INSITU CONCRETE</u>				
<u>Formwork generally</u>				
Soffits; horizontal				
f. floors or the like	8	sm	18,000	144,000
Sides; vertical or battering;				
g. columns or the like	25	sm	18,000	450,000
h. walls or the like	42	sm	18,000	756,000
Sides and soffits				
i. columns or the like; curved mean radius 115mm	30	sm	18,000	540,000
j. beams or the like; horizontal	74	sm	18,000	1,332,000
TO SUMMARY OF BILL NUMBER TWO			TZS	24,856,500
2/2/1				



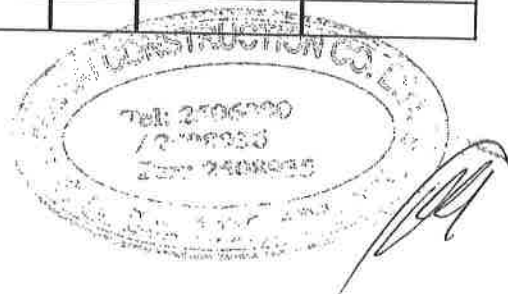
	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER THREE</u>				
<u>EXTERNAL WALLING</u>				
<u>BLOCKWORK</u>				
Concrete blocks; B.S. 6073; type A; 5.0N per square millimetre; solid; in cement mortar (1:3)				
Walls				
a. 230 mm thick	547	sm	40,000	21,880,000
TO SUMMARY OF BILL NUMBER TWO			TZS	21,880,000
2/3/1				



	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER FOUR</u> <u>INTERNAL WALLING</u>				
<u>BLOCKWORK</u>				
<u>Concrete blocks; B.S. 6073; type A; 5.0N per square millimetre; solid in cement mortar (1:3)</u>				
Walls				
a. 230mm thick	148	sm	40,000	5,920,000
TO SUMMARY OF BILL NUMBER TWO 2/4/1			TZS	5,920,000



	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER FIVE</u>				
<u>ROOF STRUCTURE</u>				
<u>STRUCTURAL TIMBER</u>				
<u>Mpodo, mtambara, cypress or cedar; seasoned with moisture content below 18%; pressure impregnated; treated with insecticide</u>				
Plates or the like				
a. 50 x 100mm	106	lm	8,000	848,000
Rafters				
b. 50 x 150mm	339	lm	8,000	2,712,000
ceiling joists or collars				
c. 50 x 150mm	244	lm	8,000	1,952,000
Members of roof trusses				
d. 50 x 100mm	613	lm	7,000	4,291,000
Purlins or the like				
e. 50 x 50mm	538	lm	5,000	2,690,000
<u>BOARDING</u>				
<u>Approved local hardwood</u>				
Fascia/Barge boards				
f. 25 x 250mm	142	lm	12,000	1,704,000
<u>CARPENTRY WORKS</u>				
<u>Marine board</u>				
Gusset plates				
b. 350 x 250 x 18mm	144	No	10,000	1,440,000
To Collection				15,637,000
2/5/1				



	QTY	UNIT	RATE	AMOUNT
a. 375 x 350 x 18mm	236	No	11,000	2,596,000
b. 1100 x 400 x 18mm	96	No	15,000	1,440,000
<u>Mild steel</u>				
Base plates				
c. 100 x 150 x 6mm angle cleats	110	No	15,000	1,650,000
Bolts				
d. 12mm diameter; 215mm long; two nuts; two washer	540	No	8,000	4,320,000
Anchor bolts				
e. 20mm diameter x 240mm long; one nut; one washer; one hooked end; cast into concrete	110	No	15,000	1,650,000
<u>CARPENTRY SUNDRIES</u>				
<u>Generally</u>				
Holes for bolts or the like; 12mm diameter				
f. 25mm marine plywood	2,380	No	2,000	4,760,000
<u>ONE COAT PRIMER; ONE UNDERCOAT; ONE COAT OIL PAINT FULL GLOSS FINISH</u>				
<u>Wood surfaces</u>				
Fascia/Barge boards				
g. 200 to 300 mm girth	142	lm	4,000	568,000
To Collection				16,984,000
<u>COLLECTION</u>				
			2/5/1	TZS 15,637,000
			2/5/1	TZS 16,984,000
TO SUMMARY OF BILL NUMBER TWO			TZS	32,621,000
				2/5/1



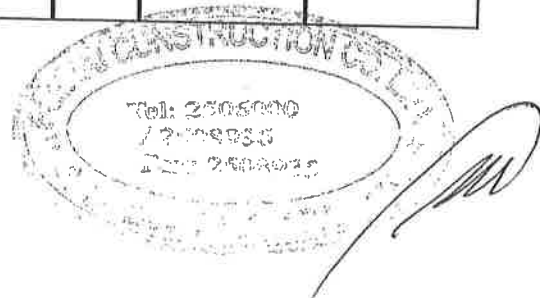
	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER SIX</u>				
<u>ROOF COVERINGS</u>				
<u>CORRUGATED OR TROUGHED SHEET ROOFING</u>				
<u>Profiled aluzinc; IT5; 28 gauge; pre-painted</u>				
Coverings; fixing to timber purlins at 1000mm general spacing with galvanised steel roofing rails with water proof cover and sealwashers; 150mm end laps and one and a half corrugation side laps				
a. sloping not exceeding 45 degrees from horizontal	422	sm	35,000	14,770,000
b. raking cutting	96	lm	5,000	480,000
Accessories; fixing with galvanised steel roofing rails with water proof cover and seal washers				
c. cappings to ridges	45	lm	15,000	675,000
d. cappings to valley	33	lm	15,000	495,000
e. cappings to hip	15	lm	15,000	225,000
<u>MOISTURE AND WATER PROOFING</u>				
<u>Gammat water proofing membranc; tanking to manufacturer's recommendations</u>				
Two layers; 150 mm laps; to cement and sand base; falls or cross falls or sloping not exceeding 45 degrees from horizontal				
f. 4 mm x over 300 mm wide	8	sm	45,000	360,000
To Collection			TZS	17,005,000
2/6/1				



	QTY	UNIT	RATE	AMOUNT
Skirtings; overall bonding to cement and sand base				
a. 600mm wide; in contact with base; one dressing over tilting fillets; one turning into grooves	12	lm	9,000	108,000
b. working into outlets pipes; dishing to gullies or the like	1	No	500,000	500,000
<u>BEDS OR BACKINGS</u>				
<u>Mortar; cement and sand (1:3)</u>				
50 mm (average) thick one coat beds; screeded to receive water proofing; to concrete or blockwork base; generally to				
c. floors; to falls, crossfalls or sloping not exceeding 45 degrees from horizontal	8	sm	32,000	256,000
15 mm one coat work backings; screeded to receive water proofing to concrete or blockwork base; generally to				
d. skirtings; 600mm wide	12	lm	9,000	108,000
e. angle fillets	1	No	500,000	500,000
To Collection				1,472,000
<u>COLLECTION</u>				
2/6/1				TZS 17,005,000
2/6/2				TZS 1,472,000
TO SUMMARY OF BILL NUMBER TWO				TZS 18,477,000
2/6/2				



	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER SEVEN</u>				
<u>RAINWATER DISPOSAL</u>				
<u>RAINWATER INSTALLATIONS</u>				
<u>Gutterwork; unplasticiced pvc half round gutters and fittings purpose made</u>				
Gutters; soldered joints in the running length fixing with matching brackets at 1000mm centres				
a. 150mm	78	Im	28,000	2,184,000
b. Extra bends	8	No	8,000	64,000
c. Extra ends	16	No	8,000	128,000
<u>Rainwater down pipes; unplasticised PVC pipes and fittings; B.S. 4514; colour to Architect approval</u>				
Pipes; solvent weld straight couplings in the running length; fixed with standard holderbats at 1500mm centres to backgrounds requiring plugging				
d. 110mm	89	Im	28,000	2,492,000
e. Extra bends	34	No	8,000	272,000
f. Extra shoes	17	No	8,000	136,000
TO SUMMARY OF BILL NUMBER TWO			TZS	5,276,000
2/7/1				



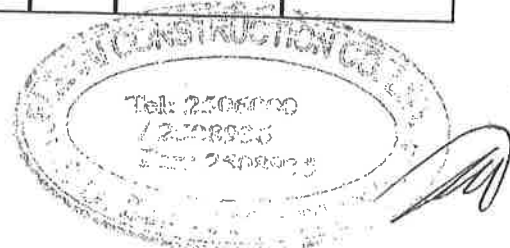
	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER EIGHT</u> <u>EXTERNAL FLOOR FINISHINGS</u>				
<u>TILE; SLAB OR BLOCK FINISHINGS</u>				
<u>Porcelain tiles; to the Project Manager's approval; to regular pattern; bedding and jointing in cement mortar (1:3); grouting joints with matching colour</u>				
450 x 450 x 10m open joint straight both ways, to cement and sand base; generally to				
a. floors; level	125	sm	50,000	6,250,000
b. treads, 300mm wide	43	lm	15,000	645,000
c. risers; 150mm wide	64	lm	7,500	480,000
d. skirtings; 100mm wide	57	lm	5,000	285,000
<u>BEDS OR BACKINGS</u>				
<u>Mortar; cement and sand (1:3)</u>				
38 mm one coat beds; screeded to receive terra-cotta tiles; to concrete or blockwork base; generally to				
e. floors; level	125	sm	12,000	1,500,000
f. treads; 300mm wide	43	lm	3,600	154,800
15mm one coat backings; screeded; to receive terra-cotta tiles; to concrete or blockwork base; generally to				
g. risers; 150mm wide	64	lm	6,000	384,000
h. skirtings; 100mm wide	57	lm	4,000	228,000
TO SUMMARY OF BILL NUMBER TWO			TZS	9,926,800
2/8/1				



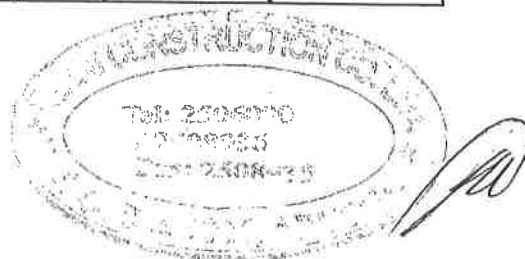
<u>ELEMENT NUMBER NINE</u>	QTY	UNIT	RATE	AMOUNT
<u>EXTERNAL WALL FINISHINGS</u>				
<u>GENERAL JOINERY</u>				
<u>Approved local hardwood; Mkongo or the like</u>				
Balustrade; 900mm high				
a.	23	lm	180,000	4,140,000
75mm balusters; fixed with bolts/nails to 50mm average diameter of selected wooden top and bottom rails; painted with three coats of clear varnish				
<u>INSITU FINISHINGS</u>				
<u>Plaster; 12 mm first coat of cement and sand (1:3); 3 mm second coat of building plaster (stucco); steel trowelled</u>				
15 mm two coat work; to concrete or blockwork base; generally to				
b.	88	sm	8,000	704,000
walls				
<u>NATURAL STONEMWORK DRESSINGS</u>				
<u>Approved local stone; squared; medium chisel dressed both sides; bedding, jointing and recessed pointing both sides in cement mortar (1:4) as work proceeds</u>				
Facings to walls				
c.	475	sm	80,000	38,000,000
50mm thick; 10nos wall ties per square metre cut and pinned to concrete or blockwork backing				
<u>THREE COATS WEATHERGUARD</u>				
<u>Steel trowelled plastered surfaces</u>				
Walls				
	88	sm	8,000	704,000
over 300mm girth				
TO SUMMARY OF BILL NUMBER TWO			TZS	43,548,000



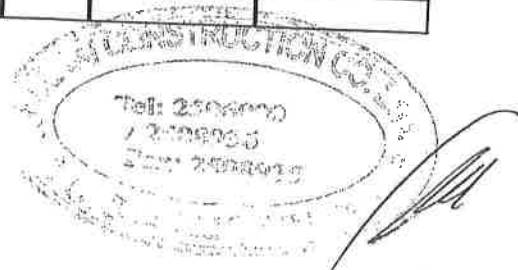
2/9/1		QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER TEN</u>					
<u>EXTERNAL CEILING FINISHINGS</u>					
<u>STRUCTURAL TIMBERS</u>					
<u>Cypress; grade 2; pressure impregnated; treated with insecticide</u>					
Branding					
a.	50 x 50mm	897	lm	5,500	4,933,500
<u>PLAIN SHEET FINISHINGS</u>					
<u>Cementitious boards; to approval of the Project Manager; fixing with screws to manufacturer's recommendations</u>					
8mm; scrim coat filler to tapped joints; set to pattern to timber base; generally to					
b.	ceilings	116	sm	22,000	2,552,000
c.	eaves ceilings	107	sm	22,000	2,354,000
Cornices; coved and decorated with approved shape					
d.	50 x 50mm; screwed to timber or concrete base; curved	154	lm	7,000	1,078,000
<u>THREE COATS PVA BASED EMULSION PAINT</u>					
<u>Cementitious board surfaces</u>					
Ceilings					
e.	over 300mm girth	223	sm	8,000	1,784,000
Cornices					
f.	not exceeding 100mm girth	154	lm	1,200	184,800
TO SUMMARY OF BILL NUMBER TWO				TZS	12,886,300
2/10/1					



