

UNIVERSITY OF EMBU

TENDER NO:UoEm/09/2020-2021

**COMPLETION OF THE PROPOSED AUDITORIUM
AND LECTURE CLASSROOM FOR THE
UNIVERSITY OF EMBU**

Date of Closing: 1st April, 2021

SECTION I

INVITATION FOR TENDERS

Tender reference No. UoEm/09/2020-2021

Tender Name: Completion of The Proposed Auditorium and Lecture Classroom for The University of Embu

- 1.1 The University of Embu invites sealed tenders for the Completion of the Proposed Auditorium and Lecture Classroom for The University of Embu
- 1.2 Interested eligible candidates may obtain further information at the Procurement Office during normal working hours.
- 1.3 A complete set of tender documents will be obtained from the University's website.
- 1.4 **MANDATORY SITE VISIT WILL TAKE PLACE ON 23rd MARCH, 2021 AT 11.00AM.**
- 1.5 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for 120 days from the closing date of tender.
- 1.4 Completed tender documents are to be enclosed in plain sealed envelopes marked with Tender name and reference number and deposited in the Tender Box at the Reception in the Administration Block or to be addressed to the Vice Chancellor, University of Embu P.O. Box 6-60100 Embu so as to be received on or before **1ST April 2021 at 11.00 am.**
- 1.7 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at the procurement office.

**The Vice Chancellor,
University of Embu**

NOTE: THE EVALUATION CRITERIA IS ON PAGE 3 – 6

University of Embu does not levy any fees in order to award tenders.

Tender Evaluation Criteria

The following criteria will be used in the evaluation of all bids. The submission of the required documents will be used in the determination of the Completeness and Suitability of the Bid.

Mandatory Requirements for Pre-Qualification

Mandatory requirements will determine the satisfactory responsiveness of a tenderer, **failure to meet any of these set requirements as noted hereunder will render a tender non-responsive and will automatically be disqualified and will not be evaluated further.**

The following documents are mandatory:

1. Registration with National Construction Authority under NCA 4 and above, for building works (**attach a valid registration certificate from NCA**)
2. Valid Tax Compliance Certificate from Kenya Revenue Authority
3. Valid Tender Security from a **recognized bank (approved and licensed by Central Bank of Kenya)/insurance company (registered and licensed by the Insurance Regulatory Authority listed by the Public Procurement Regulatory Authority)** in the amount of **KES. 500,000.00 (Kenya Shillings Five Hundred Thousand)**
4. **Certified** Copy of Certificate of Incorporation (certified by a lawyer)
5. Pre-bid site visit certificate
6. **Duly filled, Signed and stamped** Self Declaration Forms **(Pages 19 and 20)**
7. **Duly filled, Signed and stamped** Confidential Business Questionnaire **(Pages 61)**
8. Copy of CR-12 form
9. Duly **signed and filled** form of tender **(Page 49)**
10. Paginate the tender document **i.e Insert pages on all the pages of the tender document**

Technical Qualification Criteria

1.1 Requirements		<u>Weighting Factor</u>
a)	Presentation and response <ul style="list-style-type: none"> • Binding the documents & neat presentation (<i>1 mark</i>) • Separation and arrangement of requested information and in the order requested (<i>2 marks</i>) 	3
b)	Certified Audited Accounts for the last Three (3) years: <ul style="list-style-type: none"> • Year 1 (<i>2 Marks</i>) • Year 2 (<i>2 Marks</i>) • Year 3 (<i>2 Marks</i>) • If Not Certified no marks (certified by CPAK) 	6
c)	<p>Relevant past experience for the past five years.</p> <p><i>Similarity concept: The project entails completion of the construction of a 1010 M2 Auditorium in 2No. levels and all the associated services. Kindly note that road construction projects will not be considered in evaluation of this requirement.</i></p> <p>Proof of at least three (3) completed projects of similar nature and magnitude in the last five years each of which be of a value of at least Kshs.70,000,000.00</p> <ul style="list-style-type: none"> • List of 3 completed projects to include the following (<i>10 marks on each project</i>) <ul style="list-style-type: none"> i) Name and Address of project – (<i>1 mark each</i>) ii) Contact persons - (<i>1 mark each</i>) iii) Their values (70 million and above) – (<i>1 marks each</i>) iv) Proof of completion of the projects (Attach completion certificates) – (<i>7marks each</i>) <p>If no completion certificates are attached – (0 Points for the entire project)</p> <p>Kindly note that the client may visit the projects</p>	30

Requirements (cont'd)		Weighting Factor
d)	References <ul style="list-style-type: none"> Reference from clients and consultants giving recommendation for successful completion of works of at least 5 projects of similar nature and magnitude <i>(1 mark for each reference)</i> 	5
e)	Financial Capability <ul style="list-style-type: none"> Proof of access to working capital or credit facilities of at least Kenya Shillings Twenty Million (KES. 20, 000,000.00) <i>(10 marks)</i> Bank(s) Reference Letter and Letter of Authority to make inquiries to your bankers <i>(5 marks)</i> 	15
f)	Qualified Personnel Attach a detailed curriculum vitae of the personnel below, certified by employee Attach commitment letter from the bidder confirming that the personnel below would be available during the entire period of contract Attach relevant academic and valid professional practicing certificates indicating the required qualification(s) NB: If no above attachments, no marks for this requirement <ul style="list-style-type: none"> Contract Manager who must be a Registered Engineer/Architect/Quantity Surveyor/Project Manager with minimum 10 years' experience. <i>(10 marks)</i> <ul style="list-style-type: none"> Qualification <i>(5 points)</i> and experience for the Period Indicated <i>(5 marks)</i> – <i>(total 10 marks)</i> With the required qualification but less years of experience than the period indicated <i>(Pro-rate)</i> Less Qualifications than stated above regardless of experience <i>(0 marks)</i> Site Foreman with a minimum of 15 years' experience and Diploma in Building/Architecture or Civil Engineering qualification from a recognized institution. <i>(10 marks)</i> <ul style="list-style-type: none"> Qualification <i>(5 points)</i> and experience for the Period Indicated <i>(5 marks)</i> – <i>(total 10 marks)</i> With the required qualification but less years of experience than the period indicated <i>(Pro-rate)</i> Less Qualifications than stated above regardless of experience <i>(0 marks)</i> 	20

Requirements (cont'd)		<u>Weighting Factor</u>
g)	<p>Machinery & Equipment</p> <p>Attach commitment letter confirming that the machinery and equipment below would be available during the period of contract</p> <p>NB: If no above attachment(commitment letter), no marks for this requirement</p> <p>(University of Embu may visit the premises)</p> <p>Ownership or lease of major equipment.</p> <p>Proof of ownership or lease agreements to be provided and a firm commitment for inspection at any time.</p> <ul style="list-style-type: none"> • Appropriate Transport e.g tippers, tankers, pickups etc – at least 3 No. <i>(3 marks)</i> • Power Tools and workshop Equipment– <i>(1 mark)</i> • Material handling equipment e.g. cranes, forklift, hoist etc at least 3 No – <i>(3 marks)</i> • Concrete making equipment e.g. concrete mixers, truck mixers, concrete pumps e.t.c at least 3 No. <i>(3 marks)</i> 	10
h)	<p>Works Program for the Proposed Project and a Statement on current workload (state the job, value and the expected completion date).</p> <ul style="list-style-type: none"> • Proposed works program <i>(8 marks)</i> • Statement on current workload– <i>(3 marks)</i> 	11
	TOTAL	100

Any tenderer scoring less than 70 Points will be considered as technically non-responsive and therefore shall be eliminated and therefore not evaluated further.

SECTION II

INSTRUCTIONS TO TENDERERS

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INSTRUCTIONS TO TENDERERS

1. General/Eligibility/Qualifications/Joint venture/Cost of tendering

- 1.1 The Employer as defined in the Appendix to Conditions of Contract invites tenders for Works Contract as described in the tender documents. The successful tenderer will be expected to complete the Works by the Intended Completion Date specified in the tender documents.
- 1.2 All tenderers shall provide the Qualification Information, a statement that the tenderer (including all members of a joint venture and subcontractors) is not associated, or has not been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works, and any of its affiliates, shall not be eligible to tender.
- 1.3 All tenderers shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.
- 1.4 In the event that pre-qualification of potential tenderers has been undertaken, only tenders from pre-qualified tenderers will be considered for award of Contract. These qualified tenderers should submit with their tenders any information updating their original pre-qualification applications or, alternatively, confirm in their tenders that the originally submitted pre-qualification information remains essentially correct as of the date of tender submission.
- 1.5 Where no pre-qualification of potential tenderers has been done, all tenderers shall include the following information and documents with their tenders, unless otherwise stated:
 - (a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the tender to commit the tenderer;
 - (b) total monetary value of construction work performed for each of the last five years;
 - (c) experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and names and addresses of clients who may be contacted for further information on these contracts;
 - (d) Major items of construction equipment proposed to carry out the Contract and an undertaking that they will be available for the Contract.

- (e) Qualifications and experience of key site management and technical personnel proposed for the Contract and an undertaking that they shall be available for the Contract.
 - (f) reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the past five years;
 - (g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources);
 - (h) authority to seek references from the tenderer's bankers;
 - (i) information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount; and
 - (j) Proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.
- 1.6 Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements, unless otherwise stated:
- (a) the tender shall include all the information listed in clause 1.5 above for each joint venture partner;
 - (b) the tender shall be signed so as to be legally binding on all partners;
 - (c) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
 - (d) one of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of all partners of the joint venture; and
 - (e) The execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.
- 1.7 To qualify for award of the Contract, tenderers shall meet the following minimum qualifying criteria;
- (a) annual volume of construction work of at least 2.5 times the estimated cash-flow for the Contract;
 - (b) experience as main contractor in the construction of at least
 - (c) two works of a nature and complexity equivalent to the Workover the last 10 years (to comply with this requirement, works cited should be at least 70 percent complete);
 - (d) proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment listed as required for the Works;

- (e) a Contract manager with at least five years' experience in works of an equivalent nature and volume, including no less than three years as Manager; and
 - (f) Liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of no less than 4 months of the estimated payment flow under this Contract.
- 1.8 The figures for each of the partners of a joint venture shall be added together to determine the tenderer's compliance with the minimum qualifying criteria of clause 1.7 (a) and (e); however, for a joint venture to qualify, each of its partners must meet at least 25 percent of minimum criteria 1.7 (a), (b) and (e) for an individual tenderer, and the partner in charge at least 40 percent of those minimum criteria. Failure to comply with this requirement will result in rejection of the joint venture's tender. Subcontractors' experience and resources will not be taken into account in determining the tenderer's compliance with the qualifying criteria, unless otherwise stated.
- 1.9 Each tenderer shall submit only one tender, either individually or as a partner in a joint venture. A tenderer who submits or participates in more than one tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the tenderer's participation to be disqualified.
- 1.10 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible or liable for those costs.
- 1.11 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine the Site of the Works and its surroundings, and obtain all information that may be necessary for preparing the tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the tenderer's own expense.
- 1.12 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.
- 1.13 The price to be charged for the tender document shall not exceed Kshs.1,000/=
- 1.14 The procuring entity shall allow the tenderer to review the tender document free of charge before purchase.

2. Tender Documents

- 2.1 The complete set of tender documents comprises the documents listed below and any addenda issued in accordance with Clause 2.4.
- (a) These Instructions to Tenderers
 - (b) Form of Tender and Qualification Information
 - (c) Conditions of Contract

- (d) Appendix to Conditions of Contract
- (e) Specifications
- (f) Drawings
- (g) Bills of Quantities
- (h) Forms of Securities

- 2.2 The tenderer shall examine all Instructions, Forms to be filled and Specifications in the tender documents. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the tendering documents in every respect will be at the tenderer's risk and may result in rejection of his tender.
- 2.3 A prospective tenderer making an inquiry relating to the tender documents may notify the Employer in writing or by cable, telex or facsimile at the address indicated in the letter of invitation to tender. The Employer will only respond to requests for clarification received earlier than seven days prior to the deadline for submission of tenders. Copies of the Employer's response will be forwarded to all persons issued with tendering documents, including a description of the inquiry, but without identifying its source.
- 2.4 Before the deadline for submission of tenders, the Employer may modify the tendering documents by issuing addenda. Any addendum thus issued shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all tenderers. Prospective tenderers shall acknowledge receipt of each addendum in writing to the Employer.
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- 2.5 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend, as necessary, the deadline for submission of tenders, in accordance with Clause 4.2 here below.

3. Preparation of Tenders

- 3.1 All documents relating to the tender and any correspondence shall be in English language.
- 3.2 The tender submitted by the tenderer shall comprise the following:
- (a) These Instructions to Tenderers, Form of Tender, Conditions of Contract, Appendix to Conditions of Contract and Specifications;
 - (b) Tender Security;
 - (c) Priced Bill of Quantities ;
 - (d) Qualification Information Form and Documents;
 - (e) Alternative offers where invited; and
 - (f) Any other materials required to be completed and submitted by the tenderers.

- 3.3 The tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause relevant to the Contract, as of 30 days prior to the deadline for submission of tenders, shall be included in the tender price submitted by the tenderer.
- 3.4 The rates and prices quoted by the tenderer shall only be subject to adjustment during the performance of the Contract if provided for in the Appendix to Conditions of Contract and provisions made in the Conditions of Contract.
- 3.5 The unit rates and prices shall be in Kenya Shillings.
- 3.6 Tenders shall remain valid for a period of Ninety (90) days from the date of submission. However in exceptional circumstances, the Employer may request that the tenderers extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting the Tender Security. A tenderer agreeing to the request will not be required or permitted to otherwise modify the tender, but will be required to extend the validity of Tender Security for the period of the extension, and in compliance with Clause 3.7 - 3.11 in all respects.
- 3.7 The tenderer shall furnish, as part of the tender, a Tender Security in the amount and form specified in the appendix to invitation to tenderers. This shall be in the amount not exceeding 2 percent of the tender price
- 3.8 The format of the Tender Security should be in accordance with the form of Tender Security included in Section G - Standard forms or any other form acceptable to the Employer. Tender Security shall be valid for 30 days beyond the validity of the tender.
- 3.9 Any tender not accompanied by an acceptable Tender Security shall be rejected. The Tender Security of a joint venture must define as "Tenderer" all joint venture partners and list them in the following manner: a joint venture consisting of".....", ".....", and ".....".
- 3.10 The Tender Securities of unsuccessful tenderers will be returned within 28 days of the end of the tender validity period specified in Clause 3.6.
- 3.11 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Contract Agreement and furnished the required Performance Security.
- 3.12 The Tender Security may be forfeited
- (a) if the tenderer withdraws the tender after tender opening during the period of tender validity;

- (b) if the tenderer does not accept the correction of the tender price, pursuant to Clause 5.7;
 - (c) in the case of a successful tenderer, if the tenderer fails within the specified time limit to
 - (i) sign the Agreement, or
 - (ii) Furnish the required Performance Security.
- 3.13 Tenderers shall submit offers that comply with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. Alternatives will not be considered, unless specifically allowed in the invitation to tender. If so allowed, tenderers wishing to offer technical alternatives to the requirements of the tendering documents must also submit a tender that complies with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. In addition to submitting the basic tender, the tenderer shall provide all information necessary for a complete evaluation of the alternative, including design calculations, technical specifications, breakdown of prices, proposed construction methods and other relevant details. Only the technical alternatives, if any, of the lowest evaluated tender conforming to the basic technical requirements shall be considered.
- 3.14 The tenderer shall prepare one original of the documents comprising the tender documents as described in Clause 3.2 of these Instructions to Tenderers, bound with the volume containing the Form of Tender, and clearly marked "ORIGINAL". In addition, the tenderer shall submit copies of the tender, in the number specified in the invitation to tender, and clearly marked as "COPIES". In the event of discrepancy between them, the original shall prevail.
- 3.15 The original and all copies of the tender shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the tenderer, pursuant to Clause 1.5 (a) or 1.6 (b), as the case may be. All pages of the tender where alterations or additions have been made shall be initialed by the person or persons signing the tender.
- 3.16 Clarification of tenders shall be requested by the tenderer to be received by the procuring entity not later than 7 days prior to the deadline for submission of tenders.
- 3.17 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.
- 3.18 The tender security shall be in the amount of 0.5 – 2 per cent of the tender price.

4. Submission of Tenders

- 4.1 The tenderer shall seal the original and all copies of the tender in two inner envelopes and one outer envelope, duly marking the inner envelopes as **“ORIGINAL”** and **“COPIES”** as appropriate. The inner and outer envelopes shall:
- (a) be addressed to the Employer at the address provided in the invitation to tender;
 - (b) bear the name and identification number of the Contract as defined in the invitation to tender; and
 - (c) Provide a warning not to open before the specified time and date for tender opening.
- 4.2 Tenders shall be delivered to the Employer at the address specified above not later than the time and date specified in the invitation to tender. However, the Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Sub-Clause 2.5 in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.
- 4.3 Any tender received after the deadline prescribed in clause 4.2 will be returned to the tenderer un-opened.
- 4.4 Tenderers may modify or withdraw their tenders by giving notice in writing before the deadline prescribed in clause 4.2. Each tenderer’s modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 3.13 and 4.1, with the outer and inner envelopes additionally marked **“MODIFICATION”** and **“WITHDRAWAL”**, as appropriate. No tender may be modified after the deadline for submission of tenders.
- 4.5 Withdrawal of a tender between the deadline for submission of Tenders and the expiration of the period of tender validity specified in the invitation to tender or as extended pursuant to Clause 3.6 may result in the forfeiture of the Tender Security pursuant to Clause 3.11.
- 4.6 Tenderers may only offer discounts to, or otherwise modify the prices of their tenders by submitting tender modifications in accordance with Clause 4.4 or be included in the original tender submission.

5. Tender Opening and Evaluation

- 5.1 The tenders will be opened by the Employer, including modifications made pursuant to Clause 4.4, in the presence of the tenderers’ representatives who choose to attend at the time and in the place specified in the invitation to tender. Envelopes marked **“WITHDRAWAL”** shall be opened and read out first. Tenderers’ and Employer’s representatives who are present during the opening shall sign a register evidencing their attendance.
- 5.2 The tenderers’ names, the tender prices, the total amount of each tender and of any alternative tender (if alternatives have been requested or permitted),

any discounts, tender modifications and withdrawals, the presence or absence of Tender Security, and such other details as may be considered appropriate, will be announced by the Employer at the opening. Minutes of the tender opening, including the information disclosed to those present will be prepared by the Employer.

- 5.3 Information relating to the examination, clarification, evaluation, and comparison of tenders and recommendations for the award of Contract shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced. Any effort by a tenderer to influence the Employer's officials, processing of tenders or award decisions may result in the rejection of his tender.
- 5.4 To assist in the examination, evaluation, and comparison of tenders, the Employer at his discretion, may ask any tenderer for clarification of the tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, telex or facsimile but no change in the price or substance of the tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered in the evaluation of the tenders in accordance with Clause 5.7.
- 5.5 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender (a) meets the eligibility criteria defined in Clause 1.7;(b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the tendering documents. A substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tendering documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the works; (b) which limits in any substantial way, inconsistent with the tendering documents, the Employer's rights or the tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.
- 5.6 If a tender is not substantially responsive, it will be rejected, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.
- 5.7 Tenders determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:
- (a) where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and
 - (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case the adjustment will be made to the entry containing that error.

- (c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bill of Quantities, the amount as stated in the Form of Tender shall prevail.
 - (d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Work (i.e. Corrected tender sum less P.C. and Provisional Sums)
 - (e) The Error Correction Factor shall be applied to all Builders' Work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.
 - (f) the amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 3.11.
- 5.8 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with Clause 5.5.
- 5.9 In evaluating the tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:
- (a) making any correction for errors pursuant to clause 5.7;
 - (b) Excluding provisional sums and the provision, if any, for contingencies in the Bill of Quantities, but including Day-works where priced competitively.
 - (c) making an appropriate adjustment for any other acceptable variations, deviations, or alternative offers submitted in accordance with clause 3.12; and
 - (d) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with clause 4.6
- 5.10 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in unsolicited benefits for the Employer will not be taken into account in tender evaluation.
- 5.11 The tenderer shall not influence the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. Any effort by the Tenderer to influence the Employer or his employees in his decision on tender evaluation, tender comparison or Contract award may result in the rejection of the tender.

- 5.12 Firms incorporated in Kenya where indigenous Kenyans own 51% or more of the share capital shall be allowed a 10% preferential bias provided that they do not sub-contract work valued at more than 50% of the Contract Price excluding Provisional Sums to non-indigenous sub-contractor.

6. Award of Contract

- 6.1 Subject to Clause 6.2, the award of the Contract will be made to the tenderer whose tender has been determined to be substantially responsive to the tendering documents and who has offered the lowest evaluated tender price, provided that such tenderer has been determined to be (a) eligible in accordance with the provision of Clauses 1.2, and (b) qualified in accordance with the provisions of clause 1.7 and 1.8.
- 6.2 Notwithstanding clause 6.1 above, the Employer reserves the right to accept or reject any tender, and to cancel the tendering process and reject all tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected tenderer or tenderers or any obligation to inform the affected tenderer or tenderers of the grounds for the action.
- 6.3 The tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing or by cable, telex or facsimile. This notification (hereinafter and in all Contract documents called the "Letter of Acceptance") will state the sum (hereinafter and in all Contract documents called the "Contract Price") that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract. At the same time the other tenderers shall be informed that their tenders have not been successful.
- The contract shall be formed on the parties signing the contract.
- 6.4 The Agreement will incorporate all agreements between the Employer and the successful tenderer. Within 14 days of receipt the successful tenderer will sign the Agreement and return it to the Employer.
- 6.5 Within 21 days after receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in the amount stipulated in the Appendix to Conditions of Contract and in the form stipulated in the Tender documents. The Performance Security shall be in the amount and specified form
- 6.6 Failure of the successful tenderer to comply with the requirements of clause 6.5 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Tender Security.
- 6.7 Upon the furnishing by the successful tenderer of the Performance Security, the Employer will promptly notify the other tenderers that their tenders have been unsuccessful.
- 6.8 Preference where allowed in the evaluation of tenders shall not be allowed for contracts not exceeding one year (12 months)

- 6.9 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.
- 6.10 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.
- 6.11 Contract price variations shall not be allowed for contracts not exceeding one year (12 months)
- 6.12 Where contract price variation is allowed, the valuation shall not exceed 15% of the original contract price.
- 6.13 Price variation request shall be processed by the procuring entity within 30 days of receiving the request.
- 6.14 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.
- 6.15 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.
- 6.16 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

7. Corrupt and Fraudulent practices

- 7.1 The procuring entity requires that tenderers observe the highest standards of ethics during procurement process and execution of contracts. A tenderer shall sign a declaration that he has not and will not be involved in corrupt and fraudulent practices.

SELF DECLARATION FORMS

SELF DECLARATION THAT THE PERSON/TENDERER IS NOT DEBARRED IN THE MATTER OF THE PUBLIC PROCUREMENT AND ASSET DISPOSAL ACT 2015.

I,, of Post Office Box
being A resident of in the Republic of
..... do hereby make a statement as follows:-

THAT I am the Company Secretary/ Chief Executive/Managing Director/Principal Officer/Director of (insert name of the Company) who is a Bidder in respect of Tender No. for(insert tender title/description) for(insert name of the Procuring entity) and duly authorized and competent to make this statement.

2. THAT the aforesaid Bidder, its Directors and subcontractors have not been debarred from participating in procurement proceeding under Part IV of the Act.

3. THAT what is deponed to hereinabove is true to the best of my knowledge, information and belief.

.....
(Title) (Signature) (Date)

Bidder's Official Stamp

SELF DECLARATION FORMS

SELF DECLARATION THAT THE PERSON/TENDERER WILL NOT ENGAGE IN ANY CORRUPT OR FRAUDULENT PRACTICE.

I,of P. O. Box being a resident of..... in the Republic of do hereby make a statement as follows:-

1. THAT I am the Chief Executive/Managing Director/Principal Officer/Director of (insert name of the Company) who is a Bidder in respect of Tender No. for(insert tender title/description) for(insert name of the Procuring entity) and duly authorized and competent to make this statement.

2. THAT the aforesaid Bidder, its servants and/or agents /subcontractors will not engage in any corrupt or fraudulent practice and has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of(insert name of the Procuring entity) which is the procuring entity.

3. THAT the aforesaid Bidder, its servants and/or agents /subcontractors have not offered any inducement to any member of the Board, Management, Staff and/or employees and/or agents of(name of the procuring entity)

4. THAT the aforesaid Bidder will not engage /has not engaged in any corrosive practice with other bidders participating in the subject tender

5. THAT what is deponed to hereinabove is true to the best of my knowledge information and belief.

.....
(Title) (Signature) (Date)

Bidder's Official Stamp

SECTION III: CONDITIONS OF CONTRACT

1. Definitions

- 1.1 In this Contract, except where context otherwise requires, the following terms shall be interpreted as indicated;

“Bill of Quantities” means the priced and completed Bill of Quantities forming part of the tender.

“Compensation Events” are those defined in Clause 24 hereunder.

“The Completion Date” means the date of completion of the Works as certified by the Project Manager, in accordance with Clause 31.

“The Contract” means the agreement entered into between the Employer and the Contractor as recorded in the Agreement Form and signed by the parties including all attachments and appendices thereto and all documents incorporated by reference therein to execute, complete, and maintain the Works,

“The Contractor” refers to the person or corporate body 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.

“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 Contract Data and calculated from the Completion Date.

“Drawings” include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

“Day-works” are Work inputs subject to payment on a time basis for labour and the associated materials and plant.

“Employer”, or the “Procuring entity” as defined in the Public Procurement Regulations (i.e. Central or Local Government administration,

Universities, Public Institutions and Corporations, etc) is the party who employs the Contractor to carry out the Works.