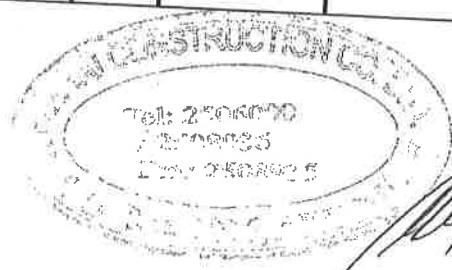
	QTY	UNIT	RATE	AMOUNT
<u>ELEMENT NUMBER ELEVEN</u>				
<u>INTERNAL FLOOR FINISHINGS</u>				
<u>TILE, SLAB OR BLOCK FINISHINGS</u>				
<u>Porcelain tiles; to comply with "CREMA ROSA" ex RAK; 302MT- 134 razor cut butt jointed floor border</u>				
600 x 600 x 10 mm open joints straight both ways; to cement and sand base; generally to				
a. floors; level	110	sm	50,000	5,500,000
b. skirting; 150 mm wide	96	lm	7,500	720,000
<u>Unpolished porcelain tiles; "CREMA ROSA" exRAK; 301MT-134; colour and pattern to approval; bedding and jointing in cement mortar (1:1); grouting joints with matching colour</u>				
400 x 400 x 10mm; butt joints straight both ways; to cement and sand base; generally to				
c. floors; to falls; crossfalls or sloping not exceeding 15 degrees from horizontal	8	sm	50,000	400,000
<u>BEDS OR BACKINGS</u>				
<u>Mortar; cement and sand (1:3)</u>				
40 mm one coat beds; screed; to receive porcelain tiles; to concrete or blockwork base; generally to				
d. floors; level	110	sm	12,000	1,320,000
e. floors; to falls; crossfalls or sloping not exceeding 15 degrees from horizontal	8	sm	12,000	96,000
12mm one coat backings; screeded; to receive porcelain tiles; to concrete or blockwork base; generally to				
f. skirtings; 150 mm wide	96	lm	1,800	172,800
TO SUMMARY OF BILL NUMBER TWO			TZS	8,208,800
2/11/1				



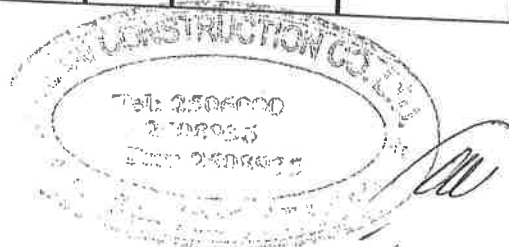
<u>ELEMENT NUMBER TWELVE</u> <u>INTERNAL WALL FINISHINGS</u>	QTY	UNIT	RATE	AMOUNT
<u>INSITU FINISHINGS</u>				
Plaster; 12 mm first coat of cement and sand (1:3); 3 mm second coat of building plaster (stucco); steel trowelled				
15 mm two coat work; to concrete or blockwork base; generally to				
a. walls	264	sm	8,000	2,112,000
<u>TILE, SLAB OR BLOCK FINISHINGS</u>				
Glazed ceramic wall tiles ex RAK "CREMA ROSA" 501 G.L-112; to regular pattern; bedding and jointing in cement mortar (1:1); grouting joints with coloured cement				
8 x 300 x 600 mm; open joints straight both ways; to cement and sand base; generally to				
b. walls	11	sm	50,000	550,000
<u>BEDS OR BACKING</u>				
Mortar; cement and sand (1:3)				
15 mm one coat backings; screeded; to receive ceramic tiles; to concrete or blockwork base; generally to				
c. walls	11	sm	8,000	88,000
<u>THREE COATS WASH AND WEAR VINYL PAINT</u>				
<u>Steel trowelled plastered surfaces</u>				
Walls				
d. over 300 mm girth	264	sm	8,000	2,112,000
TO SUMMARY OF BILL NUMBER TWO			TZS	4,862,000
2/12/1				



<u>ELEMENT NUMBER THIRTEEN</u> <u>INTERNAL CEILING FINISHINGS</u>	QTY	UNIT	RATE	AMOUNT
<u>STRUCTURAL TIMBERS</u>				
<u>Cypress; grade 2; pressure impregnated;</u> <u>treated with insecticide</u>				
Branding				
a. 50 x 50mm	449	Im	5,500	2,469,500
<u>PLAIN SHEET FINISHINGS</u>				
<u>Gypsum boards; to approval of the</u> <u>Project Manager; fixing with screws to</u> <u>manufacturer's recommendations</u>				
9mm; scrim coat filler to tapped joints; set to pattern to timber base; generally to				
b. ceilings	118	sm	22,000	2,596,000
Cornices; coved and decorated with approved shape				
c. 50 x 50mm; screwed to timber or concrete base; curved	142	Im	2,200	312,400
<u>THREE COATS PVA BASED EMULSION PAINT</u>				
<u>Gypsum board surfaces</u>				
Ceilings				
d. over 300mm girth	118	sm	8,000	944,000
Cornices				
e. not exceeding 100mm girth	142	Im	1,200	170,400
TO SUMMARY OF BILL NUMBER TWO			TZS	6,492,300
2/13/1				



ELEMENT NUMBER FOURTEEN	QTY	UNIT	RATE	AMOUNT
WINDOWS				
PRECAST CONCRETE				
<u>Normal; class 21/10; vibrated; surface fair finish</u>				
Sills				
a. 350 x 150 mm; once sunk weathered; once throated; reinforced as necessary for handling; surface finish 600mm girth; bedding, jointing and point in cement mortar (1:3)	24	lm	55,000	1,320,000
PURPOSE MADE UNITS				
<u>Powder coated aluminium windows; ironmongery to opening lights; neoprene gaskets for glazing; 6mm thick ordinary quality clear glass; assembling; fixing to grounds; sealing all round with non-hardening mastic; removing protective tape; complete with mosquito gauze</u>				
Cuttings and pinning to concrete or blockwork at jambs; fixing to head and sill with screws; plugging				
b. 600 x 600 mm overall size	2	No	72,000	144,000
c. 1500 x 2000 mm overall size	3	No	600,000	1,800,000
. 1750 x 2000 mm overall size	2	No	700,000	1,400,000
e. 2000 x 2000 mm overall size	1	No	800,000	800,000
f. 2040 x 2000 mm overall size	2	No	816,000	1,632,000
g. 2440 x 2000 mm overall size	1	No	976,000	976,000
h. 2590 x 2000 mm overall size	3	No	1,036,000	3,108,000
i. 3240 x 2000 mm overall size	2	No	1,296,000	2,592,000
GRILLE WORK				
<u>Mild steel; B.S. 4360</u>				
Grilles; consisting of angle frames; mild steel bars or the like; ends welded and angles cut; mitred and welded; all welding ground to smooth finish				
j. generally	62	sm	120,000	7,440,000
TO SUMMARY OF BILL NUMBER TWO			TZS	21,212,000
2/14/1				



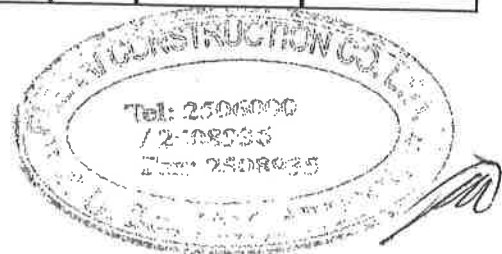
ELEMENT NUMBER FIFTEEN	QTY	UNIT	RATE	AMOUNT
<u>DOORS</u>				
<u>GENERAL JOINERY</u>				
<u>Approved local hardwood; Mkongo; selected</u>				
Panelled doors; 45 x 120 mm stiles; 45 x 120 mm top and middle rails; 45 x 200 mm bottom rail; two panels; infilled with 40mm thick boarding veneered finish on both sides; including vents				
a. 840x 2315 x 45 mm	6	Nr.	700,000	4,200,000
b. 740 x 2315 x 45 mm	5	Nr.	700,000	3,500,000
Fixed lights; 45 x 75mm framing; filled in with 5mm thick clear glass pane with 15 x 38mm hardwood beads (both m.s.)				
c. 710 x 300 mm	5	Nr.	50,000	250,000
d. 810 x 300 mm	6	Nr.	70,000	420,000
Frames				
e. 45 x 145 mm	69	Im	60,000	4,140,000
Transome				
f. 45 x 145 mm	9	Im	60,000	540,000
Glazing beads				
g. 15 x 20 mm	47	Im	35,000	1,645,000
Architraves				
h. 15 x 38 mm	138	Im	35,000	4,830,000
Grounds				
i. 15 x 80 mm	69	Im	35,000	2,415,000
To Collection			TZS	21,940,000
2/15/1				



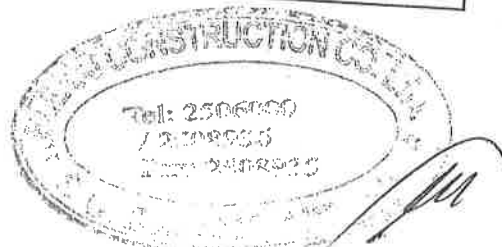
	QTY	UNIT	RATE	AMOUNT
<u>IRONMONGERY</u>				
<u>Supplying and fixing ironmongery "UNION" brand</u>				
To softwood, hardwood or the like; fixing with screws				
a. ball bearing hinges; stainless; ref MAR - SS - 404030 - 4BB	16.50	Prs	32,500	536,250
b. three lever mortice lock "HAFELE"	6	No	160,000	960,000
c. rubber door stoppers	10	No	18,000	180,000
d. one lever bathroom lock	5	No	45,000	225,000
<u>ONE COAT APPROVED STAIN; TWO COATS POLYURETHANE</u>				
<u>Wood surfaces</u>				
Frames or the like				
e. 200 to 300 mm girth	44	lm	5,000	220,000
f. over 300 mm girth	3	sm	9,000	27,000
General surfaces				
g. over 300 mm girth	38	sm	9,000	342,000
<u>PURPOSE MADE UNIT</u>				
<u>Supply and fix strong room door</u>				
500kg high security door; with built-in grilles; duo key plus combination; one master key; complete with timer setting; setting in positioning as recommended by manufacturer; including all associated fittings				
h. 1390 x 2350mm overall size	1	Nr	19,000,000	19,000,000
To Collection			TZS	21,490,250
2/15/2				



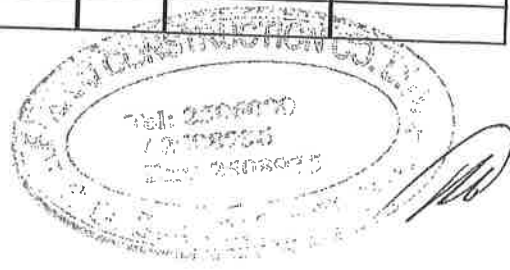
	QTY	UNIT	RATE	AMOUNT
<u>COLLECTION</u>				
2/15/1			TZS	21,940,000
2/15/2			TZS	21,490,250
TO SUMMARY OF BILL NUMBER TWO			TZS	43,430,250
2/15/3				



<u>ELEMENT NUMBER SIXTEEN</u> <u>SOFT LANDSCAPING</u>	QTY	UNIT	RATE	AMOUNT
<u>FLOWER BED</u>				
<u>Insitu concrete; reinforced; normal; class 21/20; vibrated</u>				
Bed, perforated				
a. 100 mm thick	26	sm	30,000	780,000
Walls				
b. 100mm thick	13	sm	30,000	390,000
<u>Reinforcement; fabric; B.S 4483</u>				
Reference A 142; mesh 200 x 200 mm; weight 2.22kg per square metre; 200 mm end laps				
c. in any location	39	sm	12,000	468,000
<u>Formwork to insitu concrete; formwork generally</u>				
Battering or vertical sides				
d. walls or the like	26	sm	18,000	468,000
<u>NATURAL STONEMWORK DRESSINGS</u>				
<u>Approved local stone; squared; medium chisel dressed both sides; bedding, jointing and recessed pointing both sides in cement mortar (1:4) as work proceeds</u>				
Facings to walls				
e. 50mm thick; 10nos wall ties per square metre cut and pinned to concrete or blockwork backing	13	sm	80,000	1,040,000
To Collection			TZS	3,146,000
2/16/1				



GRASSED AREAS	QTY	UNIT	RATE	AMOUNT
<p><u>Supply and store on site in approved condition and maintain</u></p> <p>Planting; well watering, weeding and cutting weekly until practical completion</p>				
<p>a. lawn grass springs (plugs); planting at 100mm centre in both directions; filling in with imported vegetable soil; mix with cow manure (1:5); 500gm DAP/rock phosphate mixed with soil; prepare, spread and level on site average 200mm thick.</p>	26	sm	96,000	2,496,000
<p><u>MAINTENANCE</u></p>				
<p><u>Generally</u></p> <p>Maintain all grass, trees, shrubs, groundcover, hedges, flowers and the like up to three months after Practical Completion Date</p>				
<p>b. generally</p> <p>To Collection</p>	-	Item	5,000,000	5,000,000
			TZS	7,496,000
			TZS	3,146,000
			TZS	7,496,000
<p>TO SUMMARY OF BILL NUMBER TWO</p>			TZS	10,642,000
<p>2/16/2</p>				



<u>ELEMENT NUMBER SEVENTEEN</u>	QTY	UNIT	RATE	AMOUNT
<u>DRIVEWAY AREAS (4.14M X 27M)</u>				
<u>SITE PREPARATION</u>				
<u>Preserving vegetable soil</u>				
Excavating average 300mm deep				
a. depositing in temporary spoil heaps	224	sm	2,000	448,000
<u>HARDCORE OR THE LIKE</u>				
<u>Granular base material; to Engineer's approval; grade G 15</u>				
Sub-base				
b. 150mm thick; compacting; grading to falls and cambers; compacting with an 8 to 10 tonne roller	224	sm	18,000	4,032,000
Base course				
c. 250mm thick; grading to falls and cambers; compacting with an 8 to 10 tonne roller	224	sm	9,000	2,016,000
<u>Sand</u>				
Beds				
d. 50mm thick; grading to falls and cambers; compacting with 8 to 10 tonne roller	224	sm	9,000	2,016,000
<u>INSITU CONCRETE; REINFORCED</u>				
<u>Normal; class 25/20; vibrated</u>				
Beds				
e. 200mm thick	224	sm	60,000	13,440,000
<u>REINFORCEMENT</u>				
<u>Fabric; B.S. 4483</u>				
Reference No. A393; mesh 200 x 200mm; weight 6.17kg per square metre; 200mm end laps; 200mm side laps				
f. in any location	224	sm	12,000	2,688,000
TO SUMMARY OF BILL NUMBER TWO			TZS	24,640,000
2/17/1				



SUMMARY - BILL NUMBER TWO

	PAGE	TZS
ELEMENT NUMBER ONE - SUBSTRUCTURE	2/1/6	62,825,900
ELEMENT NUMBER TWO - R.C. SUPERSTRUCTURE	2/2/1	24,856,500
ELEMENT NUMBER THREE - EXTERNAL WALLING	2/3/1	21,880,000
ELEMENT NUMBER FOUR - INTERNAL WALLING	2/4/1	5,920,000
ELEMENT NUMBER FIVE - ROOF STRUCTURE	2/5/2	32,621,000
ELEMENT NUMBER SIX - ROOF COVERINGS	2/6/2	18,477,000
ELEMENT NUMBER SEVEN - RAINWATER DISPOSAL	2/7/1	5,276,000
ELEMENT NUMBER EIGHT - EXTERNAL FLOOR FINISHINGS	2/8/1	9,926,800
ELEMENT NUMBER NINE - EXTERNAL WALL FINISHINGS	2/9/2	43,548,000
ELEMENT NUMBER TEN - EXTERNAL CEILING FINISHINGS	2/10/2	12,886,300
ELEMENT NUMBER ELEVEN - INTERNAL FLOOR FINISHINGS	2/11/1	8,208,800
ELEMENT NUMBER TWELVE - INTERNAL WALL FINISHINGS	2/12/1	4,862,000
ELEMENT NUMBER THIRTEEN - INTERNAL CEILING FINISHINGS	2/13/2	6,492,300
ELEMENT NUMBER FOURTEEN - WINDOWS	2/14/1	21,212,000
ELEMENT NUMBER FIFTEEN - DOORS	2/15/2	43,430,250
ELEMENT NUMBER SIXTEEN - SOFT LANDSCAPE	2/16/2	10,642,000
ELEMENT NUMBER SEVENTEEN - DRIVE WAYS	2/17/1	24,640,000
BILL NUMBER TWO TO GENERAL SUMMARY	TZS	357,704,850

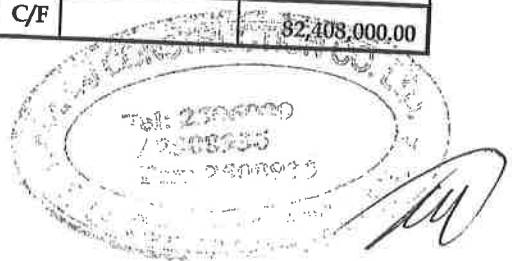
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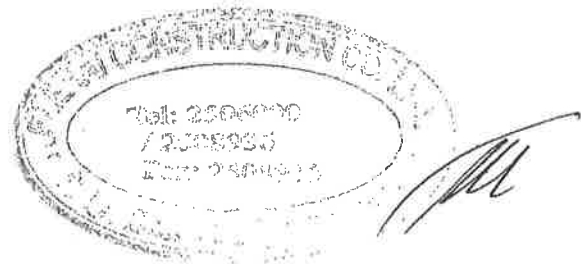
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.1: SUBSTRUCTURE (provisional quantities)					
EXCAVATION AND EARTHWORKS					
1	Clear site of bushes, small trees, undergrowth and the like including grubbing up their roots	230	m ²	2,000.00	460,000.00
2	Excavating surfaces to reduce levels 300mm average depth	230	m ²	2,000.00	460,000.00
3	Excavating pits to receive column base starting from stripped level not exceeding 1.5m deep	4	m ³	7,000.00	28,000.00
4	Excavating trenches to receive foundation starting from stripped level not exceeding 1.5m deep	190	m ³	7,000.00	1,330,000.00
4	Extra over any kind of excavation for breaking up rocks and the like (provisional)	5	m ³	35,000.00	175,000.00
5	Imported earthfilling around excavation including compacting and consolidating	129	m ³	15,000.00	1,935,000.00
6	Load up and cart away from site excavated materials	190	m ³	9,000.00	1,710,000.00
<u>Disposal of water</u>					
7	Keeping excavation free from general except running and spring water	1	item	500,000.00	500,000.00
<u>Plunking and strutting</u>					
8	Plunking and strutting to uphold sides of excavation including its subsequent removal	1	item	500,000.00	500,000.00
<u>Hardcore</u>					
9	150mm hardcore bed compacted, levelled and well blind	170	m ²	15,000.00	2,550,000.00
10	200mm imported earth filling to make levels compacted in layers and levelled	170	m ²	9,000.00	1,530,000.00
			C/F		11,178,000.00



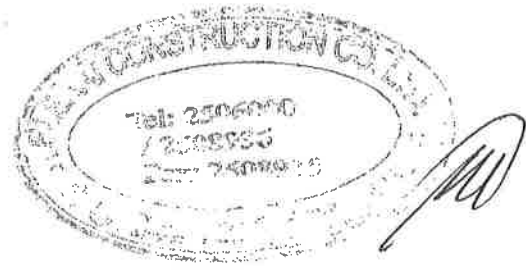
No	Description	Qty	Unit	Rate	Amount
SUBSTRUCTURE (contd)					
	<u>Ant-termite treatment</u>		B/F		11,178,000.00
12	Soil sterilization of adrian 0.5% solution applied at rate of 7litres per square metre to blinded hardcore	170	m ²	3,000.00	510,000.00
13	Soil sterilization of adrian 0.5% solution applied at rate of 7litres per linear metre to backfilled material on one side of external foundation size 230mm x 520mm depth	67	m	2,000.00	134,000.00
CONCRETE WORKS					
	<u>Plain insitu concrete, grade 10 (mix 1:4:8)</u>				-
14	50mm blinding	122	m ²	24,000.00	2,928,000.00
	<u>Plain insitu concrete, grade 15 (mix 1:3:6)</u>				-
15	Foundation in trench	28	m ³	300,000.00	8,400,000.00
16	Steps	2	m ³	300,000.00	600,000.00
17	100mm bed	170	m ³	300,000.00	51,000,000.00
	<u>Reinforced insitu concrete, grade 20 (mix 1:2:4)</u>				-
18	Column base	1	m ³	300,000.00	300,000.00
19	Column	1	m ³	300,000.00	300,000.00
20	Ground beam	10	m ³	300,000.00	3,000,000.00
	<u>High tensile steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u>				-
21	12mm diameter	720	kg	3,500.00	2,520,000.00
22	8mm diameter	280	kg	3,500.00	980,000.00
	<u>Formwork to</u>				-
23	vertical or battering sides of column base	4	m ²	18,000.00	72,000.00
24	vertical or battering sides of column	12	m ²	18,000.00	216,000.00
25	vertical or battering sides of ground beam	15	m ²	18,000.00	270,000.00
			C/F		82,408,000.00



No	Description	Qty	Unit	Rate	Amount
SUBSTRUCTURE (contd)					
			B/F		82,408,000.00
26	Sides of staircase string	1	m ²	18,000.00	18,000.00
27	Risers over 150 but not exceeding 225mm high	55	m	4,050.00	222,750.00
28	Edges of beds over 75 but not exceeding 150mm wide	67	m	2,700.00	180,900.00
WALLING					
<u>Solid concrete blocks to BS 2028 type 'A' bedded and jointed in cement mortar (1:4)</u>					
29	230mm wall	200	m ²	40,000.00	8,000,000.00
<u>Damp proofing</u>					
30	230mm wide hessian based damp proof course	174	m	2,000.00	348,000.00
31	Polythene damp proof membrane laid over bilinded hardcore bed	170	m ²	3,000.00	510,000.00
<u>Sundries</u>					
32	15mm cement sand (1:4) rendering to plinth surface	51	m ²	8,000.00	408,000.00
33	prepare and apply three coat of black bitumem paint	51	m ²	8,000.00	408,000.00
TOTAL OF SUBSTRUCTURE CARRIED TO SUMMARY					92,503,650.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.2: SUPERSTRUCTURE					
CONCRETE WORK					
<u>Vibrated reinforced insitu concrete grade 20 mix ratio 1:2:4</u>					
1	Columns	1	m ³	300,000.00	300,000.00
2	beams	10	m ³	300,000.00	3,000,000.00
<u>High tensile steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u>					
3	12mm diameter	720	kg	3,500.00	2,520,000.00
<u>Mild steel bar reinforcement to BS 4449 ditto</u>					
4	8mm diameter	280	kg	3,500.00	980,000.00
<u>Formwork to</u>					
5	Sides and soffites of horizontal beams	110	m ²	18,000.00	1,980,000.00
WALLING AND INTERNAL PARTITION					
<u>Solid concrete blocks to 2028 type 'A' bedded and jointed in cement mortar</u>					
9	150mm external wall;	169	m ²	35,000.00	5,915,000.00
10	150mm internal wall	225	m ²	35,000.00	7,875,000.00
TOTAL OF SUPERSTRUCTURE CARRIED TO SUMMARY					22,570,000.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.3: ROOFING					
Roof Covering					
<u>Pre-painted FOREST GREEN Industrial Troughened (IT5) 28gauge as manufactured by ALAF or other equal and approved nailed to timber purlins spaced at 1.2m centres, with one and half corrugations side lap and 250mm end lap</u>					
1	Covering sloping not exceeding 45 degree from horizontal	310	m ²	35,000.00	10,850,000.00
2	Rigide capping	27	m	15,000.00	405,000.00
3	Valley capping	20	m	15,000.00	300,000.00
Roof structure					
<u>Treated softwood structural timber with pressure impregnated preservatives</u>					
4	50 x 100mm rafter (provisional)	216	m	7,000.00	1,512,000.00
6	50 x 100mm joists (provisional)	173	m	7,000.00	1,211,000.00
7	50 x 100mm struts and vertical chord (provisional)	200	m	7,000.00	1,400,000.00
8	50 x 100mm wall plates	62	m	7,000.00	434,000.00
9	75 x 50mm purlin (provisional)	360	m	6,000.00	2,160,000.00
<u>Wrought softwood</u>					
10	25 x 225mm fascia and the like	79	m	12,000.00	948,000.00
<u>Mild steel gusset plate</u>					
11	Allow sum for provision of 8mm thick gusset plate each with surface area over 0.1m ² but not exceeding 0.5m ² ; holed and bolted with and including 12mm diameter as per Engineer's instructions and approval	1	sum	1,000,000.00	1,000,000.00
Roof Drainage					
12	150mm half round Upvc rainwater gutter complete with accessories fixed as per manufacturer's printed specifications	45	m	48,000.00	2,160,000.00
13	150mm diameter upvc down pipe fixed complete with fittings fixed as per Engineer's approval	15	m	8,000.00	120,000.00
TOTAL OF ROOFING CARRIED TO SUMMARY					22,500,000.00



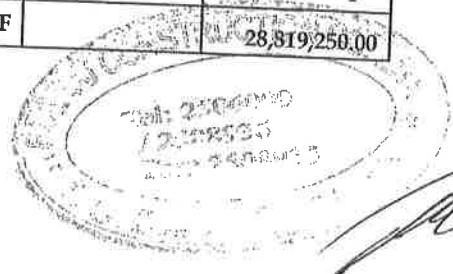
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.4: DOORS					
<u>45mm hardwood (mninga or approved equivalence) panelled door comprising of 45 x 145mm stiles, top, middle and bottom rails forming two equal open panes both of which are filled in with solid hardwood panels (minga or approved equivalence) tongued and grooved to stiles and rails</u>					
1	900 x 2100mm size	12	No	700,000.00	8,400,000.00
2	750 x 2100mm size	8	No	700,000.00	5,600,000.00
<u>Hardwood (mninga or approved equivalence) Frames and the like</u>					
3	45 x 145mm frames, rebated	97	m	60,000.00	5,820,000.00
4	45 x 145mm transomes, rebated	11	m	60,000.00	660,000.00
5	20 x 50mm moulded architrave	97	m	35,000.00	3,395,000.00
<u>Sawn hardwood</u>					
6	20 x 100mm grounds; plugged	97	m	35,000.00	3,395,000.00
<u>Supply the following ironmongery from UNION or equal and approved manufacturer</u>					
7	100mm brass butt hinges	30	pairs	32,500.00	975,000.00
8	Mortice lockset, 2levels	20	nr	60,000.00	1,200,000.00
9	Barrel lock	20	nr	15,000.00	300,000.00
Metal work					
10	Metal grill to vent on top of door, comprising of 16mm diameter mild steel bars drilled in hardwood frames (m/s) and welded connection and including with painting with approved metal paint	4	m ²	120,000.00	480,000.00
11	Pvc mosquito gauze fixed with and including 20 x 20mm hardwood glazing beads to frames and transomes	4	m ²	50,000.00	200,000.00
Glazing					
12	900 x 300 x 5mm reinforced glass louvres to hardwood frames	20	nr	100,000.00	2,000,000.00
TOTAL OF DOORS CARRIED TO SUMMARY					32,425,000.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.5: WINDOWS					
Composite units; aluminium windows					
<u>Supply and fix the following aluminium units; Anodised; bronze or any approved colour; complete with associated ironmongery and including assembling, screwing to sub-frame surrounds, bedding frame with proprietary bedding compound, pointing externally with mastic, stripping off protective tape from aluminium frames</u>					
1	Window type W1 overall size 1500mm x 1600mm high consisting of Two 700 x 900mm high sliding panels glazed with 5mm clear glass and One sliding panel glazed with pvc mosquito gauze; and the remaining are fixed panel glazed with clear	12	nr	480,000.00	5,760,000.00
2	Window type W2 overall size 2000mm x 1800mm high consisting of Two 900 x 900mm high sliding panels glazed with 5mm clear glass and One sliding panel glazed with pvc mosquito gauze; and the remaining are fixed panel glazed with clear	2	nr	720,000.00	1,440,000.00
3	Window type W3 overall size 1000mm x 1200mm high consisting of Two 500 x 900mm high sliding panels glazed with 5mm clear glass and One sliding panel glazed with pvc mosquito gauze; and the remaining are fixed panel glazed with clear	2	nr	240,000.00	480,000.00
4	Window type W4 overall size 600 x 1000mm high consisting of 1nr top hang casement and one fixed; with and including 6mm clear glass infill.	6	nr	120,000.00	720,000.00
5	Metal Gril 25 x 20 x 1.5mm rectangular hollow section frame; 12mm diameter mild steel bars welded to rectangular hollow section frame including painting with approved antrust paint	43	m ²	120,000.00	5,160,000.00
TOTAL OF WINDOWS CARRIED TO SUMMARY					13,560,000.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.6: FINISHING					
Internal finishing					
1	15mm plaster in two coats, first coat 12mm thick cement sand (1:4), 3mm final coat in cement sand and lime (1:1:5%) to keyed block work	565	m ²	8,000.00	4,520,000.00
backing					
2	12mm cement and sand(1:4) backing to keyed block wall	65	m ²	8,000.00	520,000.00
3	30mm cement and sand(1:4) backing to keyed concrete bed	150	m ²	12,000.00	1,800,000.00
Tiles					
4	300 x 200 x 6mm ceramic wall tiles laid to wall backing with approved adhesives including painting with approved grouts	65	m ²	40,000.00	2,600,000.00
5	300 x 300 x 6mm ceramic floor tiles laid to floor backing with approved adhesives including painting with approved grouts	42	m ²	40,000.00	1,680,000.00
6	500 x 500 x 8mm ceramic floor tiles laid to bed backing with approved adhesives including pointing with approved grouts	128	m ²	55,000.00	7,040,000.00
Skirting					
7	6mm x 150mm ceramic tile skirting fixed with approved adhesives in a regular pattern	177	m	8,250.00	1,460,250.00
Ceiling: plain sheet finishing					
8	9mm gypsum plaster board nailed to softwood brandering (measured separately) including all necessary accessories	170	m ²	18,000.00	3,060,000.00
9	100mm girth moulded gypsum cornice	177	m	7,000.00	1,239,000.00
Brandering					
10	50 x 50mm treated softwood brandering	700	m	5,000.00	3,500,000.00
Exernal finishing					
Finishing to wall and concrete surface					
11	15mm rendering in cement sand (1:4) and final in cement sand and lime (1:1:5%) to keyed blockwall or concrete work	175	m ²	8,000.00	1,400,000.00
			C/F		28,819,250.00