“Equipment” is the Contractor’s machinery and vehicles brought temporarily to the Site for the execution of the Works.

“The Intended Completion Date” is the date on which it is intended that the Contractor shall complete the Works. 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 incorporation in the Works.

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

“Project Manager” is the person named in the Appendix to Conditions of Contract (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 and shall be an “Architect” or a “Quantity Surveyor” registered under the Architects and Quantity Surveyors Act Cap 525 or an “Engineer” registered under Engineers Registration Act Cap 530.

“Site” is the area defined as such in the Appendix to Condition of Contract.

“Site Investigation Reports” are those reports that may be included in the tendering documents which are factual and interpretative about the surface and subsurface conditions at the Site.

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

“Start Date” is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with the Site possession date(s).

“A Subcontractor” is a person or corporate body who has a Contract with the Contractor to carry out a part of the Work in the Contract, which includes Work on the Site.

“Temporary works” are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

“A Variation” is an instruction given by the Project Manager which varies the Works.

“The Works” are what the Contract requires the Contractor to construct, install, and turnover to the Employer, as defined in the Appendix to Conditions of Contract.

2. Interpretation

- 2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning in English Language unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.
- 2.2 If sectional completion is specified in the Appendix to Conditions of Contract, reference 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 Intended Completion Date for the whole of the Works).
- 2.3 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;
- (1) Agreement,
 - (2) Letter of Acceptance,
 - (3) Contractor's Tender,
 - (4) Appendix to Conditions of Contract,
 - (5) Conditions of Contract,
 - (6) Specifications,
 - (7) Drawings,
 - (8) Bill of Quantities,
 - (9) Any other documents listed in the Appendix to Conditions of Contract as forming part of the Contract.

Immediately after the execution of the Contract, the Project Manager shall furnish both the Employer and the Contractor with two copies each of all the Contract documents. Further, as and when necessary the Project Manager shall furnish the Contractor [always with a copy to the Employer] with three [3] copies of such further drawings or details or descriptive schedules as are reasonably necessary either to explain or amplify the Contract drawings or to enable the Contractor to carry out and complete the Works in accordance with these Conditions.

3. Language and Law

- 3.1 Language of the Contract and the law governing the Contract shall be English language and the Laws of Kenya respectively unless otherwise stated.

4 Project Manager's Decisions

- 4.1 Except where otherwise specifically stated, the Project Manager will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5 Delegation

- 5.1 The Project Manager may delegate any of his duties and responsibilities to others after notifying the Contractor.

6 Communications

- 6.1 Communication between parties shall be effective only when in writing. A notice shall be effective only when it is delivered.

7 Subcontracting

- 7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.

8 Other Contractors

- 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities etc. as listed in the Appendix to Conditions of Contract and also with the Employer, as per the directions of the Project Manager. The Contractor shall also provide facilities and services for them. The Employer may modify the said List of Other Contractors etc., and shall notify the Contractor of any such modification.

9 Personnel

- 9.1 The Contractor shall employ the key personnel named in the Qualification Information, to carry out the functions stated in the said Information 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 Qualification Information. If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the Work in the Contract.

10 Works

- 10.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings. The Works may commence on the Start Date and shall be carried out in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.

11 Safety and Temporary Works

- 11.1 The Contractor shall be responsible for the design of temporary works. However before erecting the same, he shall submit his designs including specifications and drawings to the Project Manager and to any other relevant third parties for their approval. No erection of temporary works shall be done until such approvals are obtained.
- 11.2 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent Works, shall be subject to prior approval by the Project Manager before they can be used.
- 11.3 The Contractor shall be responsible for the safety of all activities on the Site.

12. Discoveries

- 12.1 Anything of historical or other interest or of significant value unexpectedly discovered on 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.

13. Work Program

- 13.1 Within the time stated in the Appendix to Conditions of Contract, the Contractor shall submit to the Project Manager for approval a program showing the general methods, arrangements, order, and timing for all the activities in the Works. An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining Work, including any changes to the sequence of the activities.

The Contractor shall submit to the Project Manager for approval an updated program at intervals no longer than the period stated in the Appendix to Conditions of Contract. If the Contractor does not submit an updated program within this period, the Project Manager may withhold the amount stated in the said Appendix 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. The Project Manager's approval of the program shall not alter the Contractor's obligations. The Contractor may revise the program and submit it to the Project Manager again at any time. A revised program shall show the effect of Variations and Compensation Events.

14. Possession of Site

- 14.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Appendix to Conditions of Contract, the Employer will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event.

15. Access to Site

- 15.1 The Contractor shall allow the Project Manager and any other person authorised 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.

16. Instructions

- 16.1 The Contractor shall carry out all instructions of the Project Manager which are in accordance with the Contract.

17. Extension or Acceleration of Completion Date

- 17.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining Work, which would cause the Contractor to incur additional cost. The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager in writing for a decision upon the effect of a Compensation Event or variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay caused by such failure shall not be considered in assessing the new (extended) Completion Date.
- 17.2 No bonus for early completion of the Works shall be paid to the Contractor by the Employer.

18. Management Meetings

- 18.1 A Contract management meeting shall be held monthly and attended by the Project Manager and the Contractor. Its business shall be to review the plans for the remaining Work and to deal with matters raised in accordance with the early warning procedure. The Project Manager shall record the minutes of management meetings and provide copies of the same to those attending the meeting and 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.

19. Early Warning

- 19.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the Work increase the Contract Price or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.
- 19.2 The Contractor shall cooperate with the Project Manager in making and considering proposals on how the effect of such an event or circumstance

can be avoided or reduced by anyone involved in the Work and in carrying out any resulting instructions of the Project Manager.

20. Defects

- 20.1 The Project Manager shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a defect and to uncover and test any Work that the Project Manager considers may have a defect. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor. However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.
- 20.2 The Project Manager shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the Appendix to Conditions of Contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.
- 20.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Project Manager's notice. If the Contractor has not corrected a defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

21. Bills Of Quantities

- 21.1 The Bills of Quantities shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rate in the Bills of Quantities for each item.
- 21.2 If the final quantity of the Work done differs from the quantity in the Bills of Quantities for the particular item by more than 25 percent and provided the change exceeds 1 percent of the Initial Contract price, the Project Manager shall adjust the rate to allow for the change.
- 21.3 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bills of Quantities.

22. Variations

- 22.1 All variations shall be included in updated programs produced by the Contractor.
- 22.2 The Contractor shall provide the Project Manager with a quotation for carrying out the variations when requested to do so. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period as may be stated by the Project Manager and before the Variation is ordered.
- 22.3 If the work in the variation corresponds with an item description in the Bills of Quantities and if in the opinion of the Project Manager, the quantity of work is not above the limit stated in Clause 21.2 or the timing of its execution does not cause the cost per unit of quantity to change, the rate in the Bills 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 Bills of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.
- 22.4 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.
- 22.5 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.
- 22.6 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 22.7 When the Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.

23. Payment Certificates, Currency of Payments and Advance Payments

- 23.1 The Contractor shall submit to the Project Manager monthly applications for payment giving sufficient details of the Work done and materials on Site and the amounts which the Contractor considers himself to be entitled to. The Project Manager shall check the monthly application and certify the amount to be paid to the Contractor within 14 days. The value of Work executed and payable shall be determined by the Project Manager.
- 23.2 The value of Work executed shall comprise the value of the quantities of the items in the Bills of Quantities completed; materials delivered on Site, variations and compensation events. Such materials shall become the property of the Employer once the Employer has paid the Contractor for

their value. Thereafter, they shall not be removed from Site without the Project Manager's instructions except for use upon the Works.

- 23.3 Payments shall be adjusted for deductions for retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of issue of each certificate. If the Employer makes a late payment, the Contractor shall be paid simple interest on the late payment in the next payment. Interest shall be calculated on the basis of number of days delayed at a rate three percentage points above the Central Bank of Kenya's average rate for base lending prevailing as of the first day the payment becomes overdue.
- 23.4 If an amount certified is increased in a later certificate or as a result of an award by 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.
- 23.5 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.
- 23.6 The Contract Price shall be stated in Kenya Shillings. All payments to the Contractor shall be made in Kenya Shillings and foreign currency in the proportion indicated in the tender, or agreed prior to the execution of the Contract Agreement and indicated therein. The rate of exchange for the calculation of the amount of foreign currency payment shall be the rate of exchange indicated in the Appendix to Conditions of Contract. If the Contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services the Employer reserves the right to pay the equivalent at the time of payment in the currencies of the countries of such goods and services. The Employer and the Project Manager shall be notified promptly by the Contractor of any changes in the expected foreign currency requirements of the Contractor during the execution of the Works as indicated in the Schedule of Foreign Currency Requirements and the foreign and local currency portions of the balance of the Contract Price shall then be amended by agreement between Employer and the Contractor in order to reflect appropriately such changes.
- 23.7 In the event that an advance payment is granted, the following shall apply:-
- a) On signature of the Contract, the Contractor shall at his request, and without furnishing proof of expenditure, be entitled to an advance of 10% (ten percent) of the original amount of the Contract. The advance shall not be subject to retention money.
 - b) No advance payment may be made before the Contractor has submitted proof of the establishment of deposit or a directly liable guarantee satisfactory to the Employer in the amount of the advance payment. The guarantee shall be in the same currency as the advance.

- c) Reimbursement of the lump sum advance shall be made by deductions from the Interim payments and where applicable from the balance owing to the Contractor. Reimbursement shall begin when the amount of the sums due under the Contract reaches 20% of the original amount of the Contract. It shall have been completed by the time 80% of this amount is reached.

The amount to be repaid by way of successive deductions shall be calculated by means of the formula:

$$R = \frac{A(x^1 - x^{11})}{80 - 20}$$

Where:

- R = the amount to be reimbursed
- A = the amount of the advance which has been granted
- X¹ = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This figure will exceed 20% but not exceed 80%.
- X¹¹ = the amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80% but not less than 20%.
- d) with each reimbursement the counterpart of the directly liable guarantee may be reduced accordingly.

24. Compensation Events

24.1 The following issues shall constitute Compensation Events:

- (a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Appendix to Conditions of Contract.
- (b) The Employer modifies the List of Other Contractors, etc., 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 the 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 effects on the Contractor of any of the Employer's risks.
 - (j) The Project Manager unreasonably delays issuing a Certificate of Completion.
 - (k) Other compensation events described in the Contract or determined by the Project Manager shall apply.
- 24.2 If a compensation event would cause additional cost or would prevent the Work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
- 24.3 As soon as information demonstrating the effect of each compensation event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager will assume that the Contractor will react competently and promptly to the event.
- 24.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having co-operated with the Project Manager.
- 24.5 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Appendix to Conditions of Contract.
- 24.6 The Contractor shall give written notice to the Project Manager of his intention to make a claim within thirty days after the event giving rise to the claim has first arisen. The claim shall be submitted within thirty days thereafter.

Provided always that should the event giving rise to the claim of continuing effect, the Contractor shall submit an interim claim within the said thirty days and a final claim within thirty days of the end of the event giving rise to the claim.

25. Price Adjustment

- 25.1 The Project Manager shall adjust the Contract Price if taxes, duties and other levies are changed between the date 30 days before the submission of tenders for the Contract and the date of Completion. The adjustment shall be the change in the amount of tax payable by the Contractor.
- 25.2 The Contract Price shall be deemed to be based on exchange rates current at the date of tender submission in calculating the cost to the Contractor of materials to be specifically imported (by express provisions in the Contract Bills of Quantities or Specifications) for permanent incorporation in the Works. Unless otherwise stated in the Contract, if at any time during the period of the Contract exchange rates shall be varied and this shall affect the cost to the Contractor of such materials, then the Project Manager shall assess the net difference in the cost of such materials. Any amount from time to time so assessed shall be added to or deducted from the Contract Price, as the case may be.
- 25.3 Unless otherwise stated in the Contract, the Contract Price shall be deemed to have been calculated in the manner set out below and in sub-clauses 25.4 and 25.5 and shall be subject to adjustment in the events specified thereunder;
- (i) The prices contained in the Contract Bills of Quantities shall be deemed to be based upon the rates of wages and other emoluments and expenses as determined by the Joint Building Council of Kenya (J.B.C.) and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.
 - (ii) Upon J.B.C. determining that any of the said rates of wages or other emoluments and expenses are increased or decreased, then the Contract Price shall be increased or decreased by the amount assessed by the Project Manager based upon the difference, expressed as a percentage, between the rate set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of labour incorporated within the amount of Work remaining to be executed at the date of publication of such increase or decrease.
 - (iii) No adjustment shall be made in respect of changes in the rates of wages and other emoluments and expenses which occur after the date of Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.4 The prices contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the Works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the

schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.

- 25.5 Upon the J.B.C. determining that any of the said basic prices are increased or decreased then the Contract Price shall be increased or decreased by the amount to be assessed by the Project Manager based upon the difference between the price set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of the relevant materials which have not been taken into account in arriving at the amount of any interim certificate under clause 23 of these Conditions issued before the date of publication of such increase or decrease.
- 25.6 No adjustment shall be made in respect of changes in basic prices of materials which occur after the date for Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.7 The provisions of sub-clause 25.1 to 25.2 herein shall not apply in respect of any materials included in the schedule of basic rates.

26. Retention

- 26.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the Appendix to Conditions of Contract until Completion of the whole of the Works. On Completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the remaining half when the Defects Liability Period has passed and the Project Manager has certified that all defects notified to the Contractor before the end of this period have been corrected.

27. Liquidated Damages

- 27.1 The Contractor shall pay liquidated damages to the Employer at the rate stated in the Appendix to Conditions of Contract for each day that the actual Completion Date is later than the Intended Completion Date. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not alter the Contractor's liabilities.
- 27.2 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 rate specified in Clause 23.30

28. Securities

- 28.1 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 and form and by a reputable bank acceptable to the Employer, and denominated in Kenya Shillings. The Performance Security shall be valid

until a date 30 days beyond the date of issue of the Certificate of Completion.

29. Day-works

- 29.1 If applicable, the Day-works 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.
- 29.2 All work to be paid for as Day-works 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.
- 29.3 The Contractor shall be paid for Day-works subject to obtaining signed Day-works forms.

30. Liability and Insurance

- 30.1 From the Start Date until the Defects Correction Certificate has been issued, the following are the Employer's risks:
 - (a) The risk of personal injury, death or loss of or damage to property (excluding the Works, Plant, Materials and Equipment), which are due to;
 - (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works, or
 - (ii) negligence, breach of statutory duty or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.
 - (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in Employer's design, or due to war or radioactive contamination directly affecting the place where the Works are being executed.
- 30.2 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 the Employer's risk except loss or damage due to;
 - (a) a defect which existed on or before the Completion Date.
 - (b) an event occurring before the Completion Date, which was not itself the Employer's risk
 - (c) the activities of the Contractor on the Site after the Completion Date.
- 30.3 From the Start 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 risk are Contractor's risks.

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 stated in the Appendix to Conditions of Contract for the following events;

- (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.

30.4 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 required to rectify the loss or damage incurred.

30.5 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 from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

30.6 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager. Both parties shall comply with any conditions of insurance policies.

31. Completion and taking over

31.1 Upon deciding that the Works are complete, the Contractor shall issue a written request to the Project Manager to issue a Certificate of Completion of the Works. The Employer shall take over the Site and the Works within seven [7] days of the Project Manager's issuing a Certificate of Completion.

32. Final Account

32.1 The Contractor shall issue the Project Manager with a detailed account of the total amount that the Contractor considers payable to him by the Employer under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 30 days a schedule that states the scope of the corrections or additions that are necessary. If the final account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a Payment Certificate. The Employer shall pay the Contractor the amount due in the Final Certificate within 60 days.

33. Termination

33.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These

fundamental breaches of Contract shall include, but shall not be limited to, the following;

- (a) the Contractor stops work for 30 days when no stoppage of work is shown on the current program and the stoppage has not been authorised by the Project Manager;
- (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days;
- (c) the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 30 days (for Interim Certificate) or 60 days (for Final Certificate) of issue.
- (e) the Project Manager gives notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
- (f) the Contractor does not maintain a security, which is required.

33.2 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under Clause 33.1 above, the Project Manager shall decide whether the breach is fundamental or not.

33.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

33.4 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. The Project Manager shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials, goods, equipment and temporary buildings on Site.

34. Payment Upon Termination

34.1 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 and delivered to Site up to the date of the issue of the certificate. 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 by the Contractor.

34.2 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.

34.3 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any defects and may enter upon the Works and use all materials on the Site, plant, equipment and temporary works.

34.4 The Contractor shall, during the execution or after the completion of the Works under this clause remove from the Site as and when required, within such reasonable time as the Project Manager may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.

Until after completion of the Works under this clause the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefore the Project Manager shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

35. Release from Performance

35.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop Work as quickly as possible after receiving this certificate and shall be paid for all Work carried out before receiving it.

36. Corrupt gifts and payments of commission

The Contractor shall not;

(a) Offer or give or agree to give to any person in the service of the

Employer any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other Contract for the Employer or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract for the Employer.

(b) Enter into this or any other contract with the Employer in connection with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the Contract is made particulars of any

such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Employer.

Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the provisions of the Public Procurement Regulations issued under The Exchequer and Audit Act Cap 412 of the Laws of Kenya.

37. Settlement Of Disputes

37.1 In case any dispute or difference shall arise between the Employer or the Project Manager on his behalf and the Contractor, either during the progress or after the completion or termination of the Works, such dispute shall be notified in writing by either party to the other with a request to submit it to arbitration and to concur in the appointment of an Arbitrator within thirty days of the notice. The dispute shall be referred to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the Chairman or Vice Chairman of any of the following professional institutions;

- (i) Architectural Association of Kenya
- (ii) Institute of Quantity Surveyors of Kenya
- (iii) Association of Consulting Engineers of Kenya
- (iv) Chartered Institute of Arbitrators (Kenya Branch)
- (v) Institution of Engineers of Kenya

On the request of the applying party. The institution written to first by the aggrieved party shall take precedence over all other institutions.

37.2 The arbitration may be on the construction of this Contract or on any matter or thing of whatsoever nature arising thereunder or in connection therewith, including any matter or thing left by this Contract to the discretion of the Project Manager, or the withholding by the Project Manager of any certificate to which the Contractor may claim to be entitled to or the measurement and valuation referred to in clause 23.0 of these conditions, or the rights and liabilities of the parties subsequent to the termination of Contract.

37.3 Provided that no arbitration proceedings shall be commenced on any dispute or difference where notice of a dispute or difference has not been given by the applying party within ninety days of the occurrence or discovery of the matter or issue giving rise to the dispute.

37.4 Notwithstanding the issue of a notice as stated above, the arbitration of such a dispute or difference shall not commence unless an attempt has in the first instance been made by the parties to settle such dispute or difference

amicably with or without the assistance of third parties. Proof of such attempt shall be required.

37.5 Notwithstanding anything stated herein the following matters may be referred to arbitration before the practical completion of the Works or abandonment of the Works or termination of the Contract by either party:

37.5.1 The appointment of a replacement Project Manager upon the said person ceasing to act.

37.5.2 Whether or not the issue of an instruction by the Project Manager is empowered by these Conditions.

37.5.3 Whether or not a certificate has been improperly withheld or is not in accordance with these Conditions.

37.5.4 Any dispute or difference arising in respect of war risks or war damage.

37.6 All other matters shall only be referred to arbitration after the completion or alleged completion of the Works or termination or alleged termination of the Contract, unless the Employer and the Contractor agree otherwise in writing.

37.7 The Arbitrator shall, without prejudice to the generality of his powers, have powers to direct such measurements, computations, tests or valuations as may in his opinion be desirable in order to determine the rights of the parties and assess and award any sums which ought to have been the subject of or included in any certificate.

37.8 The Arbitrator shall, without prejudice to the generality of his powers, have powers to open up, review and revise any certificate, opinion, decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision requirement or notice had been given.

37.9 The award of such Arbitrator shall be final and binding upon the parties.

SECTION IV – APPENDIX TO CONDITIONS OF CONTRACT

Attached in the Bills of Quantities.

SECTION IV – APPENDIX TO CONDITIONS OF CONTRACT

Attached in the Bills of Quantities.

Attached in the Bills of Quantities.

SECTION V - SPECIFICATIONS

Notes for preparing Specifications

- 1.0 Specifications must be drafted to present a clear and precise statement of the required standards of materials, and workmanship for tenderers to respond realistically and competitively to the requirements of the Employer and ensure responsiveness of tenders. The Specifications should require that all materials, plant, and other supplies to be permanently incorporated in the Works be new, unused, of the most recent or current models, and incorporating all recent improvements in design and materials unless provided otherwise in the Contract. Where the Contractor is responsible for the design of any part of the permanent Works, the extent of his obligations must be stated.
- 2.0 Specifications from previous similar projects are useful and may not be necessary to re-write specifications for every Works Contract.
- 3.0 There are considerable advantages in standardizing **General Specifications** for repetitive Works in recognized public sectors, such as highways, urban housing, irrigation and water supply. The General Specifications should cover all classes of workmanship, materials and equipment commonly involved in constructions, although not necessarily to be used in a particular works contract. Deletions or addenda should then adapt the General Specifications to the particular Works.
- 4.0 Care must be taken in drafting Specifications to ensure they are not restrictive. In the Specifications of standards for materials, plant and workmanship, existing Kenya Standards should be used as much as possible, otherwise recognized international standards may also be used.
- 5.0 The Employer should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in tender documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential tenderers.

The Employer should provide a description of the selected parts of the Works with appropriate reference to Drawings, Specifications, Bills of Quantities, and Design or Performance criteria, stating that the alternative solutions shall be at least structurally and functionally equivalent to the basic design parameters and Specifications.

Such alternative solutions shall be accompanied by all information necessary for a complete evaluation by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details. Technical alternatives permitted in this manner shall be considered by the Employer each on its own merits and independently of whether the tenderer has priced the item as described in the Employer's design included with the tender documents.

SECTION VI - DRAWINGS

SECTION VII - BILL OF QUANTITIES

Notes for preparing Bills of Quantities

1.0 The objectives of the Bills of Quantities are;

- (a) to provide sufficient information on the quantities of Works to be performed to enable tenders to be prepared efficiently and accurately; and
- (b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

2.0 The Bills of Quantities should be divided generally into the following sections:

(a) Preliminaries.

The preliminaries should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bill of Quantities and which are to be used for the measurement of any part of the Works.

The number of preliminary items to be priced by the tenderer should be limited to tangible items such as site office and other temporary works, otherwise items such as security for the Works which are primarily part of the Contractor's obligations should be included in the Contractor's rates.

(b) Work Items

- (i) The items in the Bills of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the Works may be grouped as a separate section in the Bill of Quantities.
- (ii) Quantities should be computed net from the Drawings, unless directed otherwise in the Contract, and no allowance should be made for bulking, shrinkage or waste. Quantities should be rounded up or down where appropriate.

- (iii) The following units of measurement and abbreviations are recommended for use.

<i>Unit</i>	<i>Abbreviation</i>	<i>Unit</i>	<i>Abbreviation</i>
cubic meter	m ³ or cu m	millimeter	mm
hectare	ha	month	mon
hour	h	number	nr
kilogram	kg	square meter	m ² or sq m
lump sum	sum	square millimeter	mm ² or sq mm
meter	m	week	wk
metric ton (1,000 kg)	t		

- (iv) The commencing surface should be identified in the description of each item for Work involving excavation, boring or drilling, for which the commencing surface is not also the original surface. The excavated surface should be identified in the description of each item for Work involving excavation for which the excavated surface is not also the final surface. The depths of Work should be measured from the commencing surface to the excavated surface, as defined.

(c) Day-work Schedule

A Day-work Schedule should be included if the probability of unforeseen work, outside the items included in the Bill of Quantities, is relatively high. To facilitate checking by the Employer of the realism of rates quoted by the tenderers, the Day-work Schedule should normally comprise:

- (i) a list of the various classes of labour, and materials for which basic Day work rates or prices are to be inserted by the tenderer, together with a statement of the conditions under which the Contractor will be paid for Work executed on a Day work basis; and
- (ii) a percentage to be entered by the tenderer against each basic Day work Subtotal amount for labour, materials and plant representing the Contractor's profit, overheads, supervision and other charges.

(d) Provisional Quantities and Sums

- (i) Provision for quantity contingencies in any particular item or class of Work with a high expectation of quantity overrun should be made by entering specific “Provisional Quantities” or “Provisional Items” in the Bill of Quantities, and *not* by increasing the quantities for that item or class of Work beyond those of the Work normally expected to be required. To the extent not covered above, a general provision for physical contingencies (quantity overruns) should be made by including a “Provisional Sum” in the Summary of the Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a “Provisional Sum” in the Summary of the Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises.
- (ii) Provisional sums to cover specialized works normally carried out by Nominated Sub Contractors should be avoided and instead Bills of Quantities of the specialised Works should be included as a section of the main Bills of Quantities to be priced by the Main Contractor. The Main Contractor should be required to indicate the name (s) of

the specialised firms he proposes to engage to carry out the specialized Works as his approved domestic sub-contractors. Only provisional sums to cover specialized Works by statutory authorities should be included in the Bills of Quantities.

(e) Summary

The Summary should contain a tabulation of the separate parts of the Bills of Quantities carried forward, with provisional sums for Day-work, for physical (quantity) contingencies, and for price contingencies (upward price adjustment) where applicable.

SECTION VIII – STANDARD FORM

- (i) Form of Invitation for Tenders
- (ii) Form of Tender
- (iii) Letter of Acceptance
- (iv) Form of Agreement
- (v) Form of Tender Security
- (vi) Performance Bank Guarantee
- (vii) Bank Guarantee for Advance Payment
- (viii) Qualification Information
- (ix) Tender Questionnaire
- (xi) Confidential Business Questionnaire
- (x) Statement of Foreign Currency Requirement
- (xi) Details of Sub-Contractors
- (x) Request for Review Form

FORM OF INVITATION FOR TENDERS

_____ *[date]*

To: _____ *[name of Contractor]*
_____ *[address]*

Dear Sirs:

Reference: _____ *[Contract Name]*

You have been prequalified to tender for the above project.

We hereby invite you and other prequalified tenderers to submit a tender for the execution and completion of the above Contract.

A complete set of tender documents may be purchased by you from _____

_____ *[mailing address, cable/telex/facsimile numbers].*

Upon payment of a non-refundable fee of Kshs _____

All tenders must be accompanied by _____ number of copies of the same and a security in the form and amount specified in the tendering documents, and must be delivered to

_____ *[address and location]*

at or before _____ *(time and date)*. Tenders will be opened immediately thereafter, in the presence of tenderers' representatives who choose to attend.

Please confirm receipt of this letter immediately in writing by cable/facsimile or telex.

Yours faithfully,

_____ Authorised Signature

_____ *Name and Title*

FORM OF TENDER

TO: UNIVERSITY OF EMBU

COMPLETION OF THE PROPOSED AUDITORIUM AND LECTURE CLASSROOM FOR THE UNIVERSITY OF EMBU

Dear Sir,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of Kshs. _____ *[Amount in figures]* Kenya Shillings _____ *[Amount in words]*
2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Project Manager's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
3. We agree to abide by this tender until 120 days from the date of submission, and it shall remain binding upon us and may be accepted at any time before that date.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this _____ day of _____ 20_____

Signature _____ in the capacity of _____

duly authorized to sign tenders for and on behalf of
_____ *[Name of bidder]*
of _____ *[Address of bidder]*

LETTER OF ACCEPTANCE

[letterhead paper of the Employer]

_____ [date]

To: _____
[name of the Contractor]

[address of the Contractor]

Dear Sir,

This is to notify you that your Tender dated _____
for the execution of _____
[name of the Contract and identification number, as given in the Tender documents] for the
Contract Price of Kshs. _____ [amount in figures] [Kenya
Shillings _____ (amount in words)] in accordance with the
Instructions to Tenderers is hereby accepted.

You are hereby instructed to proceed with the execution of the said Works in accordance
with the Contract documents.

Authorized Signature

Name and Title of Signatory

Attachment : Agreement

FORM OF AGREEMENT

THIS AGREEMENT, made the _____ day of _____ 20 _____
between _____ of [or whose
registered office is situated at] _____
(hereinafter called “the Employer”) of the one part AND
_____ of [or whose
registered office is situated at] _____
(hereinafter called “the Contractor”) of the other part.

WHEREAS THE Employer is desirous that the Contractor executes

_____ *(name and identification number of Contract)* (hereinafter called “the Works”) located
at _____ *[Place/location of the Works]* and the Employer has
accepted the tender submitted by the Contractor for the execution and completion of such
Works and the remedying of any defects therein for the Contract Price of
Kshs _____ *[Amount in figures]*, Kenya
Shillings _____ *[Amount in words]*.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.
 - (i) Letter of Acceptance
 - (ii) Form of Tender
 - (iii) Conditions of Contract Part I
 - (iv) Conditions of Contract Part II and Appendix to Conditions of Contract
 - (v) Specifications
 - (vi) Drawings
 - (vii) Priced Bills of Quantities
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter 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 therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the

times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The common Seal of _____

Was hereunto affixed in the presence of _____

Signed Sealed, and Delivered by the said _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

In the presence of (i) Name_____

Address_____

Signature_____

[ii] Name _____

Address_____

Signature_____

FORM OF TENDER SECURITY

WHEREAS(hereinafter called “the Tenderer”) has submitted his tender dated for the construction of
..... (name of Contract)

KNOW ALL PEOPLE by these presents that WE having our registered office at(hereinafter called “the Bank”), are bound unto(hereinafter called “the Employer”) in the sum of Kshs..... for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank this Day of20.....

THE CONDITIONS of this obligation are:

1. If after tender opening the tenderer withdraws his tender during the period of tender validity specified in the instructions to tenderers
Or
2. If the tenderer, having been notified of the acceptance of his tender by the Employer during the period of tender validity:
 - (a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the said date.

[date]

[signature of the Bank]

[witness]

[seal]

PERFORMANCE BANK GUARANTEE

To: _____ (*Name of Employer*) _____ (*Date*)
_____ (*Address of Employer*)

Dear Sir,

WHEREAS _____ (hereinafter called “the Contractor”) has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ (hereinafter called “the Works”);

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Kshs. _____ (*amount of Guarantee in figures*) Kenya Shillings _____ (*amount of Guarantee in words*), and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings _____ (*amount of Guarantee in words*) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

BANK GUARANTEE FOR ADVANCE PAYMENT

To: _____ *[name of Employer]* _____ *(Date)*
_____ *[address of Employer]*

Gentlemen,

Ref: _____ *[name of Contract]*

In accordance with the provisions of the Conditions of Contract of the above-mentioned Contract, We, _____ *[name and Address of Contractor]* (hereinafter called "the Contractor") shall deposit with _____ *[name of Employer]* a bank guarantee to guarantee his proper and faithful performance under the said Contract in an amount of Kshs. _____ *[amount of Guarantee in figures]* Kenya Shillings _____ *[amount of Guarantee in words]*.

We, _____ *[bank or financial institution]*, as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ *[name of Employer]* on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding Kshs _____ *[amount of Guarantee in figures]* Kenya Shillings _____ *[amount of Guarantee in words]*, such amount to be reduced periodically by the amounts recovered by you from the proceeds of the Contract.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between _____ *[name of Employer]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No drawing may be made by you under this guarantee until we have received notice in writing from you that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ *(name of Employer)* receives full payment of the same amount from the Contract.

Yours faithfully,

Signature and Seal _____

Name of the Bank or financial institution _____

Address _____

Date _____

Witness: Name: _____

Address: _____

Signature: _____

Date: _____

QUALIFICATION INFORMATION

1. Individual Tenderers or Individual Members of Joint Ventures

- 1.1 Constitution or legal status of tenderer (attach copy or Incorporation Certificate);

Place of registration: _____

Principal place of business _____

Power of attorney of signatory of tender _____

- 1.2 Total annual volume of construction work performed in the last five years

Year	Volume	
	Currency	Value

- 1.3 Work performed as Main Contractor on works of a similar nature and volume over the last five years. Also list details of work under way or committed, including expected completion date.

Project name	Name of clientType of work Value of performed and Contract and contact person year of completion		
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- 1.4 Major items of Contractor's Equipment proposed for carrying out the Works. List all information requested below.

Item of Equipment	Description, Make and age (years)	Condition(new, good, poor) and number available	Owned, leased (from whom?), or to be purchased (from whom?)
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
(etc.)			

- 1.5 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.

Position	Name	Years of experience (general)	Years of experience in proposed position
Project Manager			
(etc.)			

- 1.6 Financial reports for the last five years: balance sheets, profit and loss statements, auditor's reports, etc. List below and attach copies.

- 1.7 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of supportive documents.

- 1.8 Name, address and telephone, telex and facsimile numbers of banks that may provide reference if contacted by the Employer.

- 1.9 Statement of compliance with the requirements of Clause 1.2 of the Instructions to Tenderers.

- 1.10 Proposed program (work method and schedule) for the whole of the Works.

2 Joint Ventures

- 2.4 The information listed in 1.1 – 1.10 above shall be provided for each partner of the joint venture.

- 2.5 The information required in 1.11 above shall be provided for the joint venture.

- 2.6 Attach the power of attorney of the signatory(ies) of the tender authorizing signature of the tender on behalf of the joint venture
- 2.7 Attach the Agreement among all partners of the joint venture (and which is legally binding on all partners), which shows that:
- a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
 - b) one of the partners will be nominated as being in charge, authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture; and
 - c) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of tenderer
.....
2. Full address of tenderer to which tender correspondence is to be sent (unless an agent has been appointed below)
.....
3. Telephone number (s) of tenderer
.....
4. Telex address of tenderer
.....
5. Name of tenderer's representative to be contacted on matters of the tender during the tender period
.....
6. Details of tenderer's nominated agent (if any) to receive tender notices. This is essential if the tenderer does not have his registered address in Kenya (name, address, telephone, telex)
.....
.....

Signature of Tenderer

Make copy and deliver to: _____ (*Name of Employer*)

CONFIDENTIAL BUSINESS QUESTIONNAIRE FORM

You are requested to give the particulars indicated in Part 1 and either Part 2(a), 2(b) or 2 (c) whichever applied to your type of business

You are advised that it is a serious offence to give false information on this form

Part 1 – General:

Business Name
 Location of business premises.
 Plot No..... Street/Road
 Postal Address Tel No. Fax E mail
 Nature of Business
 Registration Certificate No.
 Maximum value of business which you can handle at any one time – Kshs.

 Name of your bankers Branch

	Part 2 (a) – Sole Proprietor Your name in full Age Nationality Country of origin • Citizenship details •																					
	Part 2 (b) Partnership Given details of partners as follows: <table border="1"> <thead> <tr> <th>Name</th><th>Nationality</th><th>Citizenship Details</th></tr> </thead> <tbody> <tr> <td>Shares</td><td></td><td></td></tr> <tr> <td>1.</td><td></td><td></td></tr> <tr> <td>2.</td><td></td><td></td></tr> <tr> <td>3.</td><td></td><td></td></tr> <tr> <td>4.</td><td></td><td></td></tr> </tbody> </table>	Name	Nationality	Citizenship Details	Shares			1.			2.			3.			4.					
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	Part 2 (c) – Registered Company Private or Public State the nominal and issued capital of company- Nominal Kshs. Issued Kshs. Given details of all directors as follows <table border="1"> <thead> <tr> <th>Name</th><th>Nationality</th><th>Citizenship Details</th></tr> </thead> <tbody> <tr> <td>Shares</td><td></td><td></td></tr> <tr> <td>1.....</td><td></td><td></td></tr> <tr> <td>2.</td><td></td><td></td></tr> <tr> <td>3.</td><td></td><td></td></tr> <tr> <td>4.</td><td></td><td></td></tr> <tr> <td>5</td><td></td><td></td></tr> </tbody> </table>	Name	Nationality	Citizenship Details	Shares			1.....			2.			3.			4.			5		
Name	Nationality	Citizenship Details																				
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3.																						
4.																						
5																						
Date Signature of Candidate																						

- If a Kenya Citizen, indicate under “Citizenship Details” whether by Birth, Naturalization or registration.

STATEMENT OF FOREIGN CURRENCY REQUIREMENTS

(See Clause 23] of the Conditions of Contract)

In the event of our Tender for the execution of _____
_____ (*name of Contract*) being accepted, we would
require in accordance with Clause 21 of the Conditions of Contract, which is
attached hereto, the following percentage:

(Figures)..... (Words).....

of the Contract Sum, (Less Fluctuations) to be paid in foreign currency.

Currency in which foreign exchange element is required:

.....

Date: The Day of 20.....

Enter 0% (zero percent) if no payment will be made in foreign currency.

Maximum foreign currency requirement shall be _____ (percent) of the
Contract Sum, less Fluctuations.

(Signature of Tenderer)

DETAILS OF SUB-CONTRACTORS

If the Tenderer wishes to sublet any portions of the Works under any heading, he must give below details of the sub-contractors he intends to employ for each portion.

Failure to comply with this requirement may invalidate the tender.

(1) Portion of Works to be sublet:

(i) Full name of Sub-contractor
and address of head office:
.....

(ii) Sub-contractor's experience
of similar works carried out
in the last 3 years with
Contract value:
.....
.....

(2) Portion of Works to sublet:

(i) Full name of sub-contractor
and address of head office:
.....
.....

(ii) Sub-contractor's experience
of similar works carried out
in the last 3 years with
contract value:
.....

[Signature of Tenderer)

Date

LETTER OF NOTIFICATION OF AWARD

Address of Procuring Entity

To: _____

RE: Tender No. _____

Tender Name _____

This is to notify that the contract/s stated below under the above mentioned tender have been awarded to you.

1. Please acknowledge receipt of this letter of notification signifying your acceptance.
2. The contract/contracts shall be signed by the parties within 30 days of the date of this letter but not earlier than 14 days from the date of the letter.
3. You may contact the officer(s) whose particulars appear below on the subject matter of this letter of notification of award.

(FULL PARTICULARS) _____

SIGNED FOR ACCOUNTING OFFICER

REPUBLIC OF KENYA
PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO.....OF.....20.....

BETWEEN

.....APPLICANT

AND

.....RESPONDENT (*Procuring Entity*)

Request for review of the decision of the..... (*Name of the Procuring Entity*) of
.....dated the...day of20.....in the matter of Tender No.....of
.....20...

REQUEST FOR REVIEW

I/We.....,the above named Applicant(s), of address: Physical
address.....Fax No.....Tel. No.....Email, hereby request the Public
Procurement Administrative Review Board to review the whole/part of the above mentioned
decision on the following grounds , namely:-

- 1.
- 2.
- etc.

By this memorandum, the Applicant requests the Board for an order/orders that: -

- 1.
- 2.
- etc

SIGNED(Applicant)

Dated on.....day of/...20...

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on day of
.....20.....




SIGNED
Board Secretary



COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU



BILLS OF QUANTITIES

<u>Client:</u>		<u>Project Quantity Surveyor:</u>	
	Vice Chancellor University of Embu P. O. Box 6 - 60100 Embu.		Qs. HuriaKarugu Reg. No. Q840 P. O. Box 6 - 60100 Embu.
<u>Project Architect:</u>		<u>Project Engineer:</u>	
	Arch. Michael Kyeva Reg. No. A1605 P. O. Box 6 - 60100 Embu.	Mirsa and Associates P. O. Box 54904 - 00200 Nairobi.	

MARCH 2021

**COMPLETION OF THE PROPOSED AUDITORIUM FOR THE
UNIVERSITY OF EMBU**

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COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF
EMBU

SPECIAL NOTES

1. This is a FIXED PRICE CONTRACT and NO PRICE FLUCTUATIONS will be allowed.
2. The contractor's attention is drawn to the fact that the site is located in a learning institution and should endeavor to reduce activities that may disrupt normal learning process.
3. The contractor's attention is drawn to the fact that the project is done partially and should visit the site before pricing these bills
4. Rates must be inclusive of all taxes as required by the Government of Kenya including VAT at current rate. Tenderers are therefore strongly advised to price this tender inclusive of VAT at current rate. The PC and Provisional Sums are also inclusive of VAT and should not be adjusted at all.
5. The Contractor is required to check the numbers of the pages of these Bills of Quantities against the contents stated on the Table of Contents and should he find missing, in duplicate or indistinct, he must inform the Quantity Surveyor as described in this document at once and have the same rectified.
6. Should the Contractor be in doubt about the precise meaning of any item or figure for any reason whatsoever, he must inform the Architect/ the Quantity Surveyor in order that the correct meaning may be decided before the date of submission of tenders.
7. No liability will be accepted nor any claim allowed in respect of errors in the Contractor's tender due to mistakes in these Bills of Quantities which should have been rectified in the manner described above.

(03) GENERAL SPECIFICATIONS

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(03) GENERAL SPECIFICATIONS**EXCAVATION AND EARTHWORK**

- A. The Contractor shall comply with the requirement of the following codes of Practice.

Codes of Practice

- | | | |
|----|--|-----------|
| B. | Site investigations | C.P. 2001 |
| C. | Earthworks | C.P. 2003 |
| D. | Foundations | C.P. 2004 |
| E. | Protection of building against water from the ground | C.P. 102 |

Note: The Contractor's attention is drawn to section "D" of the Standard Method of Measurements.

- F. The Contractor shall visit the site and ascertain for himself the nature of the soil to be excavated. The rates for excavation shall include excavation in any type of material or made up ground excluding rock as defined below. No claim will be allowed for want of knowledge in this respect.
- G. Setting out shall be approved before work is commenced.
- H. Generally clear the site of all shrubs and trees, grub up roots and fill the holes with red earth. Trees and shrubs shall only be cut as directed on site, and any damage caused to such trees and shrubs not directed to be made good at the Contractor's expense.
- I. Excavation for bases and strip foundation shall be to the widths, depth, and levels shown on the Architect's and/or Engineer's drawings. Rates shall be deemed to include for whatsoever alternative method the Contractor chooses to adopt.
- J. The Engineer shall be called to inspect the completed excavations. The Contractor shall keep all excavations dry and free from rain or other surface water.
- K. Excavations made below required levels shall be filled with Mass Concrete (1:3:6) at the Contractor's expense.
- L. Rates for filling or disposal of earth shall include for any double handling, except that resulting from a written order by the Architect and/or Engineer to deposit earth in temporary soil heaps pending its final disposal. Filling shall be in approved filling material to required levels in specified layers carefully rammed and consolidated. Disposal of all surplus excavated material shall be as instructed and rates shall include for loading and wheeling off the site to a pit to be provided by the Contractor.

(03) GENERAL SPECIFICATIONS**EXCAVATION AND EARTHWORK (CTD.)**

- A. Hardcore shall be stone, coarse gravel or other inert material yielding, when thoroughly consolidated, a freely porous bed and blinded with fine hardcore, ashes and similar materials shall include for all temporary retaining boards and for rolling with an 8-10 tonne roller unless otherwise described, in layers not exceeding 150mm deep.

- B. Anti-termite treatment shall be fine sprayed using an approved environmentally safe insecticide.

A guarantee of ten (10) years minimum shall be supplied.

- C. The Contractor shall at his own expense and before commencing excavations ascertain in writing from the Postal and Power Authorities, Municipal Council and other public bodies, companies and persons who may be affected, the position and depths of their respective ducts, cables, mains, or piles and appurtenances.

The Contractor shall there upon search and locate such services in order to appropriately prop, protect, underpin, alter, divert, restore and make good all pipes, cables or ducts, poles or wires and their appurtenances disturbed or damaged during the progress of the works or consequent thereof.

Such services as required to be removed or altered by virtue of the situation of the permanent work and not the manner in which the work is carried out, shall be so removed or altered at the expenses of the Employer.

- D. Rock excavation shall be deemed to mean excavating in such hard material as will necessitate the use of wedges or compressed air equipment or other special plant.

- E. Blasting will only be allowed with the prior express permission of the Architect and/or Engineer.

All blasting operations shall be carried out at the Contractor's sole risk and cost in accordance with any Government regulations in force for the time being, and any special regulations laid down by the Architect and/or Engineer governing the use and storage of explosives.

- F. 'Rates are to include also for destroying any white ants' nests found in the vicinity of the buildings, destroying queen ants, depositing cyanide lumps in hole and tunnels and filling with hardcore and murrum well rammed and sealed.

(03) GENERAL SPECIFICATIONS

CONCRETE WORK

GENERAL

Definitions

- A. The term "ARCHITECT" or "ENGINEER" wherever used hereinafter shall have the same meaning as stated in the Preliminaries.
- B. The Engineer is authorised to act on behalf of the Architect in all relevant matters in the contract price.
- C. The terms "APPROVED", "DIRECTED" AND "SELECTED" wherever used hereinafter shall mean upon approval, direction and selection of or the Engineer, in writing, at their absolute discretion.
- D. The Engineer is authorised to act on behalf of the Architect after due consultations in all relevant matters in the contract approvals.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS****GENERAL****Authoritative Standards and Codes of Practice**

The following authoritative standards are referred to hereinafter:

	<u>B.S.</u>	<u>Date</u>	<u>Title</u>
A.	12	1989	Portland Cement (Ordinary and rapid hardening).
B.	812	1967	Methods for sampling and testing of mineral aggregates, sand and fillers.
C.	882	1983	Aggregates from natural sources for concrete (including granolithic).
D.	1881	1970/71	Methods of testing concrete.
E.	5328	1981	Methods for specifying concrete
F.	2499	1973	Hot applied joint sealants for concrete pavements.
G.	3148	1980	Tests for water making concrete.
H.	3921	1985	Clay bricks
I.	4251	1974 (1980)	Truck type concrete mixers.
J.	4449	1988	Carbon steel bars for the reinforcement of concrete.
K.	4466	1981	Bending dimensions and scheduling of bars for the reinforcement of concrete (old edition).
L.	4483	1985	Steel fabric for the reinforcement of concrete.
M.	5075		Concrete Admixtures.
N.	6073:Pt.1	1981	Precast concrete blocks.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****Authoritative Standards and Codes of Practice (ctd.)**

	<u>B.S.</u>	<u>Date</u>	<u>Title</u>
A.	8110:Pt.1 & 2	1985	The structural use of concrete.
B.	5950		The use of structural steel in buildings.
C.	5400:Pt.5	1979	Steel, concrete and composite Bridge.
D.	8007	1987	The structural use of concrete for retaining aqueous liquids.

American Society for Testing and Materials Standards as published by the American Society for Testing and Materials, 1916 Race St., Philadelphia pa. 19103 U.S.A. (Abbreviated in Test to ASTM).

	<u>ASTM</u>	<u>Date</u>	<u>Title</u>
E.	C88	73	Soundness of aggregates by use of Sodium sulphate
F.	C234	71	Comparing concrete on the Basis of the Bond developed with Reinforcing steel.
G.	C289	71	Potential Reactivity of Aggregates (Chemical Method).

The following codes of practice are referred to hereinafter:

British Standard Codes of Practice published by the Council for Codes of practice British Institution, 2 Park Street, London W1A 2BS, England (abbreviated in text to C.P).

	<u>C.P.</u>	<u>Date</u>	<u>Title</u>
H.	CP.117:pt.1:	1965	Composite construction in structural steel and concrete
I.	BS.3110	1972	Safe use of cranes (mobile cranes, tower cranes and derrick cranes)

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****Authoritative Standards and Codes of Practice**

- A. Should the contractor wish to substitute any of the authoritative standards or code of practice for any listed above he should submit details of any such together with two complete copies of the same to the Engineer for approval with his tender. Approval will only be given to the use of such standard where the Engineer considers the proposed standard or code of practice will give a quality of finished work equal to or better than specified standard.
- B. All in situ concrete shall be in accordance with BS 8110 except where superceded by this specification.
- C. All precast concrete shall be in accordance with BS 8110 except where superceded by this specification.

NOTE: The Contractor's attention is drawn to section 'F' of the standard method of measurement of building works.

Samples and Materials Generally

- D. The Contractor shall, when required, provide for approval samples of all materials to be incorporated in the works. Such samples when approved shall be retained by the Engineer and shall form the standard for all such materials incorporated. No deliveries to the site should commence before such approval is obtained.
- E. No materials of any description will be used without prior sanction by the engineer and any condemned as unfit for use in the works must be removed immediately from site by and without recompense to the Contractor.

Test Certificate

- F. The Contractor shall provide the Engineer with three copies of all test reports or certificates that are or may be required by this Specification.

Suppliers

- G. As soon as possible after the contract has been awarded and before finalising any order for materials to be incorporated in the works, the contractor shall submit the names of any proposed suppliers to the Engineers for approval.
- H. Each supplier must be willing to admit the Engineer, or his representative, to his premises during working hours for the purposes of obtaining samples of the materials in question.
- I. The information regarding the names of the suppliers may be submitted at different times, as may be convenient, but no sources of supply will be changed without proper approval.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)**

Drawings

- A. The Contractor should check all drawings carefully before any part of the work is carried out. Any discrepancy should be reported to the Engineer immediately for his clarification. The contractor shall be responsible for any costs arising out of his failure to report such discrepancies to the Engineer, in good time.
- B. The Contractor shall ensure that he has all relevant drawings and bar bending schedules for any part of the works, well in advance of the execution of that part of the works. Any costs arising out of the contractor's failure to ask for related drawings, or bending schedules in writing, in good time, shall be the responsibility of the contractor. The same shall hold true even if the contractor has submitted a programme of works at commencement.

C. **Bending Schedules**

The Engineer will issue bar bending schedules in accordance with B.S. 4466 (1981). The contractor should check these against the drawings before any cutting; bending or construction involving the schedules is started. Any discrepancy should be reported to the Engineer immediately for his clarification. The contractor shall be responsible for any delays or additional work caused solely by his failure to check the schedules.

Approval

- D. Well before construction commences the contractor shall supply to the Engineer for his approval details of his proposed layouts of concreting plant and on site workshop, details of formwork system and the construction devises e.g., cranes, chutes, scaffolding, which he proposes using for the structural work. The information is to be sufficiently detailed to enable the Engineer to approve or otherwise.
- E. The Contractor should note that further approvals are required by the specification before construction starts. The contractor is wholly responsible for obtaining these approvals and no claim for delays will be entertained due to the contractor's failure to obtain such approvals in adequate time.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****MATERIALS**

Cement

- A. Cement, unless otherwise specified, shall be ordinary Portland cement complying with B.S. 12.
- B. The Contractor shall obtain a manufacturer's certificate of test in accordance with the appropriate standard for each consignment of cement delivered to the site and shall immediately forward copies of the same to the Engineer for his retention.
- C. Notwithstanding the manufacturer's certificate the Engineer may require that any cement delivered to the site be sampled and tested. Any batch of cement so tested which fails to comply with this specification will be rejected.
- D. All cement unless delivered in bulk, shall be stored in a weatherproof shed, the floor of which shall be raised at least 150mm above the ground to allow free air circulation. Cement delivered in bulk shall be stored in a weatherproof silo. All cement shall at all times be protected from deterioration.
- E. All cement shall be delivered to the site in the original sealed bags of the manufacturer or in approved bulk containers.
- F. Each consignment of cement shall be kept separate. Identified and used in order of delivery. No two types of cement shall be used in combination.
- G. Any cement which upon inspection is considered by the Engineer to have deteriorated in any way will be rejected.