No	Description	Qty	Unit	Rate	Amount
FINISHING (Contd)					
	External finishing (contd)		B/F		28,819,250.00
12	30mm cement and sand(1:4) backing to keyed concrete bed	30	m ²	12,000.00	360,000.00
13	500 x 500 x 8mm ceramic floor tiles laid to bed backing with approved adhesives including pointing with approved grouts	30	m ²	55,000.00	1,650,000.00
	<u>Skirting</u>				-
14	6 x 100mm high ceramic tile skirting fixed to wall backing with approved adhesives	17	m	8,250.00	140,250.00
	<u>Ceiling; plain sheet finishing</u>				-
15	9mm tongue and grooved boarding nailed to softwood brandering (measured separately) including all necessary accessories	28	m ²	18,000.00	504,000.00
16	100mm girth moulded softwood cornice	52	m	7,000.00	364,000.00
	<u>Brandering</u>				-
17	50 x 50mm treated softwood brandering	59	m	5,000.00	295,000.00
TOTAL OF FINISHING CARRIED TO SUMMARY					32,132,500.00



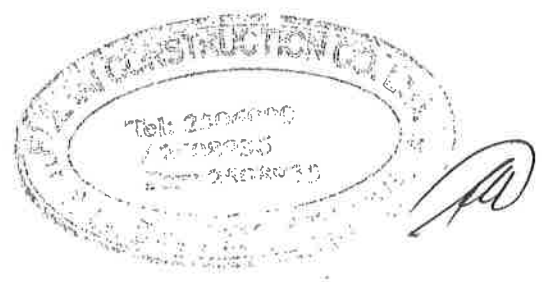
No	Description	Qty	Unit	Rate	Amount
	FINISHING (Contd)				
	<u>External finishing (contd)</u>		B/F		28,819,250.00
12	30mm cement and sand(1:4) backing to keyed concrete bed	30	m ²	12,000.00	360,000.00
13	500 x 500 x 8mm ceramic floor tiles laid to bed backing with approved adhesives including pointing with approved grouts	30	m ²	55,000.00	1,650,000.00
	<u>Skirting</u>				-
14	6 x 100mm high ceramic tile skirting fixed to wall backing with approved adhesives	17	m	8,250.00	140,250.00
	<u>Ceiling; plain sheet finishing</u>				-
15	9mm tongue and grooved boarding nailed to softwood brandering (measured separately) including all necessary accessories	28	m ²	18,000.00	504,000.00
16	100mm girth moulded softwood cornice	52	m	7,000.00	364,000.00
	<u>Brandering</u>				-
17	50 x 50mm treated softwood brandering	59	m	5,000.00	295,000.00
TOTAL OF FINISHING CARRIED TO SUMMARY					32,132,500.00



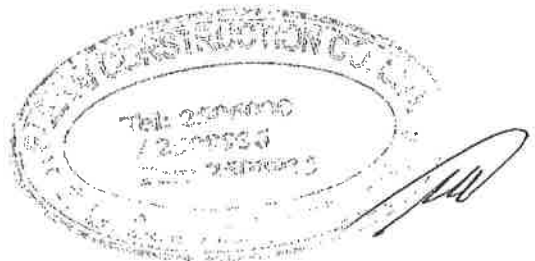
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.7: PAINTING AND DECORATION					
Internal paint					
<u>Prepare and apply one primer coat and two finishing coats of acrylic paint to</u>					
1	Plastered walls	565	m ²	8,000.00	4,520,000.00
2	Gypsum ceiling lining	170	m ²	8,000.00	1,360,000.00
<u>Prepare; prime and apply three coats of vinyl varnish as per manufacturer's specifications to hardwood surfaces</u>					
3	Generally	76	m ²	8,000.00	608,000.00
4	Frames and the like over 200mm but not exceeding 300mm girth	108	m	2,400.00	259,200.00
External painting					
<u>Prepare and apply one primer coat and two finishing coats of weather guard paint to</u>					
5	Rendered walls	175	m ²	8,000.00	1,400,000.00
6	Fascia board over 200mm but not exceeding 300mm gith	79	m ²	8,000.00	632,000.00
<u>Prepare; prime and apply three coats of vinyl varnish as per manufacturer's specifications to T&G boarding ceiling</u>					
7	Generally	28	m ²	8,000.00	224,000.00
TOTAL OF PAINTING AND DECORATIONS CARRIED TO SUMMARY					9,003,200.00



No	Description	Qty	Unit	Rate	Amount
	ELEMENT NO.8: FITTINGS AND FIXTURES				
	Kitchen low level cabinet				
	Supply all necessary materials and assemble kitchen cabinet comprising of 80mm plain concrete grade 15 plinth; 75mm reinforced concrete grade 20 complete with fabric reinforcement ref. A142 weighing 2.22kg per square metres; 75 x 50mm hardwood frames and bearers; 25mm hardwood shelves, partitions and tops; 25mm thick Door shutter to approved size and quantities; Drawers of approved size and quality; complete with all necessary fittings and ironmongery and including decorating with approved paint/vanish.				
1	Overall size 600 x 1000mm high	2	m	2,000,000.00	4,000,000.00
	Dress cabinet				
	Supply all necessary materials and assemble bedroom cabinet comprising of 80mm plain concrete grade 15 plinth; 75mm reinforced concrete grade 20 complete with fabric reinforcement ref. A142 weighing 2.22kg per square metres; 75 x 50mm hardwood frames and bearers; 25mm hardwood shelves, partitions and tops; 25mm thick Door shutter to approved size and quantities; Drawers of approved size and quality; complete with all necessary fittings and ironmongery and including decorating with approved paint/vanish.				
2	Overall size 600 x 1525 x 2500mm high	4	nr	3,000,000.00	12,000,000.00
3	Overall size 600 x 1600 x 2500mm high	2	nr	3,000,000.00	6,000,000.00
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	TOTAL OF JOINERY CARRIED TO SUMMARY				22,000,000.00



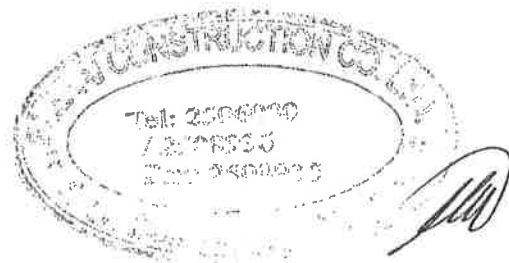
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.9: PLUMBING INSTALLATION					
Sanitary Appliances Installation					
<u>Supply and fix the following sanitary appliances from armitage shanks or equal and approved manufacturer including all connections and fixing to floor or wall as per manufacturer's printed instructions</u>					
1	1200 x 600mm stainless steel sink with combined single bowl and single drainer, complete with 50mm bottle trap, 50mm waste, chain and plug and including all necessary accessories	2	nr	600,000.00	1,200,000.00
2	Low level white WC western type with 9 litres capacity flushing cistern complete with high pressure ball valve, cover, chain and handle including 50mm flush pipe and overflow "S" trap, and all necessary accessories	2	nr	800,000.00	1,600,000.00
3	White WC eastern type with 9 litres capacity flushing cistern complete with high pressure ball valve, cover, chain and handle including 50mm flush pipe and overflow "S" trap, and all necessary accessories	2	nr	400,000.00	800,000.00
4	580 x 470mm white WHB complete with chromium plated pillar taps, safety brackets, 50mm waste pipe chain and plug, 50mm bottle trap with 10mm seal and flexible pipe	4	nr	450,000.00	1,800,000.00
5	150 x 150mm recessed toilet roll holder	4	nr	55,000.00	220,000.00
6	15mm diameter; 800mm long chromium plated towel rail	4	nr	55,000.00	220,000.00
7	600mm x 350mm x 6mm plate glass mirror with polished edges, plugged and screwed to wall with chromium plated donnex screws	4	nr	180,000.00	720,000.00
8	13mm diameter; 1500mm adjustable umbreller shower rose complete with mixer	4	nr	350,000.00	1,400,000.00
9	150 x 150mm soap holder plugged and screwed to wall with chromium plated donnex screws	4	nr	55,000.00	220,000.00
TOTAL OF PLUMBING INSTALLATIONS CARRIED TO SUMMARY					8,180,000.00



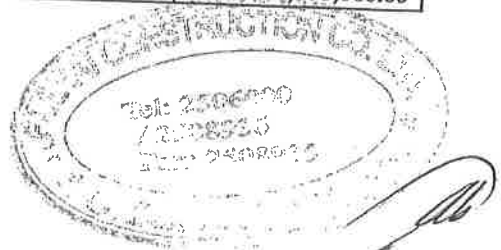
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.10: DRAINAGES AND LANDSCAPING					
1	Soakaway pit Construct a soakaway pit with 3000mm internal diameter and minimum depth of 3000mm; complete with french pipes; the soakage pit comprising of 230mm solid concrete block wall as described before built as per drawings and specifications; 150mm reinforced concrete grade 25 suspended slab with 12mm diameter high tensile steel reinforcement bars spaced at 200mm centres; including excavations and disposal of surplus excavated materials	1	Nr	4,000,000.00	4,000,000.00
2	Septic tank Construct a septic tank with 2400mm long x 1300mm wide internal diameter and minimum depth of 1900mm; complete with pipes; the tank comprising of 230mm solid concrete block wall as described before built as per drawings and specifications; 150mm reinforced concrete grade 25 suspended slab with 12mm diameter high tensile steel reinforcement bars spaced at 200mm centres; 15mm water proof plaster in cement sand (1:3) including excavations and disposal of surplus excavated materials	1	Nr	3,000,000.00	3,000,000.00
3	Manholes, Inspection chambers and foul/waste water pipeworks Provide for construction of manholes inspection chambers complete with installation of waste water pipes (establish price basing on sketch drawing and site inspection)	1	Sum	3,000,000.00	3,000,000.00
4	Pavement and Landscaping 100mm plain concrete grade 15 cast on and including 150mm blinded hardcore in granular stones	65	m ²	45,000.00	2,925,000.00
5	250 x 125mm precast concrete kerb stone jointed in cement sand mortars (1:4); haunched with mass concrete grade 15	65	m	25,000.00	1,625,000.00
TOTAL OF DRAINAGES AND LANDSCAPING CARRIED TO SUMMARY					14,550,000.00



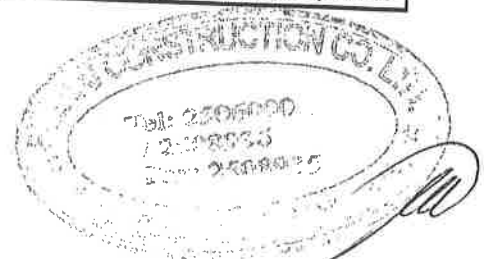
S/No	Description of Elements	Amount (Tshs)
	SUMMARY	
1	ELEMENT NO.1: SUBSTRUCTURE	92,503,650.00
2	ELEMENT NO.2: SUPERSTRUCTURE	22,570,000.00
3	ELEMENT NO.3: ROOFING	22,500,000.00
4	ELEMENT NO.4: DOORS	32,425,000.00
5	ELEMENT NO.5: WINDOWS	13,560,000.00
6	ELEMENT NO.6: FINISHING	32,132,500.00
7	ELEMENT NO.7: PAINTINGS AND DECORATION	9,003,200.00
8	ELEMENT NO.8: FITTING AND FIXTURES	22,000,000.00
9	ELEMENT NO.9: PLUMBING INSTALLATION	8,180,000.00
10	ELEMENT NO.10: DRAINAGE WORKS	14,550,000.00
	TOTAL CARRIED TO GENERAL SUMMARY	269,424,350.00