Aggregate for Concrete

- H. Any aggregate for concrete shall, unless otherwise specified, be aggregate from natural sources complying with B.S.882. Additionally, the flakiness index when determined by the sieve method described in B.S.812 shall not exceed 35 for any size of concrete aggregate. Fine aggregate within or finer than zone 4 of B.S. 882 shall not be used.
- I. When tested for soundness in accordance with ASTM Test C88-73 the loss of weight after 5 cycles shall not exceed 5% (percent) for any aggregate.
- J. Aggregate which is potentially reactive when tested in accordance with ASTM Test C.289-71 for the alkali aggregate reaction shall not be used? The Standard for acceptance being that test results shall plot to the left of the solid line which is shown in Figure 2 of the test standard.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****MATERIALS (CTD)****Aggregate for Concrete (ctd.)**

- A. Well before any concreting work, the contractor shall forward to the Engineer for approval details of his proposed source of supply of aggregates giving the aggregate group classification and typical physical properties as required by B.S.882.
- B. The Contractor shall provide the Engineer with a certificate for his retention showing that all aggregates regularly comply with the requirements of this specification.
- C. The Engineer may require that any aggregate be tested for soundness in accordance with ASTM Test C88-73 before giving approval to any proposed source of supply.
- D. The Engineer may require that any aggregate be tested for potential reactivity in accordance with ASTM Test C.289-71
- E. Notwithstanding any certificate of compliance, the Engineer may at any time require that any aggregate delivered to the site be sampled and tested. Any aggregate so tested which fails to comply with this specification will be rejected.
- F. Coarse aggregate shall be delivered ready screened or screened on site into separate nominal single sizes within limits given in B.S.882
- G. Aggregate of different sizes or typical shall be stored in different hoppers or different stockpiles on approved well drained paved areas which shall be separated from each other. Stockpiles shall be protected against contamination from any source.
- H. Any aggregate which has become contaminated or which does not conform to the above requirements may be rejected by the Engineer.

Water for use with cement.

- I. Water for use in mixing with cement or for curing concrete shall be from an approved source, clean, fresh and free from organic and other deleterious matter.
- J. The Engineer may require that any water sampled and tested by the method given in B.S.3148. Water failing the criteria given in the Appendix to B.S. 3148 will be rejected.
- K. Water for use in mixing with cement shall neither be hotter than 25deg. C (77deg.F) - or colder than 5deg. (41deg. F) at the time of mixing.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****MATERIALS (CTD.)****Steel Rod Reinforcement****A. Steel Rod Reinforcement shall consist of:**

- a) Mild steel bars complying with B.S 4449
- b) Hot rolled high yield bars complying with B.S.4449
- c) Cold worked high yield bars complying with B.S.4449 as described in the drawings.

Where cold worked high yield bars are to be used these shall be square twisted bars formed by a torsion-controlled process.

- B. The contractor shall obtain a manufacturer's certificate of test in accordance with the appropriate standard for each steel batch relating to reinforcement delivered to site and shall immediately forward copies of the same to the Engineer for his retention.
- C. Where hot rolled high yield deformed bars are to be used, the results of bond tests to ASTM 234-71 using concrete of the same quality as that to be used in the works, shall be forwarded to the Engineer.
- D. Notwithstanding the manufacturer's certificate, the Engineer may require that any reinforcement delivered to the site be sampled and tested. Any reinforcement so sampled and tested which fails to comply with this specification will be rejected.
- E. All reinforcement shall be delivered to the site either as straight bars or ready cut and bent to shape.
- F. All reinforcement shall be stored in clean conditions in an orderly manner to the satisfaction of the Engineer such that the batch to which each piece belongs can be readily identified.

Steel Fabric Reinforcement

- G. Steel fabric reinforcement shall be electrically cross welded steel mesh reinforcement complying with B.S.4483.

Tying Wires

- H. Tying wires for fixing reinforcement shall be either:
 - a) No. 16 gauge soft annealed iron wire.
 - or
 - b) No. 18 gauge stainless steel wire.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****MATERIALS (CTD.)****Spacers**

- A. Spacer blocks required for ensuring that the reinforcement is correctly positioned shall be as small as possible consistent with their purpose, of a shape acceptable to the Engineer, and designed so that they will not overturn when the concrete is placed, unless otherwise approved they shall be made of concrete with 10mm maximum aggregate size and mix proportions to produce the same strength as the adjacent concrete S.W.G. 18 wire shall be cast in the block for the purpose of tying it to the reinforcement.
- B. Space blocks of concrete shall not be used until at least 7 days old.
- C. No admixtures or cement containing additives shall be used in concrete unless specified or approved by the Engineer. Such approval will not be given unless in the Engineer's opinion specific benefit to the density or quality of the concrete will result.

D. **Wall Ties**

Wall ties between concrete and adjoining block or brick walling shall be "Abbey" slots and anchors as supplied Abbey Building Suppliers Limited. or similar approved. Wall ties must be provided at concrete and block or brick wall butting surface.

Joint Fillers

- E. Joint fillers unless otherwise stated shall be "Flexcell" as manufactured by Expandite Ltd. or similar approved and placed in accordance with the manufacturer's instructions.

Joint Sealants

- F. Shall be as described in the drawings and approved by the Engineer. Sealants shall be used strictly in accordance with the manufacturer's instructions.
- G. Poured joint sealing compound shall be a hot poured rubber bitumen compound complying with the requirement of B.S.2499.

Water stops

- H. Water stops unless otherwise stated shall be "Sika water bar" as manufactured by Sika International or similar approved and placed and jointed in accordance with the manufacturer's instructions. In addition, the method of holding water bar in position, while concreting, must be to the approval of the Engineer.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT****Workmanship**

- A. Reinforcement shall be bent accurately in accordance with B.S. 4466 to the shapes and dimensions shown in the schedules. All reinforcement shall be at temperatures in range of 5deg.C and 100deg. C.
- B. Cold worked or any high yield bars shall not be straightened or bent again once having been bent. When it is necessary to bend mild steel reinforcement already cast in the concrete the internal radius of such bends shall be not less than twice the diameter of the bar.
- C. No welding of reinforcement shall be carried out without the approval of the Engineer.
- D. All reinforcement shall at the time of concreting be free from mud, oil mortar droppings, loose rust, paint, grease, mill scale or other deleterious matter. Reinforcement still 'blue' from the mill shall not be used.
- E. All reinforcement shall be fixed in the position shown on the drawings by adequate use of spacers, tying wires, chairs, stools, etc. and shall be so maintained during the concreting operations.
- F. Lap in all reinforcement shall be where indicated on the drawings or approved by the Engineer. Unless otherwise indicated the minimum lap length for rod reinforcement shall be 40 diameters for mild steel and 50 diameter for high tensile twisted bars.
- G. A steel-fixer shall be in attendance at all times when concreting is in progress to correct any errors, omissions or movement in the reinforcement.
- H. In severe heat conditions reinforcement shall be shaded from direct sunlight and hosed down with clean water prior to concreting to keep the reinforcement below 25deg.C (77deg.F).
- I. Notwithstanding any inspections, approvals regarding reinforcement, it shall be the contractor's sole responsibility to ensure that the reinforcement complies exactly with the details on the Drawings or Schedule or other written instructions by the Engineer.

Composite floor slabs

- J. Concrete hollow pots for use in the composition floor slabs are to be of the sizes required as shown on the drawings and with 25mm wall thickness and are to be true to shape, free from cracks or distortion of adequate strength to support the concrete during placing and consolidation by vibration. Stocks are to be manufactured in accordance with the procedure specified in B.S.2028 and to be of mix not weaker than 1:4:8 cement; sand; stone using maximum 10mm size aggregate. Samples must be approved before incorporation into the works.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT (CTD)****Composite floor slabs (ctd)**

- A. Concrete hollow pots are to be cured for at least 28 days before use on site. During the first seven days of curing, pots are to be kept permanently damp and protected from exposure to sun and wind.
- B. Hollow clay pots where indicated for use in the composite floor slabs are to be the sizes shown on the drawings and to be of adequate strength to support the concrete during placing and consolidation by vibration. They shall be obtained from an approved manufacturer. Before any orders are placed, at least 6 sample clay blocks shall be provided for the approval of the Engineer. Any clay blocks subsequently delivered to site which in the opinion of the Engineer are not of equal standard to the approved samples shall be rejected.
- C. Rejected pots shall immediately be removed from site and shall not be used in the works. Clay blocks are to be fully cured before delivery or use on site.
- D. Defective or damaged pots are to be removed immediately from site.
- E. The hollow pot floor construction is generally to be as shown on the Engineer's drawings.
- F. Care shall be taken in planning pots to ensure that they are set out in accordance with the details shown on the Drawings and that they run truly in line without encroaching on the width of the insitu ribs.
- G. The open ends of hollow pots, if adjacent to concrete to be placed insitu, are to be plugged or stopped to prevent the concrete from flowing into the void and the contractor is to include for this in his prices.
- H. The contractor should note that slip tiles are not to be used to the soffit of ribs and he is to take this into consideration in pricing the items of formwork to the soffit of hollow pot floor construction.
- I. Before concreting is carried out the pots are to be thoroughly wetted.
- J. Care should be taken during concreting that the width of ribs between the rows of pots and the solid insitu concrete shown on the Drawings adjacent to stopping beams is not encroached upon by the pots.
- K. Where holes for service occur, the necessary holes or pockets shall be accommodated by replacing of a hollow pot by insitu concrete or the widening of a rib.
- L. Prices for such holes through hollow pots slab construction are to include for the re-arrangement or substitution of the hollow pot with solid concrete or the widening of a rib.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT (CTD)****Composite floor slabs (ctd)**

- A. The concrete topping shall be poured at the same time as the ribs between hollow pots.
- B. Reinforcement shall be positioned accurately with the specified cover in accordance with the Drawings and using the particular spacer blocks as previously described.
- C. Spacer blocks shall be provided at no more than 1.2m centres.
- D. Care must be taken during concreting that the reinforcement is not displaced.

Composite Construction of Beams and Columns

- E. The contractor shall provide a method statement for construction of concrete encased steel columns and beams. Notwithstanding the Engineer's approval of this method statement, the responsibility of producing workmanship of the specified quality shall rest entirely with the contractor. In addition the contractor shall construct a sample of a concrete encased column and beam, on site, in accordance with the method statement for approval. If approved, all composite construction for the works shall be of a similar quality. The contractor should allow for hoisting of steel beams and columns in his rates.
- F. The contractor shall maintain on site for the duration of the contract, all equipment required for modifications to 'in-position' steel beams and columns.
- G. The contractor is to note that steel grade 43 shall be used in composite beams steel grade 50 will be used in composite columns.
- H. All connections of steel beams to columns and column splice connection details shall be as specified on the structural drawings.

FORM WORK**Definition**

- I. "Forms falsework or shuttering" shall include all temporary moulds forming the concrete to the required shape together with any special lining that may be required to produce the concrete finish specified.
- J. "Falsework or Centering" shall consist of furnishing, placing and removal of all temporary construction such as framing, props and struts required for the support of forms.
- K. All timber for formwork, falsework and centering shall be sound wood, well seasoned and free from loose knots, shakes, large cracks, warping and other defects. Before use on the work, it shall be properly stacked and protected from injury from any source. Any timber which becomes badly warped or cracked, prior to the placing of concrete, shall be rejected.

CONCRETE WORK SPECIFICATIONS (CTD)

(03) GENERAL SPECIFICATIONS**REINFORCEMENT (CTD)****Form Work (ctd)**

- A. If the contractor proposes to use steel shuttering, he shall submit to the Architect/ Engineer dimensioned drawings of all the component parts, and give details of the manner in which he proposes to assemble or use them. Steel shuttering will only be permitted if it is sturdy in construction and if the manner of its use is approved by the Architect/Engineer.
- B. Struts and props shall, where required by the Architect, be fitted with double hardwood wedges or other approved devices so that the moulds may be adjusted as required and eased gradually when required. Wedges shall be spiked into position and any adjusting devices locked before the concrete is cast.
- C. All forms shall be wood or metal and shall be built grout-tight and of sufficient rigidity to prevent distortion due to the pressure of the concrete and other loads incident to the construction operations. Form shall be constructed and maintained so as to prevent warping and the opening of joints due to shrinkage of the timber.
- D. All formwork shall be approved by the Architect/Engineer before concrete is placed within it. The contractor shall if required by the Architect provide the latter with copies of his calculations of strength and stability of the formwork or falsework but notwithstanding the Engineer's approval of these calculations, nothing shall relieve the contractor of his responsibilities for the safety or adequacy of the formwork.

Falsework and centering

- E. Detailed plans for falsework or centering shall be supplied by the contractor to the Architect at least 14 days in advance of the time the contractor begins construction of the falsework. Notwithstanding the approval of the Architect of any designs for falsework submitted by the Contractor, the Contractor shall solely be responsible for the safety and adequacy of the falsework or centering.
- F. All falsework shall be constructed to provide the necessary rigidity and to support the loads from the weight of green concrete and shutting and incidental construction loads.
- G. Falsework or centering shall be founded upon a solid footing safe against undermining and protected from softening. Falsework which cannot be founded on satisfactory footings shall be supported on piling which shall be spaced driven and removed in a manner approved by the Architect. The Architect may require the contractor to employ screw jacks, or hard wood wedges to take up any settlement in the formwork either before or during the placing of concrete.
- H. Falsework shall be set to give the finished structure the required grade and camber shown on the Drawings.

(03) GENERAL SPECIFICATIONSCONCRETE WORK SPECIFICATIONS (CTD)REINFORCEMENT (CTD)Form of Construction Joints (ctd)

- A. Where permanent or temporary joints are to be made in horizontal or inclined members, stout stopping off boards shall be securely fixed across the mould to form a grouting joint. The form of the permanent construction joints shall be as shown on the Drawings.
- B. Where reinforcement or water stops pass through the face of construction joint the stopping off boards shall be drilled so that the bars or water stop can pass through or the board shall be made in sections with a half round indentation in the joint faces for each bar so that when placed, the board is a neat and accurate fit and not grout leaks from the concrete through the bar holes, joints, or around the water stops.
- C. The forms shall be restrained and unyielding and shall be so designed that the finished concrete will conform to the proper dimensions and contours. The design of the forms shall take into account the effect of vibration of concrete as it is placed.
- D. All sharp edges inside the forms shall be provided with 25mm by 25mm triangular fillets, unless otherwise shown on the drawings or directed by the Architect.
- E. Openings for the inspection and cleaning of the inside of shuttering for walls, piers and columns shall be formed in such a way that they can be closed conveniently before commencing to concrete.
- F. When concrete is to be deposited to a steeper slope than 15deg. to the horizontal, top forms shall be used to enable the concrete to be properly compacted.
- G. Form clamps tie bolts and anchors shall be used to fasten forms. The use of wire ties to hold forms in position during placing of concrete will not be permitted. Tie bolts and clamps shall be positive in action and of sufficient strength and number to prevent spreading or springing of the forms. They shall be of such type that no metal part shall be left within the specified concrete.
- H. The cavities shall be filled with grout or mortar and the surface left sound, smooth, even and uniform in colour. All forms for outside surfaces shall be constructed with stiff wales at right angles to the studs and all form clamps shall extend through and fasten such wales.
- I. The shapes, strength, rigidity, water tightness and surface smoothness of re-used forms shall be maintained at all times. Any warped or bulged timber must be replaced. Forms which are unsatisfactory in any respect shall not be re-used.
- J. All forms shall be treated with approved mould or similar oil or be soaked with water immediately before placing concrete to prevent adherence of concrete. Any materials which adhere to or discolour concrete shall not be used.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT (CTD)****Form of Construction Joints C'td**

- A. All forms shall be set and maintained true to the line designed until the concrete is sufficiently hardened. Forms shall remain in place for periods which shall be as specified hereinafter. When forms appears to be unsatisfactory in any way, either before or during the placing of concrete, the Architect shall order the work stopped until the defect have been corrected.

Release Agents

- B. Only approved chemical release agents, mould creams (emulsions of water in oil) or oils containing a proportion of surfactant not exceeding 2% will be permitted. Water soluble emulsion and oils without surfactant shall not be used. Oil based release agents shall be applied at a ratio of 7m²/litre 24 hours in advance of concreting, preferably by spray or roller. Chemical release agents shall be applied in accordance with the manufacturers' recommendations.
- C. The greatest care must be taken that all sawdust shavings, chips and other debris is removed from the formwork before concrete is placed in position and the necessary arrangements must be made by leaving out a board in the bottom of the formwork or otherwise as required.
- D. The erection, easing, striking and removal of all formwork must be done under the personal supervision of a competent foreman, and any damage occurring through faulty formwork or its incorrect removal shall be made good by the contractor at his own expense.
- E. All projecting fins on the concrete surfaces after removal of formwork shall be chipped off, and any voids or honeycombing to any surface made good to the requirements of the Architect.
- F. No patching of the concrete is to be done before inspection of the concrete surfaces as stripped.
- G. Traffic or loading must not be allowed on the concrete until the concrete is sufficiently matured and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or damage to the concrete members. Where directed by the Architect/Engineer props may be required to be left in position under slabs and other members for greater period than those specified hereinafter.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT (CTD)****Striking Times**

- A. 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 damage 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 times given in day (24 hours) are the absolute minimum that will be permitted:-

FORMS	ORDINARY PORTLAND CEMENT	RAPID HARDENING CEMENT
Walls, columns (unloaded), beams sides	2	2
Slabs - props left under	7	2
Beams soffites - props left under	14	5
Slabs - props	14	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.

The periods given above based on the removal of all props and formwork using ordinary Portland cement under average weather conditions. Adverse weather conditions or different cement may cause the above periods to be increased. Should the contractor wish to make use of reduced striking times then he must satisfy the Engineer that the strength of the concrete at such time and the structural system is adequate to withstand the dead and imposed loads applied to it. Before making use of reduced striking times the Engineer's agreement must be obtained in writing.

- B. Where the structure is of multi storey construction props with head trees and braces shall be provided to distribute the imposed load below the floor being cast. This will normally be 3 storey heights below the floor being cast unless otherwise stated.

(03) GENERAL SPECIFICATIONSREINFORCEMENT (CTD)Finish to Concrete Shuttered Surface

- A. Sawn finish. The shuttering shall consist of sawn boards, sheet metal or other suitable material to give a support to the concrete. Appearance is not of primary importance for this class of formwork. It shall be used for surface against which backfill or further concrete is to be placed. The treatment of the shuttering or concrete to provide a bond for the further surface treatment of the concrete shall be directed or approved by the Architect. Masonry or similar material used for facing concrete shall only be used as shuttering where directed by the Architect.

The Architect's approval shall be obtained to the use of blocks or slabs when used as permanent forms in foundation and other similar location.

- B. Wrought finish. The shuttering shall be wrought with boards arranged in a uniform pattern. Alternatively, plywood, metal panels or other approved materials may be used, subject to the Architect's approval. Joints between boards or panel shall be horizontal or vertical unless otherwise directed. This shuttering shall give a good finish to the concrete and will normally be used for all faces where a high class finish is not necessary.
- C. Fair-faced finishing. Standard steel panels, hardboard and boarding will not be permitted for the face of this shuttering. The shuttering shall be faced with resin-bonded plywood, faced with matt finished plastic or equivalent material in large sheets which shall be arranged in an approved uniform pattern. Wherever possible, joints between sheets shall be arranged to coincide with features such as sills, heads, jambs or changes in direction or the surface areas of formwork between features in walls, between beams in horizontal surface or other similar arrangement, shall where possible, be divided into panels of uniform dimensions, without the use of make-up pieces. All joints between panels on vertical or inclined surfaces shall be vertical or horizontal unless otherwise directed by the Architect; those on horizontal surfaces shall be at right angles and wherever possible they shall be parallel to walls and beams. The shuttering shall give a high class finish to the concrete with no lips, fins, or irregularities, and shall give a completely true and even surface which will be prominently exposed to view where good alignment is of special importance. It is for use in both in-situ and precast concrete.
- D. Texture finish. This is an all-over finish of high quality as may be directed by the Architect. Sample panels may be constructed on site prior to commencement of the works, to compare different textures. The shuttering shall be such that the concrete finish has not lips, fins, or irregularities and shall give a surface which will be prominently exposed to view where good appearance and alignment are of special importance.
- E. Chisel dressed finish. This finish consists of cutting a maximum of 10mm of concrete surfaces to expose the aggregate. This work is to be carried out after the concrete is at least 30 days old and is to be executed by hand. Mechanical means will not be permitted.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT (CTD)****Finish to Concrete Shuttered Surface (ctd)**

- A. Where other finishes, apart from the above are specified, the contractor shall provide a sample panel at least 2.4m x 1.2m in vertical surface area including a typical horizontal and vertical joint in the shuttering. The sample panel shall be constructed using the systems of shuttering and the construction techniques that the contractor proposes for the actual works. This sample when approved will form the standard for the entire works. All unsuccessful samples shall be removed from the site.

Tamped Floor Finish

- B. Where "tamped finish" is specified it will be obtained by an edge board to the Architect's approval. Board works are to be made to a true pattern and will generally be at right angles to the traffic flow. Haphazard or diagonal tamping will not be accepted.

Concrete Mixes (General)**Works Cubes**

- C. For all structural concrete the following representative samples shall be taken and in accordance with B.S. 1881.

One each day on which less than 50cu.m. of concrete is being poured.

- a) Six 150mm cubes - three for test 7 days and three for test 28 days.
- and
- b) Two slump test
- or
- c) Two compacting factor tests.

On any day when greater quantities of concrete are being poured then six additional cube tests and two additional slump or compacting factor test shall be carried out for each 50M3 or part thereof.

- D. All cubes shall be marked with the date of casting and a reference number. For each cube a record shall be kept of the position in which the batch of concrete from which it was sampled was placed. All cubes shall be tested by an approved testing authority.
- E. The concrete cubes tested at 7 days are intended to be indicative only and the target works strengths at 7 days given in Table 1 or II are not mandatory. It should be noted however that it is unlikely that cubes failing the 7 days target will subsequently pass the 28 days cube strength.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****REINFORCEMENT (CTD)****Work cubes (ctd.)**

- A. The concrete cubes tested at 28 days shall be taken to represent the concrete placed in the works. The standard of acceptance for cube strength tests shall be as follows:
- B. The cube strength shall be calculated from the maximum load sustained by the cube failure. One test result shall be the average of two test specimens taken from the same sample. The appropriate strength requirement, as given in Table 1 or 11 shall be considered to be satisfactory if:
 - a) None of the strengths of the three cubes is below the specified cube strength, or if
 - b) The average strength of three cubes is not less than the specified cube strength and the difference between the greatest and the least strengths are not more than 20% of that average.
- C. The standard of acceptance for the slumps test during the production of concrete shall be the design slump $\pm 25\text{mm}$.
- D. The standard of acceptance for the compacting factor test during the production of concrete shall be design compacting factor ± 0.03 .
- E. Any concrete which fails to meet the above standard of acceptance shall be either further tested or condemned at the Engineer's sole discretion. Any such tests or the removal of condemned concrete, replacement and associated costs shall be at the Contractor's expense.
- F. If the strength required are not attained or maintained throughout the contract, the contractor will also be required to redesign the mix and submit trial mixes in accordance with the specification so as to give a concrete which does comply with the requirements of this specification.

Concrete Mixes (Nominal Mixes)

- G. Mixes for each class of concrete specified or shown on the drawings shall be used by the contractor. They shall be mixed to achieve high density combined with adequate workability for the purpose.
- H. Details of any proposed mix shall be forwarded to the Engineer not less than 7 days before that class of concrete is required to be used on the works for his approval in principle.
- I. Classes of concrete will be referred to by their nominal mix proportions. Classes of concrete shall meet the criteria shown in Table I.
- J. The workability of the concrete shall be the minimum consistent with producing a dense, well compacted mass. Due regard shall be paid to the size and shape of the section together with any congestion of reinforcement.

CONCRETE WORK SPECIFICATIONS (CTD)

(03) GENERAL SPECIFICATIONS**REINFORCEMENT (CTD)****Concrete Mixes (Design Mixes)**

- A. Mixes for each class of concrete specified or shown on the drawings shall be designed by the contractor to achieve the specified minimum cube strength combined with high density and adequate workability for the purpose. In order to allow for unavoidable variation the mean design strength should exceed the specified works cube strength by twice the expected standard deviation. In the absence of previous information a standard deviation of 7N/MM² should be assumed.
- B. Details of any proposed mix design shall be forwarded to the Engineer not less than 7 days before that class of concrete is required to be used on the works for his approval in principle. The details shall include at least the following information.
- a) Source, nature and grading of coarse and fine aggregates
 - b) Source of cement.
 - c) Nominal maximum size of aggregate.
 - d) Cement content.
 - e) Aggregate/cement ratio.
 - f) Water/cement ratio.
 - g) Design density
 - h) Design slump or compacting factor,
 - i) Design strength.
- C. Classes of concrete will be referred to by the minimum 28 days work cube strength and the maximum size of aggregate. Classes of concrete shall meet the criteria shown in Table II. The maximum water/cement ratio is herein defined as the ratio of the weight of the "free" water to the available weight of the cement. The "free water" is that quantity of water available to combine with the cement. Any required to be absorbed by aggregate is excluded.
- D. The workability of the concrete shall be the minimum consistent with producing a dense well compacted mass. Due regard shall be paid to the size and shape of the section together with any congestion of reinforcement.
- E. After the Engineer has approved a design mix in principle the contractor shall prepare a trial mix on site using plant and materials intended for the works. Three batches of concrete shall be sampled and the following prepared, from each batch in accordance with B.S.1881:

(03) GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

REINFORCEMENT (CTD)

Concrete Mixes (Design Mixes) (ctd)

- a) nine 150mm cube-three for test at 7 days, three for test at 14 days and three for test at 28 days, and
- b) three slump tests or where the design slump is less than 25mm then
- c) three compacting factor tests.