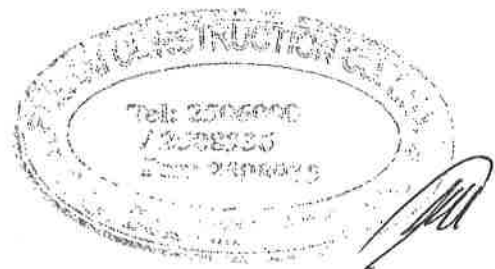
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.1: SUBSTRUCTURE (provisional quantities)					
EXCAVATION AND EARTHWORKS					
1	Clear site of bushes, small trees, undergrowth and the like including grubbing up their roots	244	m2	2,000	488,000.00
2	Excavating oversite to remove vegetable soil 150mm average depth	244	m2	2,000	488,000.00
3	Excavating surfaces to reduce levels over 300mm average depth	74	m3	2,000	148,000.00
4	Excavating trenches to receive foundation starting from stripped level not exceeding 1.5m deep	158	m3	7,000	1,106,000.00
5	Extra over any kind of excavation for breaking up rocks and the like	15	m3	35,000	525,000.00
6	Imported earthfilling around excavation including compacting and consolidating	90	m3	15,000	1,350,000.00
7	Load up and cart away from site excavated materials	232	m3	9,000	2,088,000.00
<u>Disposal of water</u>					
8	Keeping excavation free from general except running and spring water	1	item	500,000	500,000.00
<u>Plunking and strutting</u>					
9	Plunking and strutting to uphold sides of excavation including its subsequent removal	1	item	500,000	500,000.00
<u>Hardcore</u>					
10	150mm hardcore bed compacted, levelled and well blined	180	m2	15,000	2,700,000.00
11	250mm imported earth filling to make levels compacted in layers and levelled	180	m2	15,000	2,700,000.00
			C/F		12,593,000.00



No	Description	Qty	Unit	Rate	Amount
SUBSTRUCTURE (contd)					
	<u>Ant-termite treatment</u>		B/F		12,593,000.00
12	Soil sterilization of adrian 0.5% solution applied at rate of 7litres per square metre to blinded hardcore	180	m2	3,000	540,000.00
13	Soil sterilization of adrian 0.5% solution applied at rate of 7litres per linear metre to backfilled material on one side of external foundation size 230mm x 520mm depth	64	m	2,000	128,000.00
CONCRETE WORKS					
14	Plain insitu concrete, grade 15 (mix 1:3:6) Foundation in trench	25	m3	300,000	7,500,000.00
15	Steps	2	m3	300,000	600,000.00
16	100mm bed	175	m2	30,000	5,250,000.00
17	100mm ramp	5	m2	30,000	150,000.00
<u>Reinforced insitu concrete, grade 20 (mix 1:2:4)</u>					
19	Ground beam (230 X 230mm)	8	m3	300,000	2,400,000.00
<u>High tensile steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u>					
20	12mm diameter	532	kg	3,500	1,862,000.00
21	8mm diameter	272	kg	3,500	952,000.00
<u>Formwork to</u>					
22	vertical or battering sides of ground beam	69	m2	18,000	1,242,000.00
23	Sides of staircase string	10	m2	18,000	180,000.00
24	Risers over 75 but not exceeding 150mm high	12	m	2,700	32,400.00
25	Edges of beds over 75 but not exceeding 150mm wide	61	m	2,700	164,700.00
26	Edges of ramp over 75 but not exceeding 150mm wide	4	m	2,700	10,800.00
			C/F		33,604,900.00



No	Description	Qty	Unit	Rate	Amount
SUBSTRUCTURE (contd)					
	WALLING		B/F		33,604,900.00
27	<u>Solid concrete blocks to BS 2028 type 'A' bedded and jointed in cement mortar (1:4)</u> 230mm wall	150	m2	40,000	6,000,000.00
28	<u>Damp proofing</u> 230mm wide hessian based damp proof course	136	m	2,000	272,000.00
29	Polythene damp proof membrane laid over bilinded hardcore bed	180	m2	3,000	540,000.00
30	<u>Sundries</u> 15mm cement sand (1:4) rendering to plinth surface	19	m2	8,000	152,000.00
31	prepare and apply three coat of black bitumem paint	19	m2	8,000	152,000.00
TOTAL OF SUBSTRUCTURE CARRIED TO SUMMARY					40,720,900.00



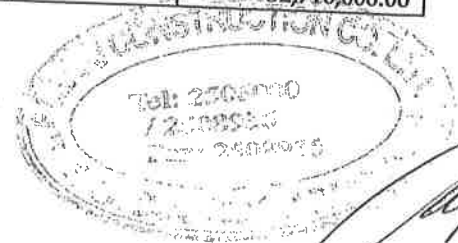
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.2: SUPERSTRUCTURE					
CONCRETE WORK					
1	<u>Vibrated reinforced insitu concrete grade 20 mix ratio 1:2:4</u> beams	5.5	m3	300,000	1,650,000.00
2	<u>High tensile steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u> 12mm diameter	544	kg	3,500	1,904,000.00
3	<u>Mild steel bar reinforcement to BS 4449 ditto</u> 8mm diameter	230	kg	3,500	805,000.00
4	<u>Formwork to</u> Sides and soffites of horizontal beams	94	m2	18,000	1,692,000.00
5	<u>Pre cast concrete grade 20; including hoisting bedding and pointing in cement sand mortar (1:4)</u> 225 x 55mm window cill; weathered and throated with smooth finishing	23	m	4,050	93,150.00
WALLING AND INTERNAL PARTITION					
6	<u>Solid concrete blocks to 2028 type 'A' bedded and jointed in cement mortar</u> 150mm external wall;	350	m2	38,000	13,300,000.00
TOTAL OF SUPERSTRUCTURE CARRIED TO SUMMARY					19,444,150.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.3: ROOFING					
Roof Covering					
<u>Pre- painted FOREST GREEN Industrial Troughened (IT5) 28gauge as manufactured by ALAF or other equal and approved nailed to timber purlins spaced at 1.2m centres, with one and half corrugations side lap and 250mm end lap</u>					
1	Covering sloping not exceeding 45 degree from horizon	259	m2	35,000	9,065,000.00
2	Rigde capping	43.08	m	15,000	646,200.00
Roof structure					
<u>Treated softwood structural timber with pressure impregnated preservatives</u>					
3	50 x 100mm rafter (provisional)	167	m	7,000	1,169,000.00
4	50 x 100mm joists (provisional)	147	m	7,000	1,029,000.00
5	50 x 100mm struts and vertical chord (provisional)	42	m	7,000	294,000.00
6	50 x 150mm wall plates	97	m	8,000	776,000.00
7	75 x 50mm purlin (provisional)	333	m	6,000	1,998,000.00
<u>Wrought softwood</u>					
8	25 x 225mm fascia and the like	66	m	12,000	792,000.00
<u>Mild steel gusset plate</u>					
Allow sum for provision of 8mm thick gusset plate each with surface area over 0.1m ² but not exceeding 0.5m ² ; holed and bolted with and including 12mm diameter as per Engineer's instructions and approval					
9		1	sum	1,000,000	1,000,000.00
Roof Drainage					
150mm half round Upvc rainwater gutter complete with accessories fixed as per manufacturer's printed specifications					
10		66	m	48,000	3,168,000.00
150mm diameter upvc down pipe fixed complete with fittings fixed as per Engineer's approval					
11		14	m	8,000	112,000.00
TOTAL OF ROOFING CARRIED TO SUMMARY					20,049,200.00



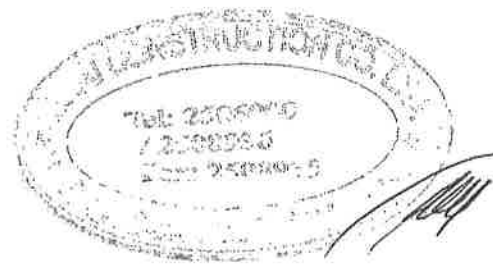
No	Description	Qty	Unit	Rate	Amount
	ELEMENT NO.4: DOORS				
1	<u>45mm hardwood (mninga or approved equivalence) panelled door comprising of 45 x 145mm stiles, top, middle and bottom rails forming two equal open panes both of which are filled in with solid hardwood panels (minga or approved equivalence) tongued and grooved to stiles and rails</u> 900 x 2100mm size	12	No	700,000	8,400,000.00
2	800 x 2100mm size	4	No	700,000	2,800,000.00
	<u>Hardwood (mninga or approved equivalence) Frames and the like</u>				
3	45 x 145mm frames, rebated	91	m	60,000	5,460,000.00
4	45 x 145mm transomes, rebated	14	m	60,000	840,000.00
5	20 x 50mm moulded architrave	91	m	35,000	3,185,000.00
	<u>Sawn hardwood</u>				
6	20 x 100mm grounds; plugged	91	m	35,000	3,185,000.00
	<u>Supply the following ironmongery from UNION or equal and approved manufacturer</u>				
7	100mm brass butt hinges	24	pairs	32,500	780,000.00
8	Mortice lockset, 2levels	16	nr	60,000	960,000.00
9	Barrel lock	32	nr	15,000	480,000.00
	Metal work				
10	Metal grill to vent on top of door, comprising of 16mm diameter mild steel bars drilled in hardwood frames (m/s) and welded connection and including with painting with approved metal paint	14	m2	120,000	1,680,000.00
11	Pvc mosquito gauze fixed with and including 20 x 20mm hardwood glazing beads to frames and transomes	14	m2	50,000	700,000.00
	Glazing				
12	900 x 150 x 5mm clear glass louvres housed in grooves to hardwood frames	32	nr	52,500	1,680,000.00
	Labour				
13	Making grooves to hardwood frames for 150 x 5mm	128	nr	20,000	2,560,000.00
	TOTAL OF DOORS CARRIED TO SUMMARY				32,710,000.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.5: WINDOWS					
Composite Windows					
<u>Supply and fix the following aluminium units;</u>					
<u>Anodised; bronze or any approved colour; complete</u>					
<u>with associated ironmongery, mosquito gauze and</u>					
<u>including assembling, screwing to sub-frame</u>					
<u>surrounds, bedding frame with proprietary bedding</u>					
<u>compound, pointing externally with mastic, stripping</u>					
<u>off protective tape from aluminium frames</u>					
1	W1 Overall size 1800 x 1800mm	4	Nr	648,000	2,592,000.00
2	W2 Overall size 1500 x 1500mm	8	Nr	450,000	3,600,000.00
3	W3 overall size 900 x 600mm	4	Nr	108,000	432,000.00
Metal Gril					
<u>25 x 50 x 1.5mm rectangular hollow section frame;</u>					
<u>16mm diameter mild steel round bars spaced</u>					
<u>diagonally at 200mm c/c welded to rectangular hollow</u>					
<u>section frame including painting with approved</u>					
<u>antrust paint</u>					
4	W1 Overall size 1800 x 1800mm	4	Nr	388,800	1,555,200.00
5	W2 Overall size 1500 x 1500mm	8	Nr	270,000	2,160,000.00
6	W3 overall size 900 x 600mm	4	Nr	64,800	259,200.00
TOTAL OF WINDOWS CARRIED TO SUMMARY					10,598,400.00

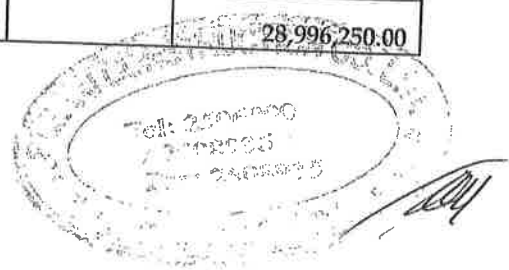


No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.5: WINDOWS					
Composite Windows					
<u>Supply and fix the following aluminium units;</u> <u>Anodised; bronze or any approved colour;complete</u> <u>with associated ironmongery, mosquito gauze and</u> <u>including assembling, screwing to sub-frame</u> <u>surrounds,bedding frame with proprietary bedding</u> <u>compound, pointing externally with mastic, stripping</u> <u>off protective tape from aluminium frames</u>					
1	W1 Overall size 1800 x 1800mm	4	Nr	648,000	2,592,000.00
2	W2 Overall size 1500 x 1500mm	8	Nr	450,000	3,600,000.00
3	W3 overall size 900 x 600mm	4	Nr	108,000	432,000.00
Metal Gril					
<u>25 x 50 x 1.5mm rectangular hollow section frame;</u> <u>16mm diameter mild steel round bars spaced</u> <u>diagonally at 200mm c/c welded to rectangular hollow</u> <u>section frame including painting with approved</u> <u>antrust paint</u>					
4	W1 Overall size 1800 x 1800mm	4	Nr	388,800	1,555,200.00
5	W2 Overall size 1500 x 1500mm	8	Nr	270,000	2,160,000.00
6	W3 overall size 900 x 600mm	4	Nr	64,800	259,200.00
TOTAL OF WINDOWS CARRIED TO SUMMARY					10,598,400.00

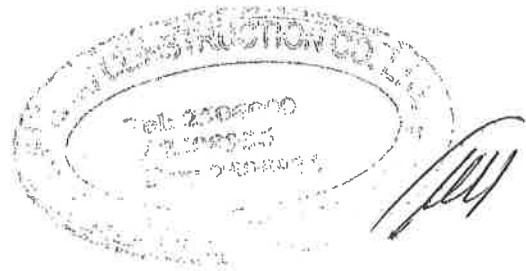


No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.6: FINISHING					
Internal finishing					
1	15mm plaster in two coats, first coat 12mm thick cement sand (1:4), 3mm final coat in cement sand and lime (1:1:5%) to keyed block work	606	m2	8,000	4,848,000.00
backing					
2	12mm cement and sand(1:4) backing to keyed block wall	46	m2	8,000	368,000.00
3	30mm cement and sand(1:4) backing to keyed concrete bed	170	m2	12,000	2,040,000.00
Tiles					
4	300 x 200 x 6mm ceramic wall tiles laid to wall backing with approved adhesives including painting with approved grouts	46	m2	40,000	1,840,000.00
5	400 x 400 x 6mm ceramic floor tiles laid to floor backing with approved adhesives including painting with approved grouts	170	m2	55,000	9,350,000.00
Skirting					
6	15 x 100mm high moulded hardwood skirting fixed with approved method of fixing; and including painting	197	m	8,250	1,625,250.00
Ceiling; plain sheet finishing					
7	9mm gypsum plaster board nailed to softwood brandering (measured separately) including all necessary accessories	170	m2	18,000	3,060,000.00
8	100mm girth moulded gypsum cornice	197	m	7,000	1,379,000.00
Branding					
9	75 x 50mm treated softwood branding	670	m	5,000	3,350,000.00
Exernal finishing					
Finishing to wall and concrete surface					
10	15mm rendering in cement sand (1:4) and final in cement sand and lime (1:1:5%) to keyed blockwall or concrete work	142	m2	8,000	1,136,000.00
			C/F		28,996,250.00