Concrete Mixes (General)

- A. The standard of acceptance of preliminary tests will be similar to the standard for normal cubes, slump or compacting factor, except that the minimum cube strengths required shall be those given under "minimum preliminary cube strength at 28 days" in Table I or II.
- B. No structural concrete shall be placed in the works until the Engineer has approved the preliminary tests. Thereafter the approved mix proportions shall be adhered to throughout the work and may only be varied with the prior approval of the Engineer.

(03) GENERAL SPECIFICATIONS

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CONCRETE WORK SPECIFICATIONS (CTD)

TABLE 1: PRESCRIBED WORKMANSHIP CONCRETE MIXES

Class of concrete	Minimum work cube strength of 28 days N/MM2	Cement Kg	Fine Aggregate Cubic Metres	Coarse Aggregate Cubic Metres	Minimum Preliminary Cube Strength at 28 days N/MM2	Minimum Target Works Cube Strength at 7 days N/MM2
1:1:2	30	50	0.035	0.07	40	22
1:1:5:3	25	50	0.05	0.10	33	19
1:2:4	20	50	0.07	0.14	28	14

(03) GENERAL SPECIFICATIONS

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CONCRETE WORK SPECIFICATIONS (CTD)

TABLE II: DESIGN MIXES CONCRETE WORKMANSHIP CONCRETE MIXES

Class of Concrete	Minimum Work Cube Strength of 28 days N/MM2	Maximum Size of Aggregate MM	Minimum Cement Content KG/M3	Maximum Water Cement Ratio	Maximum Cement Content KG/M3	Minimum Preliminary Cube Strength at 28 days	Minimum Target Works Cube Strength at 7 days N/MM2
40	40	20	350	0.44	540	40	30
30/40	30	40	300	0.46	540	40	22
30/20	30	20	310	0.46	540	40	22
30/10	30	20	340	0.46	540	40	22
25/40	25	40	280	0.53	540	33	19
25/20	25	20	295	0.53	540	33	19
25/10	25	10	325	0.53	540	33	19
20/40	20	40	260	0.60	540	28	14
20/20	20	20	280	0.60	540	28	14

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Tolerance

- A. All in-situ concrete shall be dimensionally accurate to within the following non-accumulative tolerances:
- a) between the centre lines of principal members' columns or beams +/- 5mm up to 15metres c/c +/-10mm over 15metres c/c
- Note the +/- 10mm tolerance shall not be cumulative
- b) in storey height +/- 5mm floor to floor
 - c) in plumbness of columns and walls +/- 10mm on any storey or overall the structure
 - d) in level of floors + 5mm/ -3mm of the true prescribed horizontal surface level
 - e) in cross sectional dimensions of column beams and walls +5mm/- 3mm in any dimension up to 2 metres overall +10mm/ - 3mm in any dimension over 2 metres
 - f) cover to reinforcement +5 mm / - 0 of the stated covers.

Miscellaneous Items

- B. Holes chases indentations and the like shall be provided where indicated on the drawings. All such shall be formed in the concrete and not cut after the concrete has hardened.
- C. Should the contractor or any sub-contractor require additional holes or the like these requirements shall be submitted to the Engineer at least two days prior to concreting, for his approval.
- D. Pipes, conduits, fixing bolts and other such cast-in items shall be provided where indicated on the drawings.
- E. Should the contractor or any sub-contractor require additional cast-in items these requirements shall be submitted to the Engineer at least two days prior to concreting, for his approval.

Ready Mixed Concrete

- F. Ready Mixed Concrete shall be used only with the approval of the Engineer. When such approval is given it shall be supplied in accordance with B.S. 5328 except where this conflicts with this specification when this specification shall prevail.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Ready Mixed Concrete (ctd.)

- A. Truck mixer units and their mixing and discharge performance shall comply with the requirement of B.S.4251.
- B. The use of ready mixed concrete shall not relieve the Contractor of any of his obligations and the appropriate clauses of this specification shall apply equally to the ready mixed concrete.
- C. Concrete test cubes and slump tests shall be taken on site at the point and time of discharge in accordance with this specification irrespective of any cubes that the supplier may take at his own risk.

Mixing and Transporting Concrete

- D. All materials for concrete shall be measured by weight in approved weight batching equipment. Such equipment shall be checked at weekly intervals at the Contractor's expense and shall be accurate to within 2%. Certificate of accuracy shall be submitted immediately to the Engineer.
- E. All concrete shall be mixed in approved power driven mixers of a type and capacity suitable for the work. The mixer shall be equipped with an accurate water measuring device which shall be checked at weekly intervals at the contractor's expense. Certificates of accuracy shall be submitted immediately to the Engineer.
- F. All materials shall be thoroughly mixed dry before water is added and the mixing of each batch shall continue for a period not less than two minutes after the water is added or such longer period are recommended by the manufacturer of the mixer. The mixture shall be of uniform colour and distribution on discharge and the entire contents of the mixer shall be discharged before recharging. The volume of mixed materials shall not exceed the rated capacity of the mixer.
- G. Mixers shall be all times be kept in a clean condition. prior to the first mix each day being agitated in the mixer a rich cement sand mix shall be used to coat the inside of the drum, the surplus material being emptied away and not used in the works.
- H. The moisture contents of the coarse and fine aggregate shall be checked by the contractor at frequent intervals and the amount of water added to the mix adjusted to maintain the design workability.
- I. Concrete shall be discharged from the mixer onto a clean, level watertight platform or into a clean watertight container. It shall be transported in a manner which ensures that it is of the correct quality and consistency at the point of deposition. All platforms and containers shall be cleaned of the old concrete before the fresh concrete is discharged onto them.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Mixing and Transporting Concrete (ctd)

- A. Concrete shall not be dropped from a height, thrown or otherwise treated so that segregation, undesirable finish, or defective structural quality results. In any case concrete shall not be dropped from a height greater than 3.0m
- B. No extra water shall be added to the concrete mix after it has left the mixer.
- C. The Contractor shall take adequate precautions to protect concrete in transit from the effects of the weather.
- D. Pumping of concrete, which will require a special design mix, will only be permitted with the approval of the Engineer.
- E. Should the concreting be stopped due to mechanical malfunction, accident or other similar cause then the contractor shall inform the Engineer immediately so that necessary measures and precautions can be taken. The cost of any additional work caused by these stoppages shall be the responsibility of the Contractor.
- F. No concreting shall be commenced until the formwork and reinforcement have been inspected by the Engineer. The Contractor shall give the Engineer two clear days notice of his intention to concrete.

Placing and Compacting Concrete

- G. All concrete shall be vibrated unless otherwise specified. The vibration shall be carried out by experienced operators and with immersion type vibrations to the Engineer's satisfaction.
- H. Placing of concrete shall be carried out in layers not exceeding 500mm deep and in sequence from one end of the form to the other.
- I. Concrete in foundations and other underground work shall be protected from contamination with falling earth or rock during and after placing.
- J. Any concrete which shows signs of initial setting before or during placing shall not be used and it shall be removed at the contractor's expense.
- K. Sufficient vibrators shall be provided to correspond with the rate of deposition of concrete. The vibration shall be continuous throughout the placing of the concrete. Standby vibrators shall be on site during all concrete placing.
- L. Vibration must not be allowed to disturb any recently placed concrete that has begun to set. Any water accumulating on the surface of newly placed concrete shall be removed by approved means and no further concrete shall be placed thereon until such water is removed.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Placing and Compacting Concrete (ctd).

- A. Suitable means shall be provided to ensure that the temperature of the concrete on placing does not exceed 30 deg.C (86 deg.F). All surface shall be thoroughly dampened immediately prior to placing fresh concrete to prevent excessive absorption of water.

Unformed finishes for Concrete

- B. Where a concrete surface is specified as suitable for receiving a further applied finish or in all cases where no other finish is specified the concrete shall be uniformly levelled and screeded to produce a ridge surface. No further work shall be applied to the surface.
- C. Where a concrete surface is specified as exposed with no further applied finish the concrete shall be uniformly levelled and screeded to produce a plain surface. After the concrete has hardened sufficiently the surface shall be hand or machine floated sufficiently only to produce a uniform surface free from screed marks.

Construction, Contraction and Expansion Joints

- D. Construction joints will be permitted only at the positions shown on the drawings and as instructed on the site by the Engineer. These joints will in general be spaced to allow a maximum plan area for any bay of 100 sq.m. maximum length of 12m in any one dimension.
- E. Vertical construction joints shall be properly made to form a vertical grout tight joint. Where reinforcement passes through the face of the joint the stopping off board shall be drilled so that the bars pass through or the board shall be made in sections with half round indentation in the joint.
- F. Under no circumstances shall concrete when being deposited be allowed to 'tail off'. Construction joints formed with expanded metal or similar or will not be permitted for reinforced concrete work.
- G. At all construction joints, both horizontal and vertical the surface of the already placed concrete shall be suitably roughened to remove laitance and by exposing the coarse aggregate to form a key for adjacent concrete. This work shall be carried out to the satisfaction of the Engineer by the following or other approved methods:
- a) After the initial set has taken place but before final set the coarse aggregate shall be exposed by the use of a water jet brushing.
 - b) After final set has taken place the laitance shall be removed and coarse aggregate shall be exposed by bush hammering or chiselling.

In both cases the surface is to be thoroughly cleaned after roughening.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Construction, Contraction and Expansion Joints

- A. At least 72 hours shall be left between completion of concreting one bay and the start of concreting any adjacent bay if the Engineer deems fit.
- B. Construction joints shall be formed as detailed where shown on the drawings.
- C. Expansion joints shall be formed as detailed at the position on the drawings.

Curing and protecting Concrete

- D. Immediately after compacting and for 7 days thereafter concrete shall be protected against harmful effects of weather including rain rapid temperature changes and from drying out. The methods of protection used shall be subject to the approval of the Engineer. The method of curing used shall prevent loss of moisture from the concrete.
- E. During the curing period horizontal surface shall be protected by the following or other approved means:
 - a) Covering with damp hessian canvas sacks or similar absorbent materials kept constantly damp and wholly covering the exposed concrete surface or
 - b) Covering with an impermeable material raised approximately 50mm over the surface so as to prevent loss of moisture.
 - c) An approved membrane curing compound.
- F. During the curing period other surfaces shall be protected by the following or other approved means:
 - a) Formwork in close application of water preferably in the form of a mist so as not to damage the surface.
 - b) Direct and continuous application of water preferably in the form of a mist so as not to damage the surface.
 - c) Covering as described for horizontal surfaces.
- G. All concrete faces or edges, particularly those which are exposed without rendering in the final structure, shall be adequately protected from damage and discolouration at all times.
- H. Concrete structure shall be loaded until the concrete is at least 21 days old or 28 days in the case of cantilevers. With the prior approval of the Engineer the structure may be loaded before this time but in no case will loading greater than the final design loading be permitted.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Test of Defective Concrete

- A. Additional tests may be necessary when there are physical defects in the finished concrete. These defects may be in the form of cracking while the member is still under props, excessive deflection or segregation and insufficient strength of concrete test cubes. If in the opinion of the Engineer these defects are as a result of the Contractor's bad workmanship, then the contractor will be required to carry out additional tests which the Engineer may deem necessary to establish the load carrying capacity of the member. All costs for the test or incurred thereof as a consequence of the test shall be chargeable to the contractor. Costs for tests shall be borne by the contractor immaterial of the outcome of such tests.

Concrete for Water Retaining Structures

- B. Concrete and its constituents for water retaining structures, in addition to the general and particular provisions in this specification, shall comply with the following requirements in this section.
- C. In addition to the requirements of clauses pages concrete in water retaining structures shall have a low drying shrinkage and absorption, as measured in accordance with B.S.812 or not greater than 3%.
- D. The Engineer may before approval is given to an aggregate or at any time thereafter require that the aggregate be tested for absorption in accordance with B.S.812. Any aggregate failing to comply with this specification will be rejected.
- E. In addition to the requirements of clauses page, concrete for the water retaining structures shall have a maximum cement content of 400kg/M3
- F. Blasting concrete under water retaining structures shall be a minimum of 75mm thick and shall be in class 15/40 concrete.
- G. Class 15/40 concrete shall comply with the following requirements:
- Minimum works cube strength at 28 days 15N/MM²
- Maximum size of aggregate 40mm
- Mix proportions 1 cement:2.5 fine aggregate: 5 coarse aggregate.
- This is a nominal mix and no cubes will be required to be taken.
- H. For water retaining structures the provisions of clause page are modified. The construction joints will in general be spaced to allow a maximum plan area for any bay of 40sq.m. or maximum lengths of 7.5m in any one dimension.
- I. A waterproofing additives - plastocrete DM by Sika or other similar approved shall be used for all reinforced concrete in water tank structures.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Concrete for Water Retaining Structures (ctd.)

- A. All additives shall be incorporated into the mix according to the manufacturer's instructions.
- B. For water retaining structures the provisions of the clause are modified. At least 96 hours shall be left between completion of concreting any adjacent bay if the Engineer deems fit.
- C. A kicker of minimum height 150mm shall be cast integrally with the base slab for all water retaining structures.
- D. The surface of all concrete for water retaining structures shall not be permitted to dry out even after the 7 day curing period specified in clause.
- E. All pipes passing through concrete walls or slabs for water retaining structures shall be cast in at the time of concreting and not subsequently fitted. All such pipes shall be provided with a puddle flange fitted to form a seal against the pipe and of an outside diameter 2.00mm greater than the outside diameter of the pipes.
- F. Joint sealants shall be applied not less than 7 days after completion of the structure.
- G. On completion of water retaining structure at a time decided by the Engineer it shall be tested for water tightness in the following manner. Structures which are elevated shall be filled at a uniform rate not exceeding 1 meter rise in head per 24 hours and allowed to absorb water for 3 days. After this period the water level shall be brought up to the top water level and left for 7 days. During this period the exposed faces shall show no signs of leakage and shall remain apparently dry. Structures founded on or in the ground shall be tested prior to backfilling unless otherwise stated. The structure shall be filled as specified above. After filling to top water level no further water shall be introduced for the next 7 days. The structure will be deemed to be watertight if at the expiration of this time the total drop in surface level does not exceed 100mm after making due allowance for evaporation and absorption and no sign of leakage are observed.
- H. Water for testing shall be provided at the contractor's expense.
- I. If the structure fails the test above any defects shall be made good or such action taken to eliminate leakage as the Engineer shall direct. All such work shall be at the Contractors expense.
- J. After completion of any repairs the structure shall be tested using the procedure specified above.
- K. Swimming pool should be tested prior to applying internal finishes.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Precast Concrete

- A. The material for precast work shall be similar to the materials for insitu work. The workmanship for precast work shall comply with C.P.116 except where this conflicts with this specification when the specification shall prevail.
- B. The contractor shall prepare for any type of Precast units, a drawing indicating his proposed formwork construction, casting methods de-moulding and handling procedure for the Engineer's approval.
- C. Moulds and formwork shall be so constructed that the dimensions of the finished concrete members are within the specified permissible tolerances given in Clause 407 of BS 8110.
- D. Where precast concrete is described as "Fair Faced" the moulds shall be metal, or are to have metal or hardboard linings, or are to be other approved moulds which will produce a smooth, dense fair face to the finished concrete and free from all shutter marks, holes, pitting, etc.
- E. Precast concrete shall be made of the mixes described on the Engineer's drawings in suitable mould, true in form of the shapes required, thoroughly tamped into the moulds and around reinforcement and vibrated.
- F. All precast work shall be carried out under cover and the period before removal from forms and the period of storing shall be determined and agreed by the Engineer and Contractor with due regard to the type of unit, i.e. load bearing or non-load bearing, difficulties of casting, projections, holes and other points which require particular attention.
- G. The method of lifting, positions of lifting points and Curing time before lifting shall be agreed with the Engineer before casting of any units.
- H. Extreme care shall be taken when handling precast units and any units damaged during transportation and/or positioning shall be replaced at the Contractor's expense.

MEASUREMENTS PREAMBLES

General

- A. Concrete work shall be measured generally in accordance with the method of measurements stated in the contract. The rates shall be deemed to include for complying with the specification in all respects. All testing and samples required by the Specification, whether covered by a particular item below or not, shall be deemed to be included within the rates or sums in the Bill of Quantities. Where the Engineer may instruct the contractor to test (such test not being mandatory) the materials or workmanship in accordance with the provisions of the Specifications the test of such costs will be borne by the employer, if the test result proves satisfactory and by the Contractor if the test result proves unsatisfactory. In either case no consequential costs or delay will be allowed, it being considered that testing covered by this Specification is of a usual or expected nature.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

Concrete

- B. The rate for concrete shall include for all costs associated with the following:
- C. Supply concrete of the required strength, manufactured with materials complying with the Specification.
- D. Mixing, transporting placing, compacting, curing and protecting the concrete all as specified.
- E. Forming construction joints and complying with the specified requirements for maximum bay size and interval between casting adjacent bays.
- E. Providing test certificates for cement and aggregates.
- F. Designing the concrete mix (where applicable) and carrying out trial mixes and preliminary tests.
- G. Carrying out routine sampling and testing of concrete and its constituents.
- H. Keeping on site sufficient cube moulds, slump cones and associated test equipment to comply with the Specification.

Mass Concrete

- I. The rate for mass concrete in blinding shall, in addition to *B* to *H* above, include, for concreting the sub base.
- J. The rate for mass concrete shall, in addition to *B* to *H* above, included for any formwork necessary unless otherwise stated in the item description.

Rod Reinforcement

- K. The rate for rod reinforcement shall include all costs associated with the following:
- L. Supply rod reinforcement complying with the Specifications.
- M. Providing test certificates
- N. Cutting, bending and fixing reinforcement including any welding where this is approved.
- O. Providing and fixing all spacers, tying wire, chairs and stools.

03 GENERAL SPECIFICATIONS

CONCRETE WORK SPECIFICATIONS (CTD)

MEASUREMENTS PREAMBLES (CTD)

Fabric Reinforcement

- A. The rate for fabric reinforcement shall include for all costs associated with the following:
- a) Supplying fabric reinforcement complying with the specifications.
 - b) Providing test certificates.
 - c) Cutting and fixing fabric reinforcement.
 - d) Providing and fixing all spacers, tying wire, chairs and stools.
 - e) Providing the specified laps, fabric will be measured as the net plan area.

Sawn Formwork

- B. The rate for sawn formwork shall include for all costs associated with the following:
- a) Supplying, fixing, easing and striking all temporary forms as specified together with all temporary construction required for their support.
 - b) Supplying details or calculations for formwork.
 - c) Coating with material to prevent adhesion of the concrete.
 - d) Complying with specified minimum period before removal of forms.
 - e) Back propping for multi-storey construction.

Wrought Formwork

- C. The rate for wrought formwork shall include for all costs associated with the following:
- a) Supplying, fixing, easing and striking all temporary forms as specified together with all temporary construction required for their support.
 - b) Supplying details or calculations for formwork.
 - c) Coating with material to prevent adhesion of the concrete.
 - d) Complying with specified minimum period before removal of forms.
 - e) Back propping for multi storey construction.
 - f) Providing sample panels of concrete as specified and removing on completion of the works.

(03) GENERAL SPECIFICATIONS**CONCRETE WORK SPECIFICATIONS (CTD)****MEASUREMENTS PREAMBLES (CTD)****Precast Concrete**

- A. The rate of supply of precast concrete shall include for all costs associated with the following:
- a) Supplying concrete including item on clause page.
 - b) Supplying rod reinforcement including on page above.
 - c) Supplying fabric reinforcement (if applicable) items on page above.
 - d) Supplying, fixing, easing and striking moulds and formwork as specified including replacement after multiple use.
 - e) Producing drawings and details as specified.
 - f) Coating moulds with material to prevent adhesion of the concrete.
 - g) Complying with specified minimum period before removal of forms or handling.
 - h) Providing and fixing any additional reinforcement required for lifting or handling.
 - i) All handling, lifting and fixing of precast units.

Composite floor Construction

- B. The rate for composite floor construction is to include for all moulds, materials and all unspecified items necessary for the manufacturer of hollow concrete block by the contractor.
- C. Another rate will be applicable in the vent of the contractor purchasing the block as specified from independent suppliers or manufacturers.

D. Waffle Floor Construction

The rate for waffle floor construction is to include for all moulds, materials and all items necessary for complying with the specification. The rate shall also be deemed to include for solid concrete margins, and bearing.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL****QUALITY OF MATERIALS AND WORKMANSHIP**

- A. The quality of all materials and workmanship used in the execution of this Contract shall comply with the requirements of the most recent issues of the following British Standards and Codes of Practice, including all amendments to date of calling for Tenders.

BS.4 (Part 1)	-	Hot Rolled Sections
BS.4 (Part 2)	-	Hot Rolled Hollow Sections
BS.449	-	The use of Structural Steel in building
BS.638	-	Arc Welding plant, equipment and accessories
BS.639	-	Covered Electrodes for the Manual Metal Arc Welding of Mild Steel and Medium tensile steel
BS.916	-	Black Bolts, screws and nuts
BS.1449	-	Steel plate, sheet and strip
BS.1775	-	Steel Tubes for mechanical, Structural and General Engineering Purposes
BS.2994	-	Cold Rolled Steel Sections
BS.4190	-	ISO metric black hexagon bolts, screws and nuts
BS.4320	-	Metal Washers for general engineering purposes
BS.4360	-	Weldable structural Steel
BS.4848	-	Hot rolled structural steel sections
BS.4872	-	Approval testing of welders when welding procedure approval is not required
BS.5135	-	General requirements for the Metal Arc Welding of structural steel
BS.5493	-	Protection of iron and steel structures from corrosion

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****QUALITY OF MATERIALS AND WORKMANSHIP (CTD)**

- A. The Engineer may at any time require any materials to be tested in accordance with the requirements of the Standards listed above. The cost of all successful tests shall be borne by the Client, but the Sub-Contractor shall if required promptly supply at his own expense test pieces as required by the Engineer. The costs of tests on materials failing to comply with this Standard shall be borne by the Sub-Contractor. If in the opinion of the Engineer, faulty materials and /or workmanship have been used in the Works, the Sub-Contractor may be directed to dismantle and cut out the parts concerned and remove them for examination and testing. The cost of dismantling, cutting out and making good to the approval of the Engineer shall be borne by the Sub-Contractor.

FABRICATION**B. Cutting and Bending**

All members, plates, brackets, etc, shall be neatly and accurately sheared sawn or profiled to the required shape as shown on the drawings. Where steel is oxy-cut to shape, care shall be taken to preserve the full finished sizes required. If the members or plates are bent or set, the bends or sets shall be correctly made to the radii or angles specified without leaving hammer marks. The material may be heated to permit this. Material that has been heated shall be annealed to approval.

C. Punching and Drilling

Holes for black bolts shall be drilled or punched 2mm larger in diameter than the bolt used. Holes for high tensile friction grip bolts shall be drilled or sub-punched and reamed to 2mm larger in diameter than the specified bolts sizes. All drilled holes shall be parallel sided and shall be drilled with the axis of the holes perpendicular to the surface. Badly drilled holes shall either be reamed out to approval and larger bolts fitted or otherwise as directed. All rough arises shall be ground off. Holes for bolts in material thicker than 15mm must be drilled. When holes are drilled in one operation through two or more thicknesses of material, the parts shall be separated after drilling and all burrs removed before assembly. Holes for bolts shall not be formed by a gas cutting process.

D. Tolerances

All members shall be fabricated with a tolerance in length of + 0mm and -3mm, all shall not deviate from straightness by more than 1 in 400.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****QUALITY OF MATERIALS AND WORKMANSHIP (CTD)****A Tolerances (ctd)**

The allowance for angular twist shall be $(3+0.6L)$ mm where L is the length of the member under consideration in metres. Twist shall be measured by placing the member as fabricated against a flat surface measuring the difference between the two corners of the opposite end.

The above tolerances shall be adhered to unless otherwise specified on the Engineer's drawing.

FASTENING**B. Bolting**

All bolts used shall be of such length that at least one full thread is exposed beyond the nut after the nut has been tightened. Where a nut or bolt head would bear on an inclined surface, a bevelled washer of the correct shape shall be interposed between the two surfaces. Bevelled washers shall not be allowed to get out of position during fabrication and erection and for this purpose may be spot welded to the steel surface. Bevelled washers for use with high tensile bolts may not be welded.

C. Black Bolts, Nuts and Washers

All black Bolts, Nuts and Washers shall comply with the requirements of BS.916 or alternatively BS.4190 ISO metric black hexagonal bolts screws and nuts.

D. High Tensile Bolts, Nuts and Washers, Friction Grip Bolts

All High Tensile steel bolts, nuts and washers used in joints shall comply with the requirements of BS.3139 and shall be used in accordance with BS.3294.

ELECTRIC WELDING

E. All welding shall be carried out in strict accordance with the requirements of BS.1856 and 938 and electrodes shall comply with BS.639.

F. Fusion faces shall be free from irregularities such as tears, fins, etc., which would interfere with the deposition of weld metal.

G. Fusion faces shall be smooth and uniform and shall be free from loose scale, slag, rust, grease, paint, and/or other deleterious material.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****ELECTRIC WELDING (CTD)**

- A. All welds shall be of acceptable types, shall be of the finished sizes specified, and shall be carried out in such sequence that minimum distortion of the parts welded results.
- B. Preparation of edges for welding shall be carried out by planning or machine flame cutting. Manual flame cutting may be permitted in certain circumstances.
- C. Parts to be welded shall be maintained in their correct relative positions during welding, preferably by jigs.
- D. Multiple run welds shall be carried out with each run closely following the previous run but allowing sufficient time for the proper removal of slag.
- E. The Sub-Contractor shall ensure that each run is inspected and any unsatisfactory weld cut out and remade to approval.
- F. Welds in material 25mm or greater in thickness shall be made by the Argon arc or similar approved process, and special precautions shall be taken to prevent weld cracking.
- G. Unless otherwise shown, the minimum size of fillet shall be 6mm.
- H. On completion, welds shall present a smooth and regular finish. Weld metal should be solid throughout with complete fusion between weld metal and parent metal and between successive runs throughout the joint.
- I. Defects shall be cut out and made good to approval in sound weld metal.
- J. The external faces of butt welds are to be ground smooth on completion and to be to the approval of the Engineer.