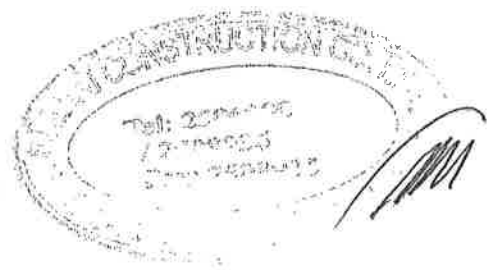
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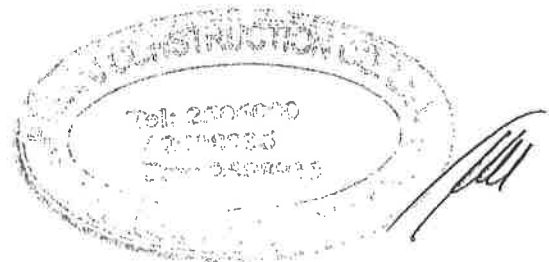
No	Description	Qty	Unit	Rate	Amount
	FINISHING (Contd)				
	External finishing (contd)		B/F		28,996,250.00
11	40mm thick floor screed cement sand (1:4) laid to keyed concrete bed (measured separately) with wooden trowelled smooth finish to Ramp	5	m2	22,000	110,000.00
	<u>Ceiling; plain sheet finishing</u>				-
12	9mm tongue and grooved boarding nailed to softwood brandering (measured separately) including all necessary accessories	37	m2	18,000	666,000.00
13	100mm girth moulded softwood cornice	122	m	7,000	854,000.00
	<u>Brandering</u>				-
14	75 x 50mm treated softwood brandering	186	m	5,000	930,000.00
	TOTAL OF FINISHING CARRIED TO SUMMARY				31,556,250.00



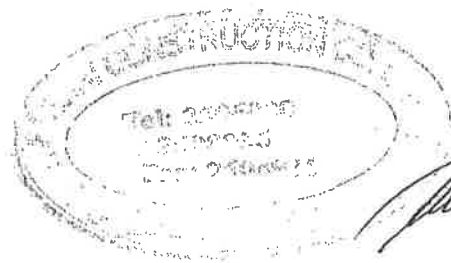
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.7: PAINTING AND DECORATION					
Internal paint					
<u>Prepare and apply one primer coat and two finishing coats of acrylic paint to</u>					
1	Plastered walls	606	m2	8,000	4,848,000.00
2	Gypsum ceiling lining	170	m2	8,000	1,360,000.00
<u>Prepare; prime and apply three coats of vinyl varnish as per manufacturer's specifications to hardwood surfaces</u>					
3	Generally	59	m2	8,000	472,000.00
4	Frames and the like over 200mm but n.e 300mm girth	196	m	2,400	470,400.00
External painting					
<u>Prepare and apply one primer coat and two finishing coats of weather guard paint to</u>					
5	Rendered walls	142	m2	8,000	1,136,000.00
6	Fascia board over 200mm but not exceeding 300mm girth	66	m2	2,400	158,400.00
<u>Prepare; prime and apply three coats of vinyl varnish as per manufacturer's specifications to T&G boarding ceiling</u>					
7	Generally	37	m2	8,000	296,000.00
<u>Prepare and apply 3 Coats of red oxide paints and oil based finishing metal paints</u>					
8	Metal Grills	48	m2	120,000	5,760,000.00
TOTAL OF PAINTING AND DECORATIONS CARRIED TO SUMMARY					14,500,800.00



No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.8: FITTINGS AND FIXTURES					
Kitchen low level cabinet					
Supply all necessary materials and assemble kitchen carbinet comprising of 80mm plain concrete grade 15 plinth; 75mm reinforced concrete grade 20 complete with fabric reinforcement ref. A142 weighing 2.22kg per square metres; 75 x 50mm hardwood frames and bearers; 25mm hardwood shelves, partitions and tops; 25mm thick Door shutter to approved size and quantities; Drawers of approved size and quality; complete with all necessary fittings and ironmongery and including decorating with approved paint/vanish.					
1	Overall size 600 x2800 x 1000mm high	4	nr	2,500,000	10,000,000.00
2	Overall size 600 x2100 x 1000mm high	4	nr	2,500,000	10,000,000.00
Dress cabinet					
Supply all necessary materials and assemble bedroom carbinet comprising of 80mm plain concrete grade 15 plinth; 75mm reinforced concrete grade 20 complete with fabric reinforcement ref. A142 weighing 2.22kg per square metres; 75 x 50mm hardwood frames and bearers; 25mm hardwood shelves, partitions and tops; 25mm thick Door shutter to approved size and quantities; Drawers of approved size and quality; complete with all necessary fittings and ironmongery and including decorating with approved paint/vanish.					
2	Overall size 600 x 2100 x 2400mm high	4	nr	2,500,000	10,000,000.00
TOTAL OF JOINERY CARRIED TO SUMMARY					30,000,000.00



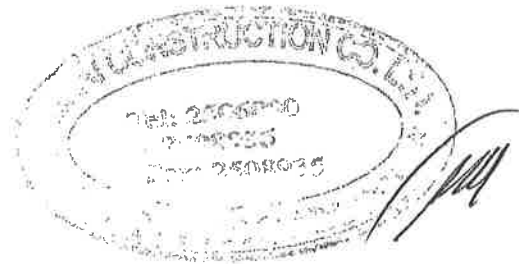
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.9: PLUMBING INSTALLATION					
Sanitary Appliances Installation					
<u>Supply and fix the following sanitary appliances from armitage shanks or equal and approved manufacturer including all connections and fixing to floor or wall as per manufacturer's printed instructions</u>					
1	1200 x 600mm stainless steel sink with combined single bowl and single drainer, complete with 50mm bottle trap, 50mm waste, chain and plug and including all necessary accessories	4	nr	600,000	2,400,000.00
2	Low level white WC western type with 9 litres capacity flushing cistern complete with high pressure ball valve, cover, chain and handle including 50mm flush pipe and overflow "S" trap, and all necessary accessories	4	nr	800,000	3,200,000.00
3	580 x 470mm white WHB complete with chromium plated pillar taps, safety brackets, 50mm waste pipe chain and plug, 50mm bottle trap with 10mm seal and flexible pipe	4	nr	400,000	1,600,000.00
4	150 x 150mm recessed toilet roll holder	4	nr	55,000	220,000.00
5	15mm diameter; 800mm long chromium plated towel rail	4	nr	55,000	220,000.00
6	600mm x 350mm x 6mm plate glass mirror with polished edges, plugged and screwed to wall with chromium plated donnex screws	4	nr	180,000	720,000.00
7	800 x 600mm white shower tray as per specifications of approved manufacturer	4	nr	400,000	1,600,000.00
8	13mm diameter; 1500mm adjustable umbreller shower rose complete with mixer and valves	4	nr	350,000	1,400,000.00
9	150 x 150mm soap holder plugged and screwed to wall with chromium plated donnex screws	4	nr	55,000	220,000.00
TOTAL OF PLUMBING INSTALLATIONS CARRIED TO SUMMARY					11,580,000.00



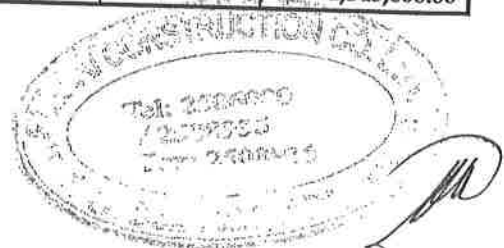
No	Description	Qty	Unit	Rate	Amount
ELEMENT NO.10: DRAINAGES AND LANDSCAPING					
1	Soakaway pit diameter and minimum depth of 3000mm; complete with french pipes; the soakage pit comprising of 230mm solid concrete block wall as described before built as per drawings and specifications; 150mm reinforced concrete grade 25 suspended slab with 12mm diameter high tensile steel reinforcement bars spaced at 200mm centres; including excavations and disposal of surplus excavated materials	1	Nr	4,500,000	4,500,000.00
2	Septic tank Construct septic tank with 2300mm long x 1000mm wide internal diameter and minimum depth of 1900mm; complete with pipes; the tank comprising of 230mm solid concrete block wall as described before built as per drawings and specifications; 150mm reinforced concrete grade 25 suspended slab with 12mm diameter high tensile steel reinforcement bars spaced at 200mm centres; 15mm water proof plaster in cement sand (1:3) including excavations and disposal of surplus excavated materials	1	Nr	3,000,000	3,000,000.00
3	Manholes, Inspection chambers and foul/waste water pipeworks Provide for construction of manholes inspection chambers complete with installation of waste water pipes (establish price basing on sketch drawing and site inspection)	1	Sum	2,000,000	2,000,000.00
4	Soft Landscapping and Hard Pavement <u>Hardcore</u> 150mm hardcore bed in granular stones; blinded	61	m2	52,000	3,172,000.00
5	<u>Plain concrete grade 15 (mix ratio 1:3:6)</u> 1000 x 100mm thick walkway slab	61	m2	55,000	3,355,000.00
6	<u>Precast concrete to BS 8110 chamfered edging jointed and pointed in cement sand mortar(1:4) laid on and including plain concrete grade 15 bed and haunching; complete with excavation and earthworks</u> 250 x 125mm kerbstone	62	m	35,000	2,170,000.00
TOTAL OF DRAINAGES AND LANDSCAPING CARRIED TO SUMMARY					18,197,000.00



S/No	Description of Elements	Amount (Tshs)
	<u>SUMMARY</u>	
1	ELEMENT NO.1: SUBSTRUCTURE	40,720,900.00
2	ELEMENT NO.2: SUPERSTRUCTURE	19,444,150.00
3	ELEMENT NO.3: ROOFING	20,049,200.00
4	ELEMENT NO.4: DOORS	32,710,000.00
5	ELEMENT NO.5: WINDOWS	10,598,400.00
6	ELEMENT NO.6: FINISHING	31,556,250.00
7	ELEMENT NO.7: PAINTINGS AND DECORATION	14,500,800.00
8	ELEMENT NO.8: FITTING AND FIXTURES	30,000,000.00
9	ELEMENT NO.9: PLUMBING INSTALLATION	11,580,000.00
10	ELEMENT NO.10: DRAINAGE WORKS	18,197,000.00
	TOTAL CARRIED TO GENERAL SUMMARY	229,356,700.00



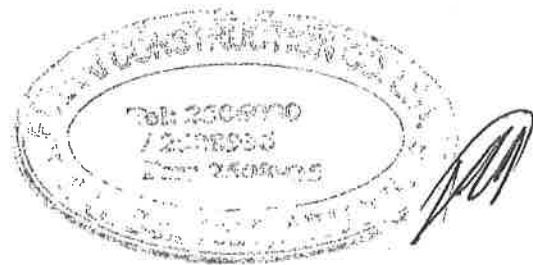
No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.1: SUBSTRUCTURE (provisional quantities)					
EXCAVATION AND EARTHWORKS					
<u>Site Clearance</u>					
1	Clear site of bushes, small trees, undergrowth and the like including glubing up their roots	86	m2	2,000	172,000.00
2	Excavate oversite to remove vegetable soil commencing at ground level average depth 150mm deep deposit in spoil heaps and cut away from site.	86	m2	2,000	172,000.00
<u>Excavation</u>					
3	Excavating trenches to receive foundation starting from stripped level not exceeding 1.5m deep	50	m3	8,000	400,000.00
4	Extra over any kind of excavation for breaking up rocks and the like (provisional)	5	m3	35,000	175,000.00
5	Imported earthfilling around excavation including compacting and consolidating	29	m3	18,000	522,000.00
6	Load up and cart away from site excavated materials	50	m3	9,000	450,000.00
<u>Disposal of water</u>					
7	Keeping excavation free from general except running and spring water	1	item	500,000	500,000.00
<u>Plunking and strutting</u>					
8	Plunking and strutting to uphold sides of excavation including its subsequent removal	1	item	500,000	500,000.00
<u>Hardcore</u>					
9	150mm hardcore bed; in broken stones levelled and well blinded	44	m2	15,000	660,000.00
10	250mm imported earth filling to make levels compacted in layers and levelled	44	m2	15,000	660,000.00
<u>Ant-termite treatment</u>					
11	Soil sterilization of adrian 0.5% solution applied at rate of 7litres per square metre to blinded hardcore	44	m2	3,000	132,000.00
Sum carried foward					4,343,000.00



No	Description	Qty	Unit	Rate	Amount (Tshs)
	Sum B/F				4,343,000.00
11	Soil sterilization of adrian 0.5% solution applied at rate of 7litres per linear metre to backfilled material on one side of external foundation size 230mm x 520mm depth	30	m	2,000	60,000.00
	CONCRETE WORKS				-
	<u>Plain insitu concrete, grade 15 (mix 1:3:6)</u>				-
12	Foundation in trench	8	m3	300,000	2,400,000.00
13	Steps/ramp	5	m2	30,000	150,000.00
14	100mm bed reinforced with 6mm BRC mesh	42	m2	30,000	1,260,000.00
	<u>Reinforced insitu concrete, grade 20 (mix 1:2:4)</u>				-
15	Plinth beam (230 x230mm)	3	m3	300,000	900,000.00
	<u>High tensile steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u>				-
16	12mm diameter	170	kg	3,500	595,000.00
	<u>Mild steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u>				-
17	8mm diameter	86	kg	3,500	301,000.00
	Formwork to				-
18	vertical or battering sides of ground beam	22	m2	18,000	396,000.00
20	Edges of beds over 75 but not exceeding 150mm wide	30	m	2,700	81,000.00
21	Riser of steps/ramp over 75 but not exceeding 150mm wide	9	m2	18,000	162,000.00
	WALLING				-
	Solid concrete blocks to BS 2028 type'A' bedded and jointed in cement mortar (1:4)				-
22	230mm wall	60	m2	40,000	2,400,000.00