SHOP AND FIELD CONNECTIONS**ROLLED SECTIONS**

- K. All shop connections shall be electric welded or bolted with high tensile friction grip bolts.
- L. No bolts used shall be less than 12mm diameter and no weld less than 40mm in length. At least two bolts shall be used in connections transmitting loads unless otherwise indicated by the Engineer.
- M. No weld of length less than four times the nominal fillet size shall be deemed capable of carrying a load.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****ROLLED SECTIONS (CTD)**

- A. Beam to column connections not detailed shall be on "Standard" top and bottom cleat connections with the load carried on the bottom cleat. "Standard" web connections shall be used for connecting beams to beams.
- B. Field connections shall be as detailed, i.e. bolted with high tensile or black bolts in drilled holes. Black bolts in punched holes will only be permitted for connections carrying a designed load or for connections to timber members.
- C. Structural Hollow Sections - Circular and Rectangular
- D. Hollow sections shall be connected by electric welding unless shown otherwise.
- E. The design of welds shall be in accordance with Clause 53 and 54 and Appendix C of BS.449.
- F. Butt welds shall be made with the fusion surfaces of the ends of each member properly prepared and the members properly aligned.

ASSEMBLY**Trusses and Portal Frames**

- G. Trusses shall be carefully set out to the dimensions shown on the drawings.
- H. Where it is required that trusses be cambered, such camber shall be provided by bending the bottom chord to the arc of a circle.
- I. Notwithstanding any dimensioned spacing of purlin cleats, the Sub-Contractor shall ensure that purlin cleat spacing is satisfactory for the available stock lengths of roof sheeting. However, the Engineer's approval must first be obtained before any alteration is made in purlin spacing or sheeting sizes.
- J. Splices in portal and other frames shall be made where shown on the details or where indicated.

Boxed Members

- K. Abutting edges of boxed members shall be connected and scaled with a continuous weld to exclude the entrance of moisture. Where specified such welds shall be ground flush to approval.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****Shop Assembly**

- A. Such assembly of units in the shop as is specified or necessary before transporting to the site will be inspected by the Engineer before painting. The work will be laid out in the shop or yard so that all parts are accessible for inspection and testing of the work.
- B. The Sub-Contractor shall furnish all facilities for inspection and testing of the work and he must notify the Engineer on each occasion when the material is ready for inspection.

Marking

- C. All members of the structure to be site assembled shall be match marked in accordance with the shop details and marking plans submitted for approval.

ERECTION**Site Dimensions**

- D. No erection shall commence before accurate Site Dimensions have been taken by the Sub-Contractor, and no claim will be considered should final dimension differ from those on the drawings. Any modifications to the structural steel required in order to comply with Site Dimensions shall be made on the ground to the Engineer's approval before erection is commenced.

E. General Setting Out-Tolerances

The temporary Bench Mark (TBM) which shall be located at the Structural Ground Floor Level (S.G.F.L.) having been agreed on site between the Architect, Engineer and Main Contractor, shall be considered as the site datum.

The datum points for the setting out of the datum lines passing through the T.B.M. at all floor and roof levels; plus or minus 0m.

The permissible Deviation (P.D.) from the T.B.M. and D.L. shall be as follows:

- a) Setting out on Plan at S.G.F.L.

All setting out dimensions with respect to each datum line (i.e. P.D. from "x" and "y" plan axes) plus or minus 10mm per 30 metres.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****ERECTION (CTD.)**

- b) Transfer of T.B.M. to Structural First Floor, intermediate Floors and Roof Levels.

With respect to the T.B.M. at S.G.F.L. the T.B.M. at:

First Floor Level - Plus or minus 5mm

Intermediate Floor Levels - Plus or minus 10mm

Roof Level - Plus or minus 15mm

- c) Setting out on Plan of Upper Floors With Respect to the Transferred T.B.M.

All setting out of dimensions with respect of each datum line plus or minus 10mm per 30 metres.

- d) The clear distance between adjacent elements at any level where accuracy is required for doors, windows, services, secondary steelwork etc.:- plus or minus 5mm.

- e) The P.D. with respect to the relevant T.B.M. of the upper or lower surface of any truss or element, taking into account specified cambers. plus or minus 10mm.

- f) The Plumb vertical members plus 10mm per storey.

A. Equipment

All erection shall be carried out by competent and experienced men and the Sub-Contractor shall take every care to safeguard the public, workmen, and adjoining property.

All gear used shall be of adequate strength and shall comply with all Regulations current at the time.

The Sub-Contractor shall be held responsible for all damage caused to the structure, workmen, or buildings during erection.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****ERECTION (CTD.)****A. Storing and Handling**

Steel shall be stored and handled and erected in such a manner that no member is subjected to excessive stresses which could have an adverse effect on the properties of the steel. If in the opinion of the Engineer, the steel work has been subjected touch treatment, the contractor shall remove this steel from the site and replace it at his own expense.

B. Erection Details

No member or part of a member which has been bent or distorted shall be erected in that condition. All straightening shall be done in the ground.

Columns shall be wedged to line and level on steel or cast iron wedges and checked by the Engineer. After acceptance, column bases shall be grouted to approval before wedges are removed. Unless shown on the drawing, all columns shall be left truly vertical and correct to line and level. Beams, girts, etc., shall be erected level unless otherwise shown, and correctly positioned.

Trusses and open web joists shall be carefully handled at all times and when being erected shall be lifted at such points and in such a manner as will preclude any possibility of damage from erection stresses.

Immediately after erection, each truss shall be made secure by purlins, bracing, or guys to approval.

Bracing shall be placed in position as soon as dependent work will permit.

C. Field Connections

In making connections, drifting of unfair holes will not be permitted and holes not matching properly shall either be reamed or drilled out and a larger bolt inserted or otherwise as directed.

Holes formed or enlarged by oxy-cutting will be condemned and must be filled to approval by electric welding and red drilled.

Tightening and testing High Tensile Friction Grip Bolts.

Before assembly, the contact surface, including those adjacent to the washers, shall be descaled or carry normal tight mill scale. They shall be free from dirt, oil, loose scale, burrs, paint (except priming paint) pits and other defects that would prevent solid seating of the parts.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****ERECTION (CTD.)****A. Field Connections C'td**

Bolts shall be assembled with approved hardened flat or tapered washers as required between the bolt head and nut and the softer mild steel.

When bearing faces of the bolted parts have a slope of more than 1 in 20 with respect to a plane normal to the bolt axis, square smooth bevelled washers shall be used to compensate for the lack of parallelism.

All bolts shall be tightened by the "Turn of Nut" method. This method shall generally be as approved by the Engineer to achieve in all bolts a minimum tension equal to the proof load.

B. Grouting

Unless otherwise detailed on the drawings, a space of not less than twenty (20) mm and not more than forty (40)mm shall be provided between undersides of column base plates and footings, and between all beam and roof truss bearings and concrete pads, etc.

After each column, beam, or roof truss has been wedged up to a line and level and fixed in position to approval, the space between footing or pad and the underside of the base plates or steel member shall be grouted with a mixture of Portland cement and approved washed sand.

The Portland Cement and sand shall be thoroughly mixed to approval in equal proportions by volume with only sufficient water to produce a mixture of "damp earth" consistency and shall be used within twenty minutes of mixing. The caulking mixture shall be packed to approval into the space between base plate and foundation and protected from damage until set.

PAINTING**C. Painting Material**

All paints are to be supplied by a Supplier approved in writing by the Architect.

Paints are to be delivered to the site or the Structural Contractor's works in the original containers as supplied by the Manufacturer with seals unbroken and are to be used in strict accordance with the manufacturer's instructions.

(03) GENERAL SPECIFICATIONS**STRUCTURAL STEEL (CTD)****PAINTING (CTD.)****A. Painting Material C'td**

Manufacturer's representatives are to be free to visit the site and inspect materials and workmanship, and if necessary take samples of materials for laboratory analysis.

Paints are not to be thinned unless instructed by the Engineer.

No external painting is to be carried out during rain or when rain is likely to occur before the paint has had time to dry. All surfaces are to be dry and free from moisture at the time of painting.

B. Preparation for painting

All structural steel shall be thoroughly scraped and wire brushed to remove mill scale and rust. Dirt and grease or oil shall be washed off with white spirit and the steel allowed to dry.

C. Painting process

A first coat of Red Oxide Zinc Chromate primer shall be applied in the works immediately the steel preparation has been completed. A minimum of 24 hours shall elapse before the steel is moved from its position whilst painting has been carried out. After delivery to site, the steel shall be carefully examined and all areas where the priming coat has been damaged and/or where rust has developed shall be washed with white spirit and wire brushed as necessary and a further priming coat as for the first applied to completely cover the damaged areas.

During erection, surface of steel which are to be in contact shall be painted with one further coat of primer as previously described and the surfaces brought together whilst the paint is still wet.

Bolts, Nuts, Washers, etc., shall, after erection is completed to approval, be carefully degreased with white spirit and painted as for steelwork.

Steel purlins and sheeting rails shall generally be painted as for steelwork except for purlins and rails supporting aluminium sheeting when the following specification shall be used.

1st coat - Red Oxide Zinc Chromate Primer

2nd Coat - An approved Aluminium paint

The interiors of mild steel gutters shall be prepared as previously described for structural steelwork.

(03) GENERAL SPECIFICATIONS**WALLING**

- A. Requirements of the following British Standards and Codes of practice and equivalent Kenya Bureau of Standards shall be observed:-

British Standard

- | | | |
|----|-------------------------|--|
| B. | B.S. 3921 part 2 | Bricks and blocks of fired brickwork clay or |
| C. | B.S. 1180 | Concrete bricks and fixing bricks |
| D. | B.S. 4729 | Shapes and dimensions of special bricks |
| E. | B.S. 2028, 1364 type B | Precast concrete blocks (for general use and load bearing walls above damp proof course) |
| F. | B.S. 2028 1364 type C | Precast concrete blocks (for internal non-load bearing walls) |
| G. | B.S. 1200 table 1 and 2 | Sand for mortar for plain and reinforced brickwork, block walling and masonry |
| H. | B.S. 890 part 2 | Building limes (Hydrated lime) |
| I. | B.S. 4721 | Ready Mixed lime: sand for mortar |
| J. | B.S. 4887 | Mortar plasticizers |
| K. | B.S. 4551 | Methods of testing mortars and Specification for mortar testing sand |
| L. | B.S. 743 | Materials for damp proof courses |
| M. | B.S. 1178 | Milled sheet lead and strip for building purposes |
| N. | B.S. 1243 Fig. 1 | Metal ties for cavity wall construction (vertical twist type) |

Codes of Practice

- | | | |
|----|-----------------|---|
| O. | C.P. 111 | Structural recommendations for load bearing walls |
| P. | C.P. 121 part 1 | Walling |

(03) GENERAL SPECIFICATIONS**WALLING (CTD.)****Codes of Practice (ctd.)**

- A. C.P. 121, 202 part 1 Masonry - rubble walls
- B. Walls and partitions of blocks and slabs C.P. 122
- C. **NOTE:** The contractor's attention is drawn to Section "G" of the Standard method of Measurements
- D. **WATER** Shall be as specified in "concrete work"
- E. **CEMENT** Shall be as specified in "concrete work"
- F. **SAND** Shall be as specified in "concrete work"
- G. **Lime** Shall be non-hydraulic quick lime or hydrated limes for cement/lime mortars and comply with B.S. 890, semi-hydraulic class "B" calcium limes .
- H. **Concrete blocks** shall be solid or hollow blocks to comply with the relevant standard as previously mentioned and shall be solid hard, true to size and shape and sharp arises in accordance with Ministry of Works Standard Specification for Metric sized concrete blocks for building dated September, 1972.

They shall be obtained from an approved manufacturer or manufactured on site in approved block making machines. The mix used shall be less than (1:9) by volume and maximum size of aggregate shall be 12mm size. The blocks on removal from the machine shall be laid on edge or racks under sheds erected by the Contractor and left for 3 days during which period they shall be kept constantly wet.

After this initial period they shall be placed on edge in the open racks and protected by sacking or other approved covering and kept wet for further 5 days.

Thereafter the blocks shall be left in the same position without wetting for a further 20 days. No blocks shall be used in the Works until 28 days old and until samples have been tested and approved by the Engineer.

The Contractor shall ensure that the blocks are stocked separately in their respective categories in the structure in the position shown on the drawings.

(03) GENERAL SPECIFICATIONS

WALLING (CTD.)

- A. Stone for walling shall be good hard local stone equal in standard and quality to "Nairobi Blue Stone". Stone shall be squared, dressed and joints chisel dressed on the face. Stone to receive render, shall be so dressed to reduce dubbing-out to a minimum.

The coursed stone shall not be less than 150mm deep and 305mm long. All stones shall be laid on their natural or quarry bed lines.

MORTARS

- B. Gauged mortar shall be used for walling and shall be composed of one part Portland cement to two parts non-hydrated lime and nine parts sand. (1:2:9) measured in gauge boxes and thoroughly mixed dry preferably with an approved mechanical mixer or on a clean and approved mixing platform with water added afterwards until all parts are completely incorporated and brought to a proper consistency and used within the hour of mixing.

No partially or wholly set mortar will be allowed to be reused or re-mixed.

- C. Cement Mortar Cement mortar (1:3) shall be composed of 42.5 Kgs. of Portland Cement to 0.085 cubic metres of sand. The cement mortar (1:6) shall be composed of 42.5 Kgs of Portland cement to 0.17 cubic metres of sand measured in specially prepared gauge boxes and thoroughly mixed in an approved mechanical mixer or mixed dry until all parts are completely incorporated and brought to a proper consistency. The use of retempering of wholly or partly set mortar will not be allowed.
- D. All Stone shall be wetted before laying and the top of walling where left off, shall be wetted before re-commencing buildings, walls to be kept wet minimum 3 days after building.
- E. All blocks and walling to be kept true, plump and level with all perpend vertical and in line and work shall not rise more than three courses above the adjoining Work and all such rising are to be properly racked back.
- F. The Contractor must provide proper setting out or storey rods so that all work is coursed to cills, lintels and underside of beams thus reducing horizontal cutting to a minimum.
- G. All walling must be carefully bonded together so that no vertical joint in any one course is nearer than 10mm from the joint in the course above or below.

(03) GENERAL SPECIFICATIONS**WALLING (CTD.)****MORTARS (CTD)**

- A. All walling must be bedded in solid mortar with cross-joints well flushes up at each course as the work proceeds.
- B. To walls less than 190mm thick the reinforcement shall consist of gauge 24 "Expamet" wall reinforcement horizontally in bed joints every alternate course and lapped over "Expamet" from column where abutting same.
- C. Rates for walling are to include for reinforcement strips.
- D. Labours on stone walling stated in the Standard Method of Measurement as to be included shall be deemed to include for redressing the beds of stones on site to the minimum extent necessary to obtain uniformly of coursing and for any redressing of faces necessary to bring the thickness within the tolerance specified.
- E. Rates for walling of any description are to include for all expenses in connection with the provision and conveyance of samples of walling materials to the Ministry of Works, Materials Testing Laboratory, Kenya.

(03) GENERAL SPECIFICATIONS**ASPHALT WORK**

- A. The requirements of the following British Standards shall be observed:-

British Standards

- | | | |
|----|---------------------------------|--|
| B. | B.S.1162, 1410
and 1418 | Mastic asphalt for tanking and damp-proof courses (Natural rock asphalt aggregate) |
| C. | B.S.988, 1097,
1076 and 1451 | Mastic asphalt for tanking and damp course (limestone aggregate) |

Code of Practice

- | | | |
|----|--------------|---|
| D. | C.P.102 | Protection of building against water from ground |
| E. | <u>Note:</u> | The Contractor's attention is drawn to Section "J" of the Standard Method of Measurement. |

All asphalt shall comply with the requirements of subsections B.S. 1418 and 1097 and C.P. 102 specifically dealing with tanking operations.

F. **Mastic asphalt for tanking**

- | | |
|-------|--|
| (i) | The Contractor shall arrange for the work to be executed by an approved Sub-Contractor. No other Sub-Contractor will then be permitted to be employed without the written authority of the Architect. |
| (ii) | Tropicalised Mastic Asphalt is to comply with B.S. 1097/1966 and B.S. 1418 applied in three coats, in the case of horizontal work on and including sheathing felt; in the case of vertical work without. The third and final coat is to have a polished finish. All tanking operations to comply with C.P.102. |
| (iii) | The Contractor is to take all necessary precautions to protect finished work, and it is his responsibility to ensure that no damage occurs to surfaces during subsequent building operations or any reasons whatsoever. |
- G. For tanking to basement lay over the whole area of the basement concrete floor horizontal damp proof course in three thickness laid with 150mm laps to a course of foundations on outer face of wall to cement with vertical damp proof course with a double angle fillet.

(03) GENERAL SPECIFICATIONS**ASPHALT WORKS (CTD.)**

- A. Vertical face of basement walls shall then be covered with damp proof course applied in three thicknesses with 75mm laps to a total thickness of not less than 20mm.
- B. Vertical damp-proof course shall be carried up to a minimum height of 150mm above ground level and connected at bottom to horizontal damp-proof course in walls with double fillet formed on top of foundations to form a complete tank to basement.
- C. All junctions between horizontal and vertical asphalt shall be warmed, cleaned and properly made good with two-coat angle fillets at all internal angles.
- D. Properly made good joints between lining pits and horizontal damp-proof course to floor shall be effected and double angle fillets to all internal angles maintained.
- E. It is essential that continuity of tanking be maintained. Care must be exercised to see that such continuity is not destroyed by stanchions, pits, sumps etc.
- F. Protect asphalt by the application of loading coats immediately each section of work is complete. Pumping of any water gaining access shall be continued until not only the asphalt work is complete, but also until loading coats are thoroughly set.
- G. If the water level is near, such water level shall be maintained at not less than 0.3m below the level of the base concrete during the progress of tanking work to avoid the application of asphalt on wet surfaces and this pumping operation shall be maintained until the temporary sump has been filled and sealed.

(03) GENERAL SPECIFICATIONS**ROOFING****BITUMEN BUILT-UP FELT ROOFING****A. Bitumen Felt**

Bitumen felt where specified shall be to B.S. 747 part 2 and in addition shall be suitable for use on tropical conditions and from approved manufacturers. Types of bitumen felt shall be as specified on the working drawing.

B. Fibre Base Bitumen Felt

Shall comply to B.S. 747 part 2, Class 1, when fibre based bitumen felt is specified the roofing shall consist of two self finished bitumen felt under layers to B.S. 747, Class 1C each weighing 13 Kg per 10 M² and one mineral surfaces bitumen felt to same B.S. Class 1E weighing 36 Kg per 10 M². All layers shall be completely bonded to one another and to the base with approved bitumen bonding compound or hot bitumen.

C. Asbestos Base Bitumen Felts

Asbestos base bitumen felts where specified shall comply to B.S. 747 Part 2, Class 2. Asbestos base bitumen felt when specified shall consist of two self finished bitumen asbestos under layers to B.S. 747, Part 2, Class 2C each weighing 13 Kg per 10 M² and one mineral surfaced bitumen asbestos to same B.S. Class 2 E weighing 36 Kg per 10 M². All layers shall be completely bitumen bonding compound or hot bitumen.

D. Edge Trim

Edge trims shall be of either aluminium to B.S. 1470 or 24 gauge galvanised mild steel sheet to B.S. 3033 of the sizes and patterns specified or shown on the drawings, and shall be approved gauges and manufacturer.

E. Concrete Paving Tiles

Concrete paving tiles shall comply to B.S. 1197, Part 2, nominal size 225 x 225 x 20mm, thick or other approved sizes. Tiles shall be bonded to built-up roofing with hot bitumen bonding compound but joints shall normally be 13mm wide, filled with hot bitumen.

F. Cement

As specified in the concrete section.

G. Sand

As specified in concrete section.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****BITUMEN BUILT-UP FELT ROOFING (CTD.)****H. Coarse Aggregate**

Shall be as specified in concrete section. However, when mineral aggregate chippings are specified, they shall be of approved colour, hard, angular and of a size to pass a 10mm sieve and be retained on a 6mm sieve.

Chipping shall be bonded over top layer of flat roofs with hot bitumen dressing compound. Chippings shall be bedded on the roof at the rate of 16Kg/M².

A. Bitumen Primer

Bitumen primer for priming base shall be of either cut-back bitumen, maximum volatile solvent 60% by weight or bitumen emulsion of a type recommended by the manufacturer for priming purposes.

B. Bitumen Bonding Compound

Bitumen bonding compound for bitumen felt shall be to B.S. 3940m Type B and shall be of approved manufacturer.

C. Bitumen Dressing compound

Bitumen dressing compound for bedding chippings shall be cutback bitumen to B.S.D. 3690 Grade 25.

D. Approved Sub-Contractor

Bitumen felt roofing work, unless otherwise directed, shall be carried out by an approved Sub-contractor. Laying shall be carried out generally in accordance with C/P.144.101. Bitumen built up felt roofing shall be guaranteed for one year from the end of the defects Liability period and such guarantee shall be given to the Architect in an approved form.

E. Falls

Before laying bitumen felt, the Contractor shall check and certify that the roof is laid to the correct falls. Minimum falls are:-

- | | | |
|----|---------------------------------|------|
| 1. | For mineral surfaced felt roofs | 1:30 |
| 2. | For protected felt roofs | 1:60 |

F. Preparation of Base

Before laying bituminous roofing felt, the Contractor shall ensure that the base is dry and clean to the approval of the Architect. All pipes and outlets passing through the roof, formation of grooved, chases fillets and gutters must be completed and approved before any roof covering commences being laid. When reinforced wood wool slabs form roof base, all joints shall be filled flush with approved strips.

Minor movement joints shall be formed with 150mm strip of damp proof course laid over joints and bonded at edges only. Movements joints shall be formed with rubber or plastic piping inserted into joints or with twin kerbs all in general accordance with Code of Practice. 144 part 3.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****A. Laying Bitumen Felt Sheet**

Hot bonding compound shall not be heated to more than 220 degrees centigrade and shall be laid at 200 degrees centigrade.

B. Partial Bonding

Partial bonding shall not be allowed without prior written approval of the Architect.

C. Full Bonding

The first and subsequent layers of bituminous roofing felt shall be laid with a minimum of 50mm, side laps and 75mm end laps. The first layer shall be fully bonded with bituminous bonding compound in similar manner to the first layer and to one another. Bitumen bonding compound shall be rolled to remove any trapped air and surplus or squeezed out bonding compound shall be wiped clean.

D. Upstand and Flashings

Upstands shall be at least 150mm high and must be fully bonded to the structure. Top edges of flat flashings shall be tucked into chase, wedged at 600mm centres and fully bonded to upstand. Ends of upstands and flashings shall be lapped at least 100mm and shall be sealed and bonded with hot bonding compound. The chase shall thereafter be pointed in cement mortar (1:3)

E. Felt Eaves and Verges

When felt eaves and verges are specified on the drawings, the Contractor shall nail one edge of 225mm wide felt strip at 150mm centres to the roof base. The felt strip shall then be folded to form welt 50mm deep and sealed with bonding compound. The remainder of the felt shall be fully bonded to the base and covered with full thickness of built up roofing.

Pipes, Vent pipes, Etc., piercing the roof shall be primed with bitumen priming solution and a collar of hot bitumen shall then be formed up round them 45.deg. Roofing felt shall then be dressed over the hot bitumen collar to the pipes etc., and secured tight with stout copper wire. Such collars shall not be less than 150mm high and shall be made completely water tight.

F. Rainwater Outlets

Built up roofing felt shall be carefully dressed into all rain water outlets and sealed in hot bitumen bonding compound. The Contractor shall seal completely and make tight, all such outlets to the approval of the Architect.

G. Protection

After built up felt roofing has been complete, the Contractor, shall protect it from any damage whatsoever and no storage materials on the roof will be allowed. Mixing of concrete mortar or heating materials on the roof will not be permitted whatsoever.

(03) GENERAL SPECIFICATIONS**ROOFING C'TD****ASPHALT ROOFING****A. Butyl Sheet Damp Roofing**

Butyl sheet shall be laid in accordance with the manufacturers printed instructions M/S Dunlop Kenya Limited. and shall be bonded in hot bitumen

B. Generally

The covering shall be executed complete by an approved roofing Sub-Contractor.

C. Asphalt Roofing

The mastic asphalt to be used shall comply with B.S. 988/1966 Table 3 column III Tropical Mastic Asphalt laid in two coats to a total thickness of 20mm on and including black sheathing felt.

D. Felt Underlay

The underlay shall be impregnated flax sheathing felt complying with B.S. 747 (Type 4A) (I) and shall be supplied by the Sub-Contractor and with 75mm laps at joints.

E. Preparation of Surfaces

All surface to receive asphalt are to be dry and roughened, grooved or otherwise prepared and finished to the entire satisfaction of the Architect.

F. Melting Asphalt

Asphalt blocks shall be broken into pieces of convenient size and carefully melted in cauldron on mechanically agitated melters on the site at a temperature not exceeding 215 deg. C. Molten material may be delivered to the site in mechanically agitated mixers.

G. Dusting of Buckets

Buckets used for carrying molten asphalt shall be dusted with a fine inert dust. On no account shall ashes or oil be used for this purpose.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****A. Laying Asphalt**

Asphalt shall be laid in bays generally not exceeding 2m wide and succeeding coats shall be laid breaking joint, junctions between bays and fillets shall be properly married, the laid asphalt being heated by the application of the hot material, the whole being worked so that the joints are neatly made. Air pockets, stains on the asphalt work shall not ring hollow over any parts of its surface.

Joints in all asphalt work shall be carefully made and complete fusion obtained to make them watertight joints shall be made around pipes passing through roofs etc.

"Resincot" Pre-painted mild steel sheeting**G.C.I. Sheeting****B. Generally**

Pre-painted corrugated mild steel sheeting shall be No.24 Gauge of best quality in accordance with B.S. 3083, and shall conform to Kenya Bureau of Standards KS06-02: Part II 1976.

C. laps

Sheets shall be laid with 150mm end laps and side laps of 30mm corrugations on the side away from the prevailing wind.

D. Fixing to steel and timber

The sheets shall be fixed to mild steel angle purlins with 6mm diameter pre-painted mild steel hook bolts 50mm longer in the shank than the depth of the steel purlins to which they are fixed each with one diamond shaped bitumen washer one pre-painted steel washer, and one pre-painted steel nut. The sheets shall be fixed to timber purlins by using 14 gauge drive screws with bituminous felt washer backed by a cranked diamond shaped aluminium washer.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****A. Holes**

Holes for bolts or screws shall be punched from the inside of the sheet and through the ridges of corrugations not in the hollows. A clearance of 0.80mm on the bolt or screw must be allowed.

B. Ridges, Valleys, Flashings

The ridges, valleys and flashing etc., shall be formed of No.24 gauge pre-painted mild steel sheeting of a quality equal to the sheeting on each side at 450mm centres maximum with 6mm diameter seam bolts 20mm long each with one diamond shaped bitumen washer one pre-painted steel washer and one pre-painted steel nut.

Ridges and valleys shall be not less than 375mm girth.

C. Bolts and Screw

All fixing bolts and screws shall comply with B.S. 1494.

D. Square Abutments

At square abutments the last two corrugations of the corrugated iron sheets next to walls shall be flattened and turned up against wall and covered with 24 gauge pre-painted sheet iron apron flashing.

E. Bat proofing

Bat proofing shall consist of "Perspex" or other equal and approved translucent plastic corrugated sheeting.

TILED ROOFING**F. Concrete single-pin tiles and fittings**

Shall comply to B.S. 473 and 550: Part 2 group B. Tiles are to be 381 x 229mm nominal unless otherwise specified.

Surface coating when specified must be firmly bonded. A full range of fittings are available from the manufacturer and must match the tiles with which they are laid.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****TILED ROOFING****Concrete single-pin tiles and fittings C'td**

- A. Mangalore Tiles where specified they shall be interlocking clay tiles as manufactured by M/S Clay works Ltd. or other equal and approved. They shall be uniform in size, shape and colour, hard, well burnt and free from defects.

They shall be laid in accordance with the manufacturer's printed instructions.

Polythene shall conform to B.S. 3012: 500 gauge and of approved manufacture.

- B. Nails for underlay: to B.S. 1202: Part 1
- C. Tying wire - to B.S. 443, 1.6mm diameter (16 S.W.G.) iron wire.

D. **HERTALAN EPDM SHEETING SYSTEM**

Hertalan EPDM rubber sheeting roofing work, unless otherwise directed shall be laid by M/S Rooftech Kenya Limited P.O. BOX 75282, Nairobi, Telephone No.725697, Nairobi. Laying shall be carried out in strict adherence of manufacturer's instructions.

E. **Preparation of Substrate**

Before laying Hertalan EPDM sheeting, the Contractor shall ensure that the surface is cleaned of all loose particles such as stones, gravels, nails, and free of sharp-edged foreign materials etc. and that the substrate is dry and clean oil/free to the approval of the Architect. All pipes and outlets and gutters must be completed and approved before any Hertalan EPDM sheeting is laid.

When reinforced wood wool slabs form roof base, all joints shall be filled flush with approved strips.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****A. Hertalan EPDM**

The Hertalan EPDM sheeting shall be free from pinholes and blisters. The edges of the sheeting shall be straight with a sharply defined cut.

When rolled out on a flat horizontal surface, the sheeting shall exhibit no wrinkling. The sheeting shall show no porosity between plies. Neither shall porosity develop when sheeting is heat-aged at 121 deg. C for a period of 7 days.

The sheeting shall be such that when bonding adhesive, type KS 143 or other approved adhesive is applied to the four edges of a one square metre piece of sheeting, these edges shall not ripple or deform in any way so that a similar one square metre of sheeting, prepared in same way, can be totally bonded along all four edges without the formation of "fish mouths". A period of 20 minutes (maximum) is allowed for the adhesives to dry.

B. Upstands and Flashings

Upstands shall be at least 300mm high and must be fully bonded to the structure. Top edges of EPDM flashing shall be tucked into chase, wedged at 600mm centres and fully bonded to upstand. Ends of upstands and flashings shall be lapped at least 100mm and shall be sealed and bonded. The chase shall thereafter be pointed in cement mortar (1:3).

C. Pipes, Vent Pipes, Flues etc. Piercing the Roof

Pipes, vent pipes, flues etc. piercing the roof shall be rapped with hertalan EPDM rubber using Conta adhesive and finally sealed with KS 87.

D. Rainwater Outlets

Hertalan sheeting shall be dressed around a PE-outlet-pipe with clamping tube. For details check working manual sheet No. 2.61.2.9g.

E. Protection and Painting

After the Hertalan EPDM single ply system has been installed, two coats of rubberized paint should be applied to give a grey finish. The Contractor should then protect it from any damage whatsoever and no storage of materials on the roof will be allowed. Mixing of concrete mortar or heating materials on the roof will not be permitted under any circumstances.

(03) GENERAL SPECIFICATIONS**ROOFING (CTD.)****A. Guarantee**

The Nominated Sub-Contractor shall be required to give a ten-year guarantee on Hertalan EPDM sheeting roofing.

VANDEX WATER-PROOFING**Specification for Waterproofing Concrete Structures****B. Preparatory work**

All areas shall be examined for structural defects.

Shrinkage cracks exceeding 0.33mm (0.01") in width shall be cut or chiseled out at least 10mm wide and 15mm deep and washed out. Then a slurry coat of VANDEX Super shall be applied. Following this the groove is filled with a mixture of 3 to 1 sand and cement in stiff mortar consistency.

Over-poured forms, around columns and/or inverted beams, form grooves shall be cleaned out, rinsed with water and slurry coated with Vandex super. These grooves shall then be filled flush with a mixture of 3 to 1 sand and cement.

Any honeycombed concrete found in walls and/or inverted beams/columns shall be raked out to solid concrete, washed out with water, coated with a slurry coat of Vandex Super and filled out flush with a 3 to 1 mixture of sand and cement.

C. Cleaning

Concrete surfaces must be free from all form scale, laitance, algae growth, mould, oil, curing agents and any other foreign materials. The finish of the surfaces shall be a brush finish.

All laitance (cement scum) shall be removed as soon after pouring as possible.

D. Pre watering

Concrete shall be thoroughly wetted down in order to achieve the penetration of the activated chemicals, and thereby starting the crystalline growth throughout the capillary tracts.

All free lying water must be removed from surface, leaving the concrete in a damp condition just prior to Vandex application

(03) GENERAL SPECIFICATIONS**VANDEX WATER-PROOFING C'TD****A. Mixing**

Vandex super is mixed to slurry consistency. Add approximately 0.8 parts water to 2.0 parts powder or 9 litres to 25 Kg when mixing full bags, and mix thoroughly until the mixture is free from lumps.

B. Application

The application should be as even as possible trying to avoid thick and thin spots. Areas applied too thick will not cure right and when drying cracks and subsequently peeling may form.

The second coat may be applied when the first coat has set and is not drawn off by the second coat.

C. Curing and protection

Vandex applications must be protected against sun and rain. After the application is dry to the touch, cover with polyethylene sheet (Hessian cloth) or wet sand for five days. If this is not possible, sprinkle with water several times a day for five days. Do not apply Vandex materials at temperature below 5 degrees C or on super cooled structures.

D. Additional information

When concrete is poured in sections, it is recommended that each section is keyed. After keyed form is removed and just prior to pouring the next section the construction joint shall receive a slurry coat of Vandex Super (1.5Kg/sq.m).

This does not apply to control or expansion joints.

E. Master Hyseal 501

Master Hyseal 501 chemical crystalline waterproofing to be applied strictly as directed by the Engineer.

F. Index Fidia Spun bond

Index Fidia Spun bond polyester mineral surfaces waterproofing ditto.

(03) GENERAL SPECIFICATIONS**CARPENTRY**

- A. The requirements of the following British Standards and Codes of Practice shall be observed:

British Standards

- | | | |
|----|------------------------|--|
| B. | B.S. 565 | Glossary of terms relating to timber and woodwork |
| C. | B.S. 1860 part 1 | Structural timber. Measurements of characteristics affecting strength (softwood) |
| D. | B.S. 4471 | Dimensions for softwood |
| E. | B.S. 373 | Methods of testing small clear specimens of timber |
| F. | B.S. 1202 part 1 Nails | |
| G. | B.S. 1579 | Connectors for timber |

British Standards (ctd.)

- | | | |
|----|-----------|------------------------------------|
| H. | B.S. 4169 | Glued laminated structural members |
| I. | B.S. 916 | Black bolts |

Codes of practice

- | | | |
|----|---|---|
| J. | C.P. 112 | The structural use of timber |
| K. | C.P. 98 | Preservative treatment for construction timber |
| L. | <u>NOTE:</u> | The Contractor's attention is drawn to Section "L" of the Standard Method of Measurement. |
| M. | <u>All timber</u> used for carpentry shall be sound, well conditioned, properly seasoned to suit the particular use and free from defects or combination of defects rendering it unsuitable for the purpose intended. | |

(03) GENERAL SPECIFICATIONS**CARPENTRY (CTD.)**

- A. Timber used for carpentry shall be in accordance with the latest approved Grading Rules issued by the Government of Kenya. Timber used structurally shall comply with the requirements of the Export Grading Rules and also with B.S. 1860.

- B. The following timber shall be used:

Podocarpus (podocarpus spp)
Cedar (Juniperus Procera)
Elgon Olive

TIMBER

- C. All timber as it arrives on site shall be inspected by the Contractor, and any timber found not to comply with the specification or not approved must be removed forthwith from the site and only timber which has been approved shall be used.

- D. Tolerances shall conform with the following extracts from the Government of Kenya Grading Rules:-

Softwood Grading: - Strength Grades, first and second grades.

Undersize: All timber to be sawn by 1.6mm per 25mm of thickness and width.

Not more than 3mm in thickness and not more than 6mm in width.

- E. All timber shall be free of live borer beetle or other insect attack when brought upon on site. The Contractor shall be responsible to the end of maintenance period for executing at his own cost all the work necessary to eradicate insect attack of timber attacked or suspected to be attacked, notwithstanding that the timber concerned may have already been inspected and passed as fit for use.
- F. Timber shall be seasoned to a moisture content of not more than 22%.

(03) GENERAL SPECIFICATIONS**CARPENTRY (CTD.)****TIMBER (CTD.)**

- A. All carpentry timbers shall be treated with pressure impregnated "Celcure" or Tenalith" solution with a minimum wet retention of 5.46 KG. of dry salt per m³. If so required "charge sheets" issued after treatment with "Celcure" or "Tenalith" shall be submitted by the Contractor to the Architect for his retention. All out ends and other cut faces or timbers sawn after treatment shall be treated before fixing with "Celcure B" or "Wolmanol" solution brushed on.
- B. The Contractor's rates for such timber hereinafter must allow for the above treatment.
- C. All grounds shall be podocarpus or other light and approved hardwood.
- D. Nails shall comply with the relevant standard as above.
- E. Black bolts shall comply with B.S. 916. Rag bolts, coach screws and others shall comply with B.S 1494. Where used externally nails and screws shall be sherardized.
- F. Timber shall be delivered early to the site, stored under cover clear of the ground and protected from the sun and dampness.
- G. The Architect shall be given facilities and reserves the right for inspection of all works in progress whether in workshop or on site. The Contractor is to allow for testing of proto-types of 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, species strength etc., such tests will be carried out by the Forestry Department.
- H. 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 proceeds and at conclusions of the work.

This is to prevent accidental borer infestation and to discourage termites and decay.
- I. All carpentry'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 brads, nails, and screws etc., shall be provided as necessary directed and approved and the rates shall be deemed to allow for these.
- J. All carpenter's work shall be left with sawn faces except where specified to be wrot.

(03) GENERAL SPECIFICATIONS**CARPENTRY (CTD.)**

- A. All timber shall be as long as possible in order to minimise joints. Where joints are unavoidable surfaces shall be in contact over the whole area of the joint before fastenings are applied.

No nails, screws and bolts are to be fixed in any split end. If splitting is likely, or is encountered in the course of the work, holes for nails are to be prepared at diameter not exceeding 4/5th of the diameter of the nails. Clenched nails must be bent at right angles to the grain.

- B. Lead Holes are to be bored for all screws. When the use of bolts is specified the holes are to be bored from both sides of the timber and are to be of the diameter $D/16$ where D is the diameter of the bolt. Nuts must be brought up tight but care must be taken to avoid crushing of the timber under washers.

(03) GENERAL SPECIFICATIONS**JOINERY**

- A. The requirements of the following British standards and Codes of practice shall be observed:-

British Standards

- B. B.S. 565 Glossary of terms relating to timber and woodwork
- C. B.S. 4471 Dimensions for softwood
- D. B.S. 1186 parts 1+2 Quality of timber and workmanship in joinery
- E. B.S. 373 Methods of testing small clear specimen of timber
- F. B.S. 4512 Methods of test for clear plywood
- G. B.S. 1142 part 3 Fibre building board (Insulation board softwood)
- H. B.S. 3444 Block board and laminated board
- I. B.S. 459 part 1 Pannelled and Glazed wood door
- J. B.S. 1455 Plywood manufactured from tropical hardwoods
- K. B.S. 3794 Decorative laminated plastics sheet
- L. B.S. 459 part 2 Flush doors
- M. B.S. 459 part 3 Fire check flush doors and wood and metal frame (1.5. hour and 1 hour types)
- N. B.S. 1567 Wood door frame and linings
- O. B.S. 584 Wood trims (softwood architraves, skirting, quadrants etc)

British Standards

- P. B.S.1204 parts 1+2 Synthetic resin adhesive (phenolic and amino-plastic) for wood
Type MR-Moisture
Resistant Type INT
-Interior

(03) GENERAL SPECIFICATIONS**JOINERY (CTD.)****British Standards**

- A. B.S. 1210 Wood Screws
- B. B.S. 1494 part2 Fixing accessories for building purposes (bolts, screws, staples etc.)
- C. B.S. 4174 Felt tapping screws and metallic drive screws

Codes of Practice

- D. C.P. 201 Timber flooring
- E. C.P. 201 parts 1+2 Flooring of wood and wood products
- F. C.P. 151 Doors and windows including frames and linings
- G. NOTE: The Contractor's attention is drawn to Section "M" of the Standard Method of Measurements

- H. The timber for joinery shall be as specified in the Export Timber Ordinance of 1951 and obtained from an approved sawmill. All such timber shall be Prime Grade and reasonably straight grained and shall be purchased immediately the Contract is signed and is to be open stacked for such further seasoning as may be required.

Timber which in the opinion of the Architect does not satisfy the specification in character or condition is not suitable for the requirements of the work because of the blemishes it contains shall not be used.

- I. **The following timber shall be used:-**

Podocarpus
Mvuli
Cedar
Elgon Olive
Camphor
Mahogany

(03) GENERAL SPECIFICATIONS**JOINERY (CTD.)**

- A. All timber shall be wrot by machine dressing non exposed faces and machine marks shall be removed with hand plane and sanded out, unless otherwise specified.

The dimensions and thickness stated in the Bills of Quantities are the finished size (unless otherwise stated) and the Contractor will allow for all necessary waste.

- B. The joinery shall be worked strictly in accordance with detail Drawings, and is to be framed up and put together as soon as possible and stored in the drying room, for as long as possible before being wedged up. All joints and angles are to be glued and where necessary cross tongued with hardwood tongues and surfaces finished clean and smooth, with machine marks sand papered out before fixing.

Should any of the joinery work shrink, warp, wind or deflect unduly before the end of the maintenance period of the Contract, the work is to be taken down and rectified at the Contractor's sole expense.

- C. Tolerance in thickness shall conform with the following extracts from the Government of Kenya Grading Rules:

Hardwood Grading: (First and Second Grades)

The following tolerances in thickness will be admitted:-

- (i) 1.6mm over size on pieces up to 25mm in thickness
- (ii) 3mm over size on pieces over 25mm and up to 51mm in thickness.
- (iii) 6mm over size on pieces over 51mm in thickness undersize will not be permitted.

Softwood Grading: Appearance Grades (first and Second Grades)

Undersize not allowed.

Oversize: All timber to be sawn oversize by 1.6mm per 25mm of thickness and width. Not more than 3mm in thickness and not more than 6mm in width.

(03) GENERAL SPECIFICATIONS**JOINERY (CTD.)**

- A. Seasoning of timber shall be to moisture content of not more than 15%.
- B. Pressure impregnation treatment shall be as for "Carpentry".
- C. Where joinery is described as screwed this is deemed to include sinking the head of the screw and pelling with similar timber, and to grain in with the finished joinery.
- D. All hardwood joinery shall be finished for oil paint, unless otherwise stated.
- E. The rates shall be deemed to allow for all nails and screws and fixing all labour cuttings, notching, halving, morticing, tenoning and wedges except where otherwise provided.
- F. All work described as plugged shall be fixed with screws to plugs formed by drilling concrete walls, etc., with the proper tool of suitable size at 750mm spacing and filling the holes completely with "Phil plug" rawl plastic or rawl plugs in accordance with the manufacturer's instructions. Alternatively and where so agreed by the Architect, hardwood dovetailed fixing slips in preservative and cut and primed or bedded in cement mortar (1:3) may be used.
- G. The rates are to allow for all surfaces of joinery where in contact with walling or plaster, or where otherwise unexpected, being treated before fixing with two coats of approved wood preservative.
- H. Laminated plastic sheeting shall be "Formica" manufactured by Thomas de la Rue and Co. or other equal and approved, 1.6mm thick and accurately fixed with approved typed waterproof impact adhesive and in the colours selected by the Architect.
- I. Blackboard shall comply with the Standard as mentioned above.
- J. Plywood shall comply with the standard as mentioned above. Bond M.R. Birch faced both sides unless otherwise stated.
- K. Fibre board shall be 12.7 "Celotex" or other equal approved soft board.

(03) GENERAL SPECIFICATIONS**JOINERY (CTD.)**

- A. **All joiner's work** shall be accurately set out and framed together as soon after commencement of the building as is practicable but not to be wedged up or glued until the building is ready for fixing same. Any portions that warp, wind or develop shapes or other defects within the maintenance period shall be removed and new fixed in their place together with other work which may be affected thereby, all at Contractor's expense.

All work shall be properly mortised, tenoned, housed, shouldered, dovetailed, notched primed, bradded, etc, as directed and to the satisfaction of the Architect and all glued up with the best quality glue.

- B. Joints in joinery shall be as specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails strings, etc are to be punched and puttied. Loose joints are to be where provisions for shrinkage is necessary; glued joints where shrinkage need not be considered and where conditions may be damp must be of the resin type. For non-load-bearing joints or where dry conditions may be guaranteed resin or organic glues may be used. All exposed surfaces for joinery shall wrot and all arises "cased off" by planing and sand papering to an approved finish suitable to the specified treatment.
- C. 3mm reduction of specified sizes will be allowed to each wrot face except in members 25mm thick or less or where, described as finished sizes in which case joinery shall hold up the full dimensions.
- D. In fixing all beads, fillets and small members shall be fixed with round or oval brads or nails well punched in and stopped. All large members shall be fixed with screws. Brass screws shall be used for fixing of all hardwoods, to the heads in and pellated over with wood pellets to match the grain.
- E. Rates shall include for bedding frames, sills etc., in mortar or dressing surfaces of walls etc. in lieu.
- F. Round wood plugs shall not be used, and screws or plugs shall be spaced at 750mm centres.
- G. All fixed joinery which in the opinion of the Architect is liable to become bruised or damaged in any shall be completely cased and protected by the Contractor at his own expense until completion of works.
- H. Bottom edges of doors shall be painted or polished with two coats of approved primer before fixing.

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS****A. STANDARDS AND DIRECTIVES**

All aluminium works are to be executed according to the valid standards, directives, government codes and building regulations, fire regulations and any other such applicable regulations as:-

DIN 107	-	Methods of testing windows; mechanical tests
DIN 1055	-	Design loads for buildings
DIN 1249	-	Flat glass for building construction
DIN 1745	-	Wrought aluminium and aluminium alloy plates, sheet and strip greater than 0.35mm thickness; properties, technical delivery conditions
DIN 1748	-	Wrought aluminium and aluminium-extruded sections; design, permissible deviations
DIN 1783	-	Strips, plates and sheets of aluminium and wrought aluminium alloys with thickness over 0.35mm, cold rolled; dimensions
DIN 4102	-	Fire behaviour of building materials and building components
DIN 4108	-	Heat insulation in buildings
DIN 4109	-	Noise control in buildings
DIN 4113	-	Aluminium constructions under predominantly static loading, static analysis and structural design
DIN 7863	-	Non-cellular elastomer glazing and panel gaskets
DIN 16935	-	Sheets of polyisobutylene used for damp-proofing
DIN 17611	-	Anodized wrought products of aluminium and aluminium alloys with layer thickness
DIN 17615	-	AlMgSi 0.5 precision profiles
DIN 18000	-	Modular co-ordination in building
DIN 18055	-	Windows; air permeability joints, water tightness and mechanical strain
DIN 18056	-	Window walls; design construction
DIN 18103	-	(Burglar resistant) Doors
DIN 18201	-	Tolerances in building; terminology, principles, application, verification
DIN 18202	-	Dimension tolerance; in building construction
DIN 18203	-	Dimension tolerance; precast /reinforced/ prestressed concrete
DIN 18335	-	Contract procedure for building works; general technical specification for steel construction works
DIN 18357	-	Contract procedure for mounting aluminium fittings
DIN 18358	-	Contract procedure for rolling shutter works
DIN 18360	-	Contract procedure for locksmith works
DIN 18361	-	Contract procedure for glazing works

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS (CTD.)****A. STANDARDS AND DIRECTIVES (CTD.)**

DIN 18364	-	Contract procedure for works for protection against corrosion of steel and aluminium structures
DIN 18540	-	Sealing of exterior wall joints in building construction using joint sealants
DIN 18801	-	Steel construction in buildings; dimensioning, design, construction
DIN 18808	-	Steel structures consisting of hollow sections predominantly static loaded
DIN 55928	-	Protection of steel structures from corrosion by organic metallic coatings
VDI 2719	-	Sound insulation of windows or comparable British codes and standards e.g.
CP3	-	Code of basic data for the design of building
CP 118	-	The structural use of aluminium
CP 158	-	Windows and roof lighting
DD 22	-	Tolerance and fits for building
BS 1470	-	Wrought aluminium and aluminium alloys for general engineering purposes, plate, sheet and strip
BS 1474	-	Wrought aluminium and aluminium alloys for general engineering purposes, bars, extruded round tubes and sections
BS 3987	-	Specification for anodic oxide coatings on wrought aluminium for external architectural applications
BS 4873	-	Aluminium alloy windows, specification
BS 5950	-	Structural use of steelwork in building
BS 6262	-	Code of practice for glazing for buildings
BS 6375	-	Performance of windows
BS 6496	-	Specification for external architectural purposes etc.

The directives and guidelines of insulating glass suppliers. The guidelines of accident insurers for local authorities. The guidelines of window/facade system manufacturers.

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS (CTD.)****A. ALUMINIUM**

Extruded aluminium profiles of alloy AlMgSi 0.5F22 in anodizing quality according to DIN 1748 and DIN 17615 are to be used, for anodized sheets ALMg1, for colour-coated ALMg1 or A199.5.

- 01 Special anodizing processes to be taken into account, if determined by the bill of quantities.
- 02 The aluminium system shall be capable of achieving different colours and finishes on the external/internal facade and within the same element.

B. STEEL

Steel parts for anchoring or bracing must either be non-corrosive or galvanized. During mounting all necessary welding points have to be painted with cold zinc galvanizing.

C. SELECTION OF PROFILES

All required sections are to be chosen according to foreseen application and data given by the system manufacturer. Thermally insulated outer and inner profiles must be continuously connected and shear-resistant by insulating bars.

The profiles must safely support all loads as described in DIN 1055. The effective moments of inertia given by the system manufacturer are to be considered when selecting the optimal profile. The principal of thermal break is to be respected in all points of construction. All thermally insulated profiles are determined by the groups of DIN 4108.

Ventilation and drainage of rebate base and front chamber must be foreseen in the aluminium construction system in order to drain off moisture to the outside. The insulating connection of outer and inner section must be water-proof and water-resistant without additional sealing if the connection uses the rebate or front chamber. When using insulating glass the ventilation of the rebate base is to be guaranteed as the insulating glass supplier specifies.

- 01 All minimum and maximum vent sizes and weights as listed in all B.S. profile system are binding.
- 02 The glazing guidelines of the insulating glass supplier and DIN 18056 determining the allowed deflection of mullions and transoms are to be observed.

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS (CTD.)****A. PROFILE CONNECTIONS**

Corner cleats must have a cross section which corresponds to the interior profile contours. At the mitres a perfect sealing and gluing is required. In T-joints the seeping of water into the construction must be prevented by corresponding packing and elastic sealing.

B. VENT GASKETS

All gaskets are to be inserted in order to fulfil the specific window requirements (type, building height etc.) permanently. The gaskets are to be exchangeable.