Sum carried forward					13,048,000.00
No	Description	Qty	Unit	Rate	Amount (Tshs)
	<i>Sum B/F</i>				13,048,000.00
	Damp proofing				
23	230mm wide hessian based damp proof course	48	m	2,000	96,000.00
24	Polythene damp proof membrane laid over bilinded	44	m2	3,000	-
	Sundries				-
25	15mm cement sand (1:4) rendering to plinth surface	13	m2	8,000	104,000.00
26	prepare and apply three coat of black bitumem paint	13	m2	8,000	104,000.00
					-
					-
	TOTAL OF SUBSTRUCTURE CARRIED TO SUMMARY				13,484,000.00



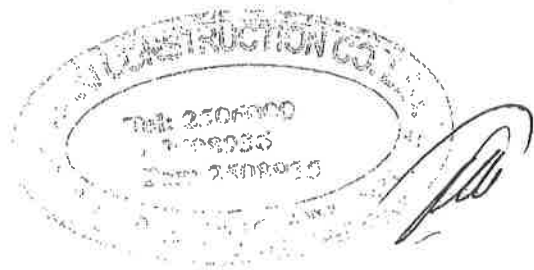
No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.2: WALLING AND FRAME					
External Wall					
Solid concrete blocks to 2028 type 'A' bedded and jointed in cement mortar					
1	150mm wall	78	m2	38,000	2,964,000.00
Internal Wall					
Solid concrete blocks to 2028 type 'A' bedded and jointed in cement mortar					
2	150mm wall	43	m2	38,000	1,634,000.00
Pre cast concrete grade 20; including hoisting bedding and pointing in cement sand mortar (1:4)					
3	225 x 55mm window cill; weathered and throated with smooth finishing	12	m	55,000	660,000.00
Reinforced insitu concrete, grade 20 (mix 1:2:4)					
4	Ring beam (size 150 x 230mm)	2	m3	300,000	600,000.00
<u>High tensile steel reinforcement bars to BS 4449 cold worked including tying wires and the like</u>					
5	12mm diameter	170	kg	3,500	595,000.00
6	8mm diameter	71	kg	3,500	248,500.00
Formwork to					
7	Vertical or battering sides of beam	30	m2	18,000	540,000.00
TOTAL OF WALLING AND INTERNAL PARTITIONS CARRIED TO SUMMARY					7,241,500.00



No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.3: DOORS					
<u>45mm hardwood (mninga or approved equivalence) panelled door comprising of 45 x 145mm stiles, top, middle and bottom rails forming Five open panels both of which are filled in with solid hardwood panels (mniga or approved equivqlence) tongued and grooved to stiles and rails as per Engineers approval.</u>					
1	800 x 2100mm size	6	No	700,000	4,200,000.00
2	900 x 2100mm size	2	No	700,000	1,400,000.00
3	1000 x 2100mm size	1	No	800,000	800,000.00
Hardwood (mninga or equivalence) Frames and the like					
2	45 x 145mm frames, rebated	47.2	m	60,000	2,832,000.00
3	45 x 145mm transomes, rebated	2.8	m	60,000	168,000.00
4	20 x 50mm moulded architrave	47.2	m	35,000	1,652,000.00
Sawn hardwood					
5	20 x 100mm grounds; plugged	47.2	m	35,000	1,652,000.00
6	5mm clear glass with timber rebate	1	m2	52,500	52,500.00
Supply the following ironmongery from UNION or equal and approved manufacturer					
7	100mm brass butt hinges	13.5	pairs	57,200	772,200.00
8	Door lockset, 2- levels	9	No	60,000	540,000.00
9	Barrel lock	9	No	15,000	135,000.00
10	Door stop	2	No	10,000	20,000.00
11	Door closer	3	No	350,000	1,050,000.00
TOTAL OF DOORS CARRIED TO SUMMARY					15,273,700.00



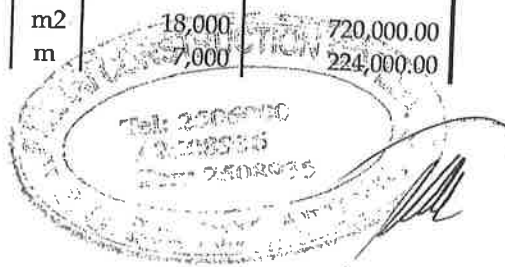
No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.4: WINDOWS					
Composite units; aluminium windows					
<p><u>Supply and fix the following aluminium units; powder coated; colour to be approved by the Engineer; complete with associated ironmongery and including assembling, screwing to sub-frame surrounds, bedding frame with proprietary bedding compound, pointing externally with mastic, stripping off protective tape from aluminium frames</u></p>					
1	Window type W1 overall size 900mm x 600 mm high.	13	No	108,000	1,404,000.00
TOTAL OF WINDOWS CARRIED TO SUMMARY					1,404,000.00



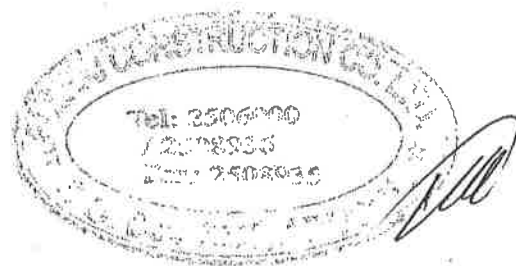
No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.5: ROOFING					
Roof Covering					
<u>Pre- painted FOREST GREEN Industrial Troughened (IT5) 28gauge as manufactured by ALAF or other equal and approved nailed to timber purlins spaced at 1.2m centres, with one and half corrugations side lap and 250mm end lap</u>					
1	Covering sloping not exceeding 32 degree from horizontal	76	m2	35,000	2,660,000.00
2	Rigde cap	24	m	15,000	360,000.00
3	Valley	6	m	15,000	90,000.00
Roof structure (provisional)					
<u>Treated softwood structural timber with pressure impregnated preservatives</u>					
3	50 x 150mm rafter (provisional)	51.2	m	8,000	409,600.00
4	50 x 150mm joists (provisional)	41.6	m	8,000	332,800.00
5	50 x 150mm king post (provisional)	10.4	m	8,000	83,200.00
6	50 x 75mm struts and vertical chord (provisional)	25.6	m	6,000	153,600.00
7	50 x 100mm wall plates;(provisional)	72.4	m	7,000	506,800.00
8	75 x 50mm purlin; (provisional)	91.2	m	6,000	547,200.00
<u>Wrought softwood</u>					
9	25 x 225mm fascia;	35.2	m	12,000	422,400.00
<u>Mild steel gusset plates; bolts and nuts</u>					
10	Allow sums for mild gusset plate holed and bolted with and including bolts and nuts to various diameters as per Engineer's instructions and approval	1	sum	1,000,000	1,000,000.00
Roof Drainage					
11	150mm half round Upvc rainwater gutter complete with accessories fixed as per manufacturer's printed specifications	35.2	m	48,000	1,689,600.00
12	150mm diameter upvc down pipe fixed complete with fittings fixed as per Engineer's approval	12	m	8,000	96,000.00



TOTAL OF ROOFING CARRIED TO SUMMARY					8,351,200.00
No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.6: FINISHING					
In-situ finishings					
1	<u>Internal plastering in two coats, first coat 12mm thick cement sand (1:4), 3mm final coat in cement sand and lime (1:1:5%) applied with steel trowelled smooth finish</u> 15mm overall thickness to block wall and concrete surface	163	m2	8,000	1,304,000.00
2	<u>External plastering in two coats, first coat 12mm thick cement sand (1:4), 3mm final coat in cement sand and lime (1:1:5%) applied with steel trowelled smooth finish</u> 15mm overall thickness to block wall and concrete surface	78	m2	8,000	624,000.00
3	<u>backing</u> 12mm cement and sand(1:4) backing to keyed block wall	116	m2	8,000	928,000.00
4	30mm cement and sand(1:4) backing to keyed concrete bed	40	m2	12,000	480,000.00
Tiles, slabs and block finishings					
<u>Tiles</u>					
5	300 x 200 x 6mm ceramic wall tiles to fixed wall backing with approved adhesives including painting with approved grouts	116	m2	40,000	4,640,000.00
6	400 x 400 x 9mm ceramic floor tiles to fixed bed (m/s) with approved adhesives including painting with approved grouts	40	m2	55,000	2,200,000.00
7	Ditto to tread of 300mm wide	8	m	16,500	132,000.00
8	Ditto to riser of 150mm deep	8	m	8,250	66,000.00
<u>Skirting</u>					
9	100mm high Cement sand screed skirting to a smooth finish as per Architect instruction.	11	m	8,250	90,750.00
<u>Ceiling: plain sheet finishing</u>					
10	9mm gypsum plaster board ceiling lining nailed to brandering (measured separately) including all necessary accessories	40	m2	18,000	720,000.00
11	100mm girth moulded gypsum cornice	32	m	7,000	224,000.00



Sum carried forward					11,408,750.00
No	Description	Qty	Unit	Rate	Amount (Tshs)
	<i>Sum B/F</i>				11,408,750.00
	<u>Branding</u>				
12	50 x 50mm treated softwood branding	201	m	5,000	1,005,000.00
	<u>External finishing</u>				
13	12mm Thick pvc boards	22	m2	22,000	484,000.00
14	50 x 50mm treated softwood branding	52	m	5,000	260,000.00
15	100mm girth moulded PVC cornice	57	m	7,000	399,000.00
TOTAL OF FINISHING CARRIED TO SUMMARY					13,556,750.00



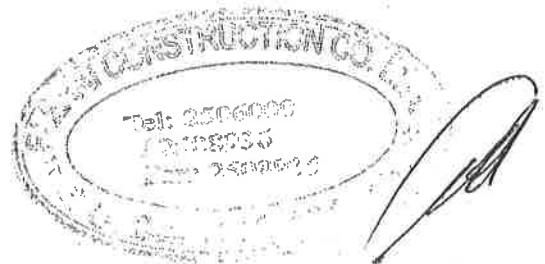
No	Description	Qty	Unit	Rate	Amount (Tshs)
ELEMENT NO.7: PAINTING AND DECORATION					
Internal paint					
1	<u>Prepare and apply one primer coat and two finishing coats of silky washable paint to</u> Plastered walls and concrete surface	163	m2	8,000	1,304,000.00
2	<u>Prepare and apply one primer coat and two finishing coats of emulsion paint to</u> Gypsum ceiling surface	40	m2	8,000	320,000.00
3	<u>Prepare; prime and apply three coats of vinyl varnish as per manufacturer's specifications to hardwood surfaces</u> Generally; to surface of door	32	m2	8,000	256,000.00
4	Frames and the like over 200mm but not exceeding 300mm girth	50	m	2,400	120,000.00
External painting					
5	<u>Prepare and apply one primer coat and two finishing coats of weather guard paint to</u> Rendered walls	78	m2	8,000	624,000.00
7	<u>Prepare; prime and apply three coats of gloss paint as per manufacturer's specifications to</u> Softwood fascia	35.2	m	1,200	42,240.00
TOTAL OF PAINTING AND DECORATIONS CARRIED TO SUMMARY					2,666,240.00



No	Description	Qty	Unit	Rate	Amount (Tshs)
	ELEMENT NO.8: PLUMBING INSTALLATION				
	<u>SANITARY APPLIANCES INSTALLATION</u>				
	<u>Supply and fix the following sanitary appliances from armitage shanks or equal and approved manufacturer including all connections and fixing to floor or wall as per manufacturer's printed instructions</u>				
1	White vitrous china WC eastern type with 9 litres capacity flushing cistern complete with high pressure ball valve, cover, chain and handle including 50mm flush pipe and overflow "S" trap, and all necessary accessories	6	nr	800,000	4,800,000.00
2	580 x 470mm white round WHB complete with chromium plated pillar taps, safety brackets, 50mm waste pipe chain and plug, 50mm bottle trap with 10mm seal and flexible pipe imbeded in concrete slab of 100mm thick finished with marble slate on top and sides as per engineers approval.	7	nr	400,000	2,800,000.00
3	Set of disabled utilities; Foro or equivalent; WC & HWB, ref. 327872..0, logica taps, ref. 5261645J0	1	nr	4,565,000	4,565,000.00
4	White vitrous china Urinals and all necessary accessories	3	nr	450,000	1,350,000.00
5	150 x 150mm recessed toilet roll holder	7	nr	55,000	385,000.00
6	800mm x 400mm x 6mm plate glass mirror with polished edges, plugged and screwed to wall with chromium plated donnex screws	7	nr	180,000	1,260,000.00
7	150 x 150mm soap holder plugged and screwed to wall with chromium plated donnex screws	7	nr	55,000	385,000.00
8	30mm diameter chromium plated towel rail fixed as per engineer's specifications	7	nr	55,000	385,000.00
9	100mm diameter stainless steel floor trap with grating including connecting to pvc pipe (measured separately)	9	nr	35,000	315,000.00
	TOTAL OF PLUMBING INSTALLATIONS CARRIED TO SUMMARY				16,245,000.00



No	Description	Qty	Unit	Rate	Amount (Tshs)
1	<p>Element No 9: FOUL WATER DRAINAGE ALL ARE PROVISIONAL DRAINAGE Excavate trench to receive pipes, commencing at ground level; not exceeding 1.5m deep average 1000mm deep; including grading bottom; backfilling; compacting and removal of surplus excavated materials away from the site</p>	Item	1	5,000,000	5,000,000.00
2	<p>SEPTIC TANKS 3000 x 2500 x 2500mm depth SEPTIC TANK, constructed in 230mm thick sold concrete block walls; 230mm thick plain insitu concrete grade '20' floor bed; 100mm thick reinforced insitu concrete grade '20' baffle walls; reinforced with y12 - 150c/c both way; complete with necessary pipe fitting; 4No cast iron manhole cover and frames; vent pipe; finished to wall sides and top of slab with water proof cement and sand render; including formwork; excavation backfilling and removal of surplus excavated materials away from the site as per Engineer specification.</p>	No	1	3,500,000	3,500,000.00
3	<p><u>Manhooles and Inspection Chambers</u> 650 x650 x 1000mm deep, constructed in 150mm thick solid concrete block wall; 150mm thick plain insitu concrete grade '15' 100mm thick reinforced concrete grade '20' cover slab with BRC mes, complete with benching and all necessary pipe fitting; 1 cast iron manholes and frames including excavation, backfilling and removal of surplus excavated materials away from the site as per Engineer specification.</p>	Sum	1	3,000,000	3,000,000.00



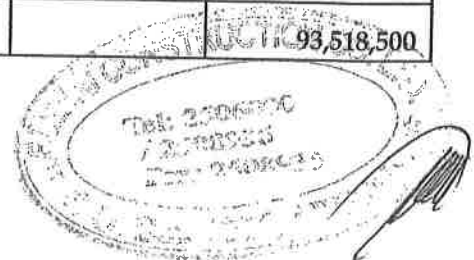
4	3800mm Diameter x 5000mm deep SOAK PIT, constructed in 230mm thick solid concrete blockwall, 230mm thick natural stone hardcore bed; 150mm thick reinforced insitu concrete grade '20' suspended cover slab reinforced with Y12 -150 c/c top and bottom in both ways; complete with necessary pipe fitting; 1No cast iron manhole covers and frame; vent pipe; finished on top of cover slab with water proof cement and sand render; including formwork; excavation; backfilling and removal of surplus excavated materials away from the site as per specification.	Sum	1	4,500,000	4,500,000.00
TOTAL SUM FOR WASTE WATER SYSTEM CARRIED TO SUMMARY Tshs					16,000,000.00

SUMMARY OF BILL NO 2.

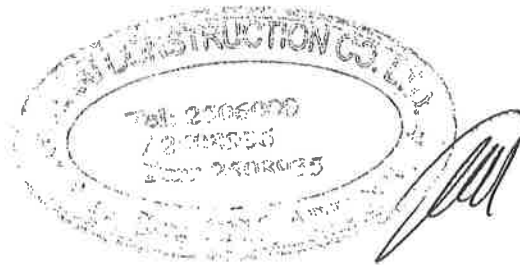
No	Description				Amount (Tshs)
1	ELEMENT NO.1: SUBSTRUCTURE				13,484,000.00
2	ELEMENT NO.2: WALLS AND PARTITIONS				7,241,500.00
3	ELEMENT NO.3: DOORS				15,273,700.00
4	ELEMENT NO.4: WINDOWS				1,404,000.00
5	ELEMENT NO.5: ROOFING				8,351,200.00
6	ELEMENT NO.6: FINISHING				13,556,750.00
7	ELEMENT NO.7: PAINTING AND DECORATION				2,666,240.00
8	ELEMENT NO.8: PLUMBING ENGINEERING INSTALLATION				16,245,000.00
9	Element No 9: FOUL WATER DRAINAGE				16,000,000.00
TOTAL OF BILL NO 2 - CARRIED TO GENERAL SUMMARY PAGE					94,222,390.00



S/N	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A: PRELIMINARIES					
1	Material Test	1.0	P/S	2,000,000	2,000,000
2	Allow a sum for Grass planting including bed preparation, supply of Humus soil, manure, glassess and growing them untill maturity approximate 2000sqm	1.0	P/S	-	-
3	Survey and Levelling work	1.0	P/S	-	-
Sub Total A					2,000,000
B: Earth WORKS					
4	Site Clearance and Levelling	13,400	m ²	1,000	13,400,000
5	Excavating ground surfaces to reduced levels over 300mm average depth including disposal of unwanted material to distance of 500m	1,523.7	m ³	5,000	7,618,500
6	Heavy Reshaping of 4m wide roads sections	1.0	km	1,500,000	1,500,000
7	Reshaping of walkway 1.5m wide to accomodation facility.	500.0	m	3,000	1,500,000
8	Gravelling (Excavate, load, haul, spread, water and compact gravel wearing course materials G25 (175mm thick) including overhaul to parking area and walkway	600.0	m ³	20,000	12,000,000
9	Gravelling (Excavate, load, haul, spread, water and compact gravel wearing course materials G25 (175mm thick) including overhaul to road area, width-4m, Length-750m	525.0	m ³	20,000	10,500,000
10	600mm x 600mm x 50mm Thick Paving Slab grade 20	100.0	m ²	35,000	3,500,000
11	600x400 x 100mm precast concrete kerb stone grade 25 jointed in cement sand mortors (1:4); haunched concrete grade 20 as shown on drawings	1,500.0	m	25,000	37,500,000
12	50mm River Sand at the parking area and walkway	200.0	m ³	30,000	6,000,000
			C/F		93,518,500



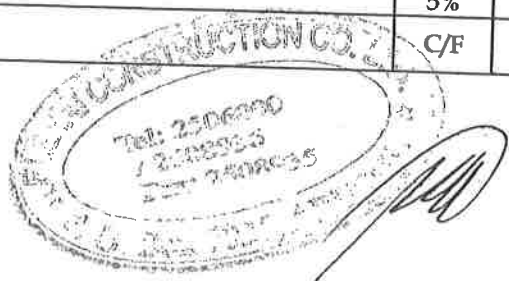
S/N	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
			B/F		93,518,500
13	Course Aggregate 3/4" to depth of 100mm Thick	375.0	m ³	100,000	37,500,000
14	Excavate of Catchwater drain 1.5m wide x 1m deep to accepted grade	750.0	m	8,000	6,000,000
15	Concrete class 20 for ground retaining beam of 400mm deep by 300mm thick as per drawing.	4.0	m ³	300,000	1,200,000
	Sub Total B				138,218,500
	C: APPROACH ROADS				
16	Site Clearance	32,000	m ²	1,000	32,000,000
17	Heavy Reshaping	4.0	km	2,800,000	11,200,000
18	Gravelling (Excavate, load, haul, spread, water and compact gravel wearing course materials G25 (150mm thick) including overhaul to road with 6.5m wide and 4000m long	3,900.0	m ³	20,000	78,000,000
19	Excavate of Mitre drain 1.5m wide x 1m deep to accepted grade	750.0	m	5,000	3,750,000
20	Construction of 900mm Pipe Culvert-Double Cell	2.0	Nr	1,700,000	3,400,000
	Sub Total C				128,350,000
	TOTAL(A+B+C) FOR CAR PARKING IN AND OUT				
					268,568,500



GATE BUILDING			
No.	DESCRIPTIONS	AMOUNT (TSHS)	
	PRIME COST AND PROVISIONAL SUM		<u>TSHS.</u>
	PROVISIONAL SUMS; PROVIDE THE FOLLOWING SUMS FOR WORK OR COSTS WHICH CANNOT BE ENTIRELY FORESEEN, DEFINED OR DETAILED		
1	Contingencies	Sum	10,000,000.00
2	External soil drainage Including soft landscaping, pavement and storm water drainage	Sum	-
3	Air consition Installation	sum	5,000,000.00
4	Telecommunication Installations	sum	-
5	Builder's works in connection with specialist services installation	Sum	-
6	6NO. Storage water tanks 5000Ltrs including Blockwork tank riser	Sum	24,000,000.00
7	Production of as per built drawings	sum	1,600,000.00
	TOTAL PROVISIONAL SUM	C/F	40,600,000.00



GATE BUILDING			
	PRIME COST SUMS FOR SPECIALIZED WORKS TO BE UNDERTAKEN BY SPECIALIST SUB CONTRACTOR	BF	40,600,000.00
1	Electrical Installation	Sum	23,000,000.00
2	Plumbing Engineering Installation (pipeworks and accessories)	Sum	10,000,000.00
	PRIME COST SUMS FOR SPECIALIZED WORKS TO BE UNDERTAKEN BY PUBLIC UNDERTAKING ORGANISATION		
3	Power connection	Sum	3,000,000.00
	Add: profit and attendance	5%	150,000.00
4	Water connection	Sum	1,500,000.00
	Add: profit and attendance	5%	75,000.00
2NO. SEMI-DETACHED (2IN1) SENIOR STAFF HOUSE			
5	Electrical Installation	Sum	11,000,000.00
	Add: Profit and attendance	5%	550,000.00
6	Plumbing Engineering Installation (pipeworks and accessories)	Sum	5,000,000.00
	Add: Profit and attendance	5%	250,000.00
	PRIME COST SUMS FOR SPECIALIZED WORKS TO BE UNDERTAKEN BY PUBLIC UNDERTAKING ORGANISATION		
7	Power connection	sum	8,000,000.00
	Add: profit and attendance	5%	400,000.00
8	Water connection	sum	2,000,000.00
	Add: profit and attendance	5%	100,000.00
		C/F	105,625,000.00



1NO. SEMI-DETACHED (4 IN 1) RANGER POST			
		B/F	105,625,000.00
9	Electrical Installation	Sum	5,500,000.00
	Add: Profit and attendance	5%	275,000.00
10	Plumbing Engineering Installation (pipeworks and accessories)	Sum	2,500,000.00
	Add: Profit and attendance	5%	125,000.00
PRIME COST SUMS FOR SPECIALIZED WORKS TO BE UNDERTAKEN BY PUBLIC UNDERTAKING ORGANISATION			
11	Power connection	sum	4,000,000.00
	Add: profit and attendance	5%	200,000.00
12	Water connection	sum	1,000,000.00
	Add: profit and attendance	5%	50,000.00
2NO. TOILETS			
13	Electrical Installation	Sum	3,000,000.00
	Add: Profit and attendance	5%	150,000.00
14	Plumbing Engineering Installation (pipeworks and accessories)	Sum	4,400,000.00
	Add: Profit and attendance	5%	220,000.00
PRIME COST SUMS FOR SPECIALIZED WORKS TO BE UNDERTAKEN BY PUBLIC UNDERTAKING ORGANISATION			
15	Power connection	sum	8,000,000.00
	Add: profit and attendance	5%	400,000.00
16	Water connection	sum	2,000,000.00
	Add: profit and attendance	5%	100,000.00
TOTAL FOR PC AND PROVISIONAL SUM			137,545,000.00



No	Description of Elements	Amount (Tshs/house)	UNITS	Amount (Tshs)
	<u>SUMMARY</u>			-
1	GATE BUILDING	357,704,850.00	1	357,704,850.00
2	SEMI-DETACHED (2 IN 1) SENIOR STAFF HOUSE	269,424,350.00	2	538,848,700.00
3	SEMI-DETACHED (4 IN 1) RANGER POST	229,356,700.00	1	229,356,700.00
4	TOILETS	94,222,390.00	2	188,444,780.00
5	CAR PARKING (IN AND OUT)	268,568,500.00	1	268,568,500.00
TOTAL CARRIED TO GENERAL SUMMARY				1,582,923,530.00



IX. FORMS OF SECURITIES

1. Performance Bank Guarantee [Unconditional]

[The bank/successful tenderer providing the Guarantee shall fill in this form in accordance with the instructions indicated in brackets, if the Employer requires this type of security.]

[insert bank's name, and address of issuing branch or office]

Beneficiary: [insert name and address of Employer]

Date: [insert date]

PERFORMANCE GUARANTEE No.: [insert Performance Guarantee number]

We have been informed that [insert name of Contractor] (hereinafter called "the Contractor") has been awarded a Contract No. [insert reference number of the Contract] dated with you, for the execution of [insert 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 [insert name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [insert amount in figures] ([insert 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 twenty-eight days from the date of issuance of the Taking-Over Certificate, calculated based on a copy of such Certificate which shall be provided to us, or on the [insert number day of [insert month], [insert year], whichever occurs first. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

[signature(s) of an authorized representative(s) of the Bank]

2. Performance Bond

By this Bond, [insert name and address of Contractor] as Principal (hereinafter called "the Contractor") and [insert name, legal title, and address of surety, bonding company, or insurance company] as Surety (hereinafter called "the Surety"), are held and firmly bound unto [insert name and address of Employer] as Oblige (hereinafter called "the Employer") in the amount of [insert amount of Bond] [insert amount of Bond in words], for the payment of which sum well and truly to be made in the types and proportions of currencies in which the Contract Price is payable, the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Whereas the Contractor has entered into a Contract with the Employer dated the [insert number] day of [insert month], [insert year] for [insert name of Contract] in accordance with the documents, plans, specifications, and amendments thereto, which to the extent herein provided for, are by reference made part hereof and are hereinafter referred to as the Contract.

Now, therefore, the Condition of this Obligation is such that, if the Contractor shall promptly and faithfully perform the said Contract (including any amendments thereto), then this obligation shall be null and void; otherwise it shall remain in full force and effect. Whenever the Contractor shall be, and declared by the Employer to be, in default under the Contract, the Employer having performed the Employer's obligations there under, the Surety may promptly remedy the default, or shall promptly:

- (1) complete the Contract in accordance with its terms and conditions; or
- (2) obtain a Tender(s) from qualified tenderers for submission to the Employer for completing the Contract in accordance with its terms and conditions, and upon determination by the Employer and the Surety of the lowest responsive Tenderer, arrange for a Contract between such Tenderer and Employer and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "Balance of the Contract Price," as used in this paragraph, shall mean the total amount payable by the Employer to the Contractor under the Contract, less the amount properly paid by the Employer to the Contractor;
or

- (3) pay the Employer the amount required by the Employer to complete the Contract in accordance with its terms and conditions up to a total not exceeding the amount of this Bond.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

Any suit under this Bond must be instituted before the expiration of one year from the date of issuance of the Certificate of Completion.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Employer named herein or the heirs, executors, administrators, successors, and assigns of the Employer.

In testimony whereof, the Contractor has hereunto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its legal representative, this *[insert day]* day of *[insert month]*, *[insert year]*.

Signed by *[insert signature(s) of authorized representative(s)]*
on behalf of *[name of Contractor]* in the capacity of *[insert title(s)]*

In the presence of *[insert name and signature of witness]*
Date *[insert date]*

Signed by *[insert signature(s) of authorized representative(s) of Surety]*
on behalf of *[name of Surety]* in the capacity of *[insert title(s)]*

In the presence of *[insert name and signature of witness]*
Date *[insert date]*

3. Bank Guarantee for Advance Payment

[Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: _____ [Name and Address of Employer]

Date: _____

ADVANCE PAYMENT GUARANTEE No.: _____

We have been informed that [name of Contractor] (hereinafter called "the Contractor") has been awarded Contract No. [reference number of the contract] dated _____ 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 [amount in figures] () [amount in words] is to be made against an advance payment guarantee.

At the request of the Contractor, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [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 _____ at _____ [name and address of 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 ___, 2___, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

Yours truly,

Signature and seal: _____

Name of Bank/Financial Institution: _____

Address: _____

Date: _____