01 Side hung, turn-tilt, bottom hung and double vent windows must have a middle gasket.

C. WIND LOADING

The system shall be so designed to suffer no permanent distortion or other damage. Deflections of longer pane edge are not to exceed 1/250 for double glazed units and 1/200 for single glazing. When subjected to positive and negative pressures as determined by and in accordance with BSCP 3 Chapter 5 part 2.

D. THERMAL MOVEMENT

The aluminium framework and glazing assemblies shall be constructed and installed in the prepared locations with sufficient tolerance and, where necessary, expansion joints incorporated within the couplings, to provide for expansion and contraction as will be caused by the climatic conditions and temperature changes, winter, summer, day to night, without buckling, distortion of joints, damage to the sealants or other detrimental effects over the temperature range - 15 deg. C. to 35 deg. C. The design shall accommodate, noiselessly, the thermal movement within the combination units and the curtain walling without distortion. Details shall be prepared based upon the dimensions at 20 deg. C. and take account of the ambient temperatures at the time of assembly and installation.

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS (CTD.)****A. DRAINAGE AND VENTILATION OF CONSTRUCTION**

All profile rebates where water or condensate could seep in are to be drained off and ventilated by wind-protected slots or through cavities to the outside.

The system shall incorporate an integral and internal condensate collection drainage channel to remove the condensate from within the assembly to the external drainage system.

Provision for the continuity of drainage from the transome to the mullion is to be provided.

No perforation of the internal structural members within areas of drainage will be permitted.

All internal section junctions are to be adequately sealed.

Transome members within sloped glazed areas shall permit water to drain from one area to another without inhibiting the flow and creating pooling.

B. FITTINGS

Construction systems of B.S. are to be assembled or completed by compatible system fittings as specified. Other fittings may be selected but only if fulfilling DIN standards.

01 If not specified in the bill of quantities all fittings except handle and hinges are to be concealed.

02 The fittings are to be attached in its rebates tension and pressure-proof. If required because of profile wall thickness screw connections need nuts and washers.

C. GLAZING AND PANELS

Glass supply and glazing is described separately for each position of the bill of quantities.

01 The glazing is to be executed by permanently elastic, EPDM-gasket.

02 Guidelines and directives of insulating glass suppliers are to be strictly followed.

03 Supply and installation for fixed panels is always described in the position concerned.

04 All glass assemblies shall be tape sealed between the units and within the structural unit zone and prior to the installation of the external gasket and pressure plate.

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS (CTD.)****A. BUILDING DIMENSIONS**

The exact measurement must be produced by the tenderer himself on site.

- 01 If the client requests the construction to be ready for mounting before the measurement on site can be carried out the tenderer shall determine the assembly dimension together with the client taking into account the tolerance of the building according to DIN.

B. WORKING DRAWINGS

After award of contract the contractor must submit working drawings for specific positions and details as requested by the architect or resident engineer.

C. INSTALLATION OF ELEMENTS

The anchoring of all aluminium elements must neutralize all movements of structure and the elements attached without loading or stress the aluminium construction.

- 01 All mounting of aluminium elements is to be executed exactly in horizontal and vertical alignment according to the measurement points provided by the client.

- 02 All attachment accessories necessary for mounting are to be calculated by the tenderer.

If described in the bill of quantities some anchor rails for attachments will be provided or will be fixed to the structure. In this case the contractor is requested to provide a location plan of required anchoring in time.

- 03 All connecting means, e.g. screws or bolts, must be non-corrosive zinc plated steel.

- 04 All attachments to neighbouring building parts are to be considered when calculating the positions in the bill of quantities.

(03) GENERAL SPECIFICATIONS**ALUMINIUM WORKS (CTD.)****A. GASKETRY AND SEALING**

Appropriate EPDM - gaskets or seals are to be inserted according to design, dimensions and its range of application. The gaskets or seals and their elasticity must fulfil all temperature requirements. The contractor shall ensure total alignment of the gasketry in all visible locations.

- 01 Permanent elastic sealing compounds on silicone or thiocol basis are to be applied for sealings. Joints within any area of the system are to be adequately bonded together to produce a watertight joint. The sealing must stick to the construction parts taking into account the shape of elements and the range of existing temperature without loosening when elements move caused by tension to be considered before. All guidelines or sealing compound suppliers are to be respected.

B. ANODIC OXIDATION

The aluminium profiles and sheets are to be anodized according to DIN 17611. Surface treatment, coating and protection is determined by the specifications as described in the bill of quantities.

- 01 After all of contract, the tone of colour is to be defined according to colour samples.
- 02 All visible fittings must suit the profile colour if available.

(03) GENERAL SPECIFICATIONS**IRONMONGERY**

- A. The requirements of the following British Standards shall be observed:-

British Standards

- B. B.S. 1227 part 1A Hinges
- C. B.S. 2088 Performance test for locks
- D. B.S. 2911 Letter plates
- E. B.S.4112 Performance requirements for hardware for domestic furniture
- F. NOTE: The Contractor's attention is drawn to Section "M" of the Standard Method of Measurement.
- G. All locks and ironmongery shall be fixed with screws etc. to match, before woodwork is painted, handles shall be removed, carefully stored and refixed after completion of painting and locks oiled and left in perfect working order.
- All keys shall be labelled with the door reference on labels before handing to the Architect on completion. All ironmongery shall be carefully protected until completion of the work and any damage is to be made good at the Contractor's expense.
- H. Rates shall allow for easing and adjusting all doors etc. and for lubricating all locks, hinges etc. and leave in perfect working order.
- I. Where descriptions fixing ironmongery include catalogue numbers, such items shall be obtained from the specified manufacturers if at all possible.
- J. Rates shall include for labelling all keys with door reference as directed by the Architect.

(03) GENERAL SPECIFICATIONS**METALWORK**

A. The requirements of the following British Standards and Codes of practice shall be observed:-

British Standards

- | | | |
|----|--------------------|--|
| B. | B.S. 4 part 1 | Structural steel, Hot rolled screws |
| C. | B.S. 4 part 2 | Structural steel, Hot rolled hollow sections |
| D. | B.S. 325 | Black cup and countersunk bolts and nuts |
| E. | B.S. 916 | Black Bolts, screws and nuts |
| F. | B.S. 4174 | Self tapping screws and metallic drive screws |
| G. | B.S. 405 | Metal washers for general engineering purposes |
| H. | 1161 and | Aluminium and aluminium alloy Sections Addendum for general engineering purposes |
| I. | B.S. 938 | Metal ore welding of structural steel tubes |
| J. | B.S 1856 | Metal or welding of mild steel |
| K. | B.S. 729 part 1 | Hot dip galvanised coating iron and steel articles |
| L. | B.S. 1474 | Wrot aluminium and aluminium alloy |
| M. | B.S. 990 parts 1+2 | Steel windows (Domestic and similar buildings) |

(03) GENERAL SPECIFICATIONS**Codes of Practice**

N.	C.P.499	Metal railings and balustrades
O.	C.P.117	Composite construction in structural steel and concrete
P.	C.P. 2008	Protection of iron and steel structures from corrosion
Q.	C.P. 3012	Cleaning and preparation of metal surfaces.

NOTE: The Contractor's attention is drawn to Section "P" of the Standard Method of Measurements.

(03) GENERAL SPECIFICATIONS**METALWORK (CTD.)**

- A. Iron and steel where galvanised shall comply with the requirements of B.S 729, part 1 entirely coated with fine fabrication by complete immersion in a zinc bath in one operation and all excess carefully removed.
- The finished surfaces shall be clean and uniform.
- B. All work in aluminium shall comply with the requirements of the standard mentioned above.
- C. All smithing and bending shall be soundly and neatly executed care being taken not to overheat.
- D. All strap, bolts and similar work shall be forged neat and clean from the anvil.
- E. All welded connections shall be ground to a smooth finish and rates shall be deemed to allow for this.
- F. Steel windows shall comply with the requirements of the Standard mentioned above and shall be fixed in accordance with manufacturer's instructions.
- G. All mild steel except galvanised shall be cleaned of rust and scale, painted one coat red lead priming paint before deliver to site and the rates shall include for this.

(03) GENERAL SPECIFICATIONS**PLUMBING AND ENGINEERING INSTALLATIONS**

A. The requirements of the following British Standards and Codes of practice shall be observed:-

British Standards

- | | | |
|----|--------------------|--|
| B. | B.S 416 | Cast iron spigot and socket soil, waste and ventilating pipes (sand cast and spun) and fittings. |
| C. | B.S. 2871 part | Copper and copper alloy tubes (for water, gas and sanitation) |
| D. | B.S. 864 part | Capillary and compression fittings of copper and copper alloy |
| E. | B.S 1184 | Copper and copper alloy traps |
| F. | B.S. 4576 | Unplasticised P.V.C. rainwater goods |
| G. | B.S 3974 | Pipe supports |
| H. | B.S 1494 | Fixing accessories for building purposes (gutter bolts, pipe brackets) |
| I. | B.S. 1010 | Draw-off taps and stop valves for water services (screw down pattern) |
| J. | B.S 1212 | part 1 & 2 Ball valves (excluding floats) |
| K. | B.S 2456 | Floats for ball valves (plastic) for cold water |
| L. | B.S 1125 | W.C flushing cisterns |
| M. | B.S 417 Part 1 & 2 | Galvanised mild steel cisterns, covers tanks and cylinders |
| N. | B.S 2760 | Pitch-impregnated fibre pipes and fittings |
| O. | B.S 1387 | Steel cubes and tubulars |
| P. | B.S 4514 | Unplasticized P.V.C. soil and ventilating pipe, fittings and accessories |
| Q. | B.S 3505 | Unplasticized P.V.C. pipes for cold water services |

(03) GENERAL SPECIFICATIONS**PLUMBING AND ENGINEERING INSTALLATIONS (CTD)****British Standards (ctd.)**

- A. B.S 143 and 1256 Malleable cast iron and cast copper alloy, screwed pipe fittings
- B. B.S. 78 part 2 and Cast iron spigot and socket pipes
- C. B.S. 1130 (vertically cast) and spigot and socket fittings
- D. B.S 1010 parts 1+2 Draw-off taps and stop valves for water services

Codes of practice

- E. C.P. 304 Sanitary pipework above ground
- F. C.P. 310 Water supply
- G. C.P. 305 Sanitary appliances

NOTE 01. The Contractor's attention is drawn to Section "Q" of the Standard Method of Measurements.

02. The whole of the work shall be executed by an approved licensed Sub-Contractor.

- H. Galvanised mild steel pipes and fittings shall comply with the requirements of B.S 1387 Class "B". The pipes shall be screwed and socketed and put together in hemp and red lead.
- I. Pitched-fibre pipes shall generally comply with requirements of B.S 2760 and shall be obtained from approved manufacturers. The pipes are to be jointed with couplings and fixed to walls with clips, strictly in accordance with the manufacturer's instructions.
- J. P.V.C Pipes for soil and waste shall comply with the Standard mentioned above solvent welded together with seal ring joints where necessary to accommodate movement. Pipes shall be fixed to wall with galvanised mild steel holderbats all to the manufacturer's instructions.
- K. 'Fulbora' Rainwater outlets shall be 100mm, and 150mm diameter as manufactured by Fulbora Limited. (UK) or other equal and approved.
- L. The words "pipe" or "tube" shall be synonymous wherever used herein or in any of the Contract Documents. Pipe sizes stated herein are nominal bore.

(03) GENERAL SPECIFICATIONS**PLUMBING AND ENGINEERING INSTALLATIONS (CTD.)**

- A. Rates shall allow for holder-bats at centres not exceeding 1000mm, cutting and priming to concrete block or in situ concrete walls and making good.
- B. Rates for all tubing shall include for all joints in the running length.
- C. Rates for galvanised mild steel tubing not exceeding 20mm diameter shall include for all sockets, connectors, back nuts, plugs, caps, elbows, bonds and made bends, made springs and made effects.
- D. Rates for fittings on pipes shall include for all cutting and fitting of pipes to same.
- E. The sizes stated of reducing fittings are those of tubes which will be attached to fittings and rates shall include for any additional socket reducers necessary to obtain the stated reduction should it be impossible, to accomplish this with only one fitting.
- F. Pipes shall be fixed at least 25mm clear between socket and wall face. Cast iron holderbats shall be fixed at centres not more than 2 metres. Eared pipes must not be used.
- G. All the plumbing and engineering installation shall be tested as instructed and any work not found satisfactory shall be made good at the Contractor's expense.
- H. Where tubing is laid in trenches care shall be taken to ensure that fittings are not strained.
- I. All tubing described as chased into walls shall have the wall face neatly out and chased, the tubing wedged and fixed and plastered over.
- J. All formed bends shall be made so as to retain the full diameter of the pipe.
- K. Cast iron pipes shall be jointed with asbestos yarn and calked with another lead or jointed with special jointing compounds all to be approved.
- L. All brasswork and fittings shall conform with the requirements of the Standard mentioned above. Such fittings shall be either high or low pressure, in accordance with the recommendations of the local Authority. At commencement of the Contract the Contractor shall ask the Architect for guidance on this point.
- M. All sanitary fittings shall be properly cleaned, polished and left to the satisfaction of the Architect on completion.

(03) GENERAL SPECIFICATIONS**ELECTRICAL INSTALLATION**

NOTE: The Contractor's attention is drawn to Section "R" of the Standard Method of Measurement.

- A. All electrical work shall be carried out under close supervision of a licenced operative of an approved firm of registered Electrical Contractors.
- B. All electrical work shall be executed in strict accordance with the latest editions of the British Standards and other Government Regulations.
- C. The main Contractor shall at all time co-ordinate his own work and that of all Sub-Contractors with the work of the Electrical Sub-Contractor.
- D. Special care shall be executed to ensure that all necessary cable trenches are completed before other subsequent floors, paths etc. including the provision of cable ducts, chases, sinking and the like.
- E. No patching up of floors, pavings, plasterwork etc. will be permitted and where, work has to be rebuilt or re-executed due to lack of planning of Sub-Contractor's work, the Contractor will be held responsible for all costs and expenses arising there from.

(03) GENERAL SPECIFICATIONS**FLOOR, WALL AND CEILING FINISHES**

- A. The Contractor's attention is drawn to Section "S" of the Standard Method of Measurement and the requirements of the following British Standards and Codes of Practice shall be observed:-

British Standards

- | | | |
|----|-----------------------------|--|
| B. | B.S. 1191 Part 1
Class B | Gypsum building plaster (excluding
premixed light weight plasters) |
| C. | B.S. 1193 | Sands for internal plastering with gypsum plasters |
| D. | B.S. 1199 Table 1 | Sands for external renderings, internal plastering with lime and
Portland Cement, and floor screeds |
| E. | B.S. 1201 | Aggregate for granolithic concrete floor finishes |
| F. | B.S. 1281 | Glazed ceramic tiles and tile fittings for internal walls |
| G. | B.S. 1369 | Metal lathing (steel for plastering) |
| H. | B.S. 890 Class A | Building limes |
| I. | B.S. 1187 | Wood Block for floors |

Codes of Practice

- | | | |
|----|---------------------|---|
| J. | C.P. 211 | Internal plastering |
| K. | C.P. 221 | External rendered finishes |
| L. | C.P. 204 | In-situ floor finishes |
| M. | C.P. 202 | Tile flooring and slab flooring |
| N. | C.P. 203 | Sheet and tile flooring (cock, linoleum, plastics and rubber) |
| O. | C.P. 212 part 1 + 2 | Wall tiling |
| P. | C.P. 209 | Care and maintenance of floor surface |

(03) GENERAL SPECIFICATIONS**FLOOR, WALL AND CEILING FINISHES (CTD.)****Materials and workmanship**

- A. Cement shall be as described in "Concrete"
- B. Sand shall comply with the requirements of the Standards mentioned earlier.
- C. Lime shall be non-hydraulic lime to satisfy the Standards mentioned above. It shall be obtained from an approved source. It must be freshly burnt and shall be slaked at least one month before being used by drenching with water, well broken up and mixed and the wet mixture shall be passed through a sieve of 10 meshes to the square centimetre. Lime putty shall consist of freshly slaked lime as described above saturated with water until semi-fluid and passed through a fine sieve, it shall then be allowed to stand until superfluous water has evaporated and it has become of consistency of thick paste, in no case for a shorter period of one month before being used during which it must be kept damp and clean and no portion of it allowed to become dry.

Alternatively, hydrated lime with 70% average calcium oxide content may be used and it must be protected from damp until required for use. It shall be soaked to a putty at least 24 hours before use.

- D. All concrete beds or slabs shall be thoroughly brushed clean, hatched if necessary and well wetted and flushed over with a cement and sand (1:1) grout immediately before screeds or paving are laid.

Screeds and cement paving shall be laid in accordance with the relevant British Standards and/or Code of Practice and in alternate bays generally not exceeding 3.0m during any period of dry hours with neat butt joints and shall be damp cured with sand or sawdust and kept damp for at least 7 days after laying.

As bays are formed batten strips must be used retain the exposed edge of the screed.

Thicknesses and mixes of screeds are adjusted to suit the various top dressing and the Contractor must first ascertain what finish is intended to each specific area before the work of the laying screeds is put in hand.

Screeds shall be finished with a wood float for wood blocks and steel trowel for thermoplastic and similar tiles.

- E. All surface to be plastered must be brushed clean and well wetted before plaster is applied. Joints of walling shall be raked and concrete hacked to form a key. Care shall be taken to see that paving and plastering do not dry out prematurely. Adequate time intervals must be left between successive coats in two coat work in order that the drying shrinkage of the undercoat may be substantially complete.

(03) GENERAL SPECIFICATIONS**FLOOR, WALL AND CEILING FINISHES (CTD.)****A. Internal Lime Plaster**

- i. To be applied in minimum two coats to finish not less than 12mm total thickness. The rendering coat shall be in the proportion of cement and sand (1:4) and the finishing coat not less than 1.50mm thick shall consist of fine sieved lime putty with 10% of cement thoroughly incorporated immediately before use, trowel led hard and smooth with a steel trowel and sprinkled with water during the process.
- ii. The first coat must be well scored to form a key and at least fourteen days must elapse between the completion of any portion of the rendering coat and application of the finishing coat.

B. External cement and sand rendering shall consist of cement and sand (1:4) applied in two coats and finished with a wood float.

C. If required the Contractor shall prepare samples of the screeds, pavings and plastering as directed until the quality, texture and finish required is obtained and approved by the Architect, after which all work executed shall conform with the respective approved samples.

D. All screeds and pavings shall be finished smooth, even and truly level, unless otherwise specified and paving shall be steel trowel led.

E. Rendering and plastering shall be finished plumb, square, smooth, hard and even and junctions between surfaces shall be perfectly true straight and square.

All work not found to be of satisfactory standard shall be hacked away and made good at the Contractor's expense.

F. Partially or wholly set materials will not be allowed to be used or re-mixed. The plaster etc., mixes must be used within two hours of being combined with water.

G. Granolithic topping is to be in two layers to the total thickness shown on the Drawings and the topping shall consist of one part coloured cement to two parts aggregate shall be 70% black trap and remainder approved local coloured stones.

Colours shall be as selected by the Architect.

Paving shall be rolled and trowel led to a dense even surface and rubbed down at completion, to a grit finished surface free from holes and blemishes. The paving shall be laid in squares divided by plastic strips anchored securely in the screed and having their top edge truly level with the finished floor surface. The granolithic work shall be laid and polished complete to the approval of the Architect.

(03) GENERAL SPECIFICATIONS**FLOOR, WALL AND CEILING FINISHES (CTD.)**

- A. Wood block flooring shall comply with the requirements of B.S.1187 mentioned above and shall be dipped in a cold latex bitumen emulsion adhesive before laying. Any one package or bundle shall contain wood blocks of a single species, thickness, width length and type of manufacture only. The pattern shall be approved by the Architect.
- B. Wood parquet flooring shall comply with relevant standards and shall be laid using an approved adhesive in accordance with manufacturer's instructions.
- C. P.V.C. coverings shall satisfy the Standard mentioned above and shall be obtained from an approved manufacturer's agent. Floor tiles shall be Dunlop or other equal and approved. Rates shall include for two of an approved emulsion floor polish or other protective coating.
- D. Glazed wall tiles shall be cushion edged and satisfy the relevant Standard as mentioned earlier. Tiles shall be well soaked in water laid with straight horizontal and vertical joints painted in white cement and cleared down at completion.

Tiles joints of 2mm width shall be formed and filled with the redding mix but using very fine, well screened sand, care shall be taken that tiles are not over soaked and water sheen shall be avoided during fixing.

The fixed tiles shall be kept damp for 4 days. Tiles as splash backs to lavatory basins, sinks, and baths shall be fixed with necessary rounded-edge and corner tiles.

Rates for linear items shall allow for all special fittings and cutting at angles and intersections.

- E. Rates for insitu work shall allow for raking out joints walling or hacking of treating with an approved bonding fluid, hacking concrete to form key, dubbing out irregular surfaces of base to provide a finished surface in the same plane as the surrounding surface, cutting out cracks, making good and leaving the whole of the work sound and prefect on completion.
- F. Rates shall also allow for fair edges, whether square, splayed or rounded, arrises, chamfered external angles not exceeding 25mm wide, rounded external angles not exceeding 25mm radius coved internal angles not exceeding 25mm radius, intersections to groins and the like, and for making good around pipe, brackets, floor spring boxes and all other items of a like nature.
- G. Rates for all linear items shall allow for all short lengths, angles, end and arrises, metres and intersections and the like.

(03) GENERAL SPECIFICATIONS**FLOOR, WALL AND CEILING FINISHES (CTD.)**

- A. Rates for all paving shall allow for adequate covering protection during the progress of the works to ensure that the floors are handed over in perfect condition on completion.
- B. Rates for external rendering shall allow for work at any height and for any scaffolding, ladders, cradles etc. required.
- C. Terrazzo pavings: Aggregate for terrazzo shall be good quality marble or other natural stone of similar characteristics, hard angular in shape, free from clay, iron oxide and other foreign matter, graded from 10mm to 6mm unless otherwise specified and without excessive content of fines or dust. The source of supply and the colour are to be approved by the Architect before bulk ordering.

Terrazzo flooring must be laid and finished by an approved specialist Sub-Contractor.

All base surfaces must be thoroughly cleaned to remove dust, dirt, rust, oil and loose material.

Terrazzo shall be laid in two courses as follows:

- (a) Base course: cement- sand screed 1:3, not less than 20mm thick, followed immediately by
- (b) Topping terrazzo mix as specified, not less than 20mm finished thickness.
- (c) Skirtings are to be 6mm thick on a screed not less than 10mm thick.

Terrazzo bays shall not be more than 1M2 and joints shall be formed with plastic or aluminium strips set out to an approved pattern. Strips must be carried through the backings screed and finish flush with the floor surface.

Tamp lightly immediately after laying and compaction trowel lightly, taking care to avoid excessive laitance on the surface. Not less than 3 days after laying, rough polish by an approved mechanical means using water. Grout with a fine mix reserved from the initial mix. Not less than 8 days after grouting, fine polish by an approved mechanical means using water to a texture approved by the Architect.

(03) GENERAL SPECIFICATIONS**FLOOR, WALL AND CEILING FINISHES (CTD.)**

- A. Terrazzo floor tiles shall be to B.S. 4131 of approved manufacturer. The faces of tiles must be free from projections, depressions, flakes and crazes. The overall colour must be practically uniform in any one delivery. The facing level must not be less than 6mm thick after grinding.

Unless otherwise specified or approved by the Architect, tiles are to be 197mm x 197mm x 22mm.

- B. Mosaic finishes: Mosaic finishes shall comply with the requirements of B.S Code of practice CP 212 part 2.

- C. Quarry tile finishes: Quarry tile finishes shall comply with the requirements of B.S 1286

- D. Granite cladding and flooring: Granite cladding and flooring shall be strictly in accordance with the requirements of CP 202 and CP 298.

Flooring granite shall have an abrasion factor not higher than 11%.

The exposed surfaces shall be finished in accordance with an approved sample at each situation.

(03) GENERAL SPECIFICATIONS**GLAZING**

- A. The Contractor's attention is drawn to Section "T" of the Standard Method of Measurements and the requirements of the following British Standards and Code of Practice shall be observed:-

British Standard

- B. B.S 952 Glass for glazing
- C. B.S. 544 Linseed oil putty for use in wooden frames

Codes of Practice

- D. C.P. 152 Glazing and fixing of glass for buildings
- E. The whole of the glass shall be of the best quality and be free from bubbles, specks, waves, flaws or any other defects and shall comply with the requirements of the standard mentioned above.
- F. All glass is to be accurately cut to fit easily into rebates. Glass shall be well puttied and sprigged with copper springs.
- G. Glazing to wood frames shall be secured with glazing beads fixed with brass caps and screws and wash leather or approved "Neoprene" beading strips. Putty for glazing in wood frames shall be composed of pure linseed oil and powdered whiting, free from grittiness all in accordance with the standard mentioned above.
- H. Glazing to metal frames shall be with clips, glass shall be properly back puttied and the front putty finished neatly and cleanly.

Putty for glazing in metal frames shall be quick hard setting tropical putty specially manufactured for use with steel windows.

Rebates of metal frames receiving glass shall be prepared and treated with primer for putty prior to glazing and putty shall be primed 10 days after glazing.

- I. Rates for glazing Georgian wired glass shall include for aligning lines in adjoining panes both ways.
- J. Glass panes shall be cut to sizes to fit the openings with not more than 1.6mm play all round. Clear sheet shall be ordinary glazing (O Q) quality and polished plate shall be (GG) quality.

(03) GENERAL SPECIFICATIONS**GLAZING (CTD.)****A. Mirrors**

To be selected glazing (S.G) quality plate glass mirrors of approved manufacturer with bevelled edge and fixed at all corners to walls with rawl plugs and brass screws with removable chromium plated dome heads.

- B. Cut out all cracked or broken glass re-glazed to match and leave perfect on completion. On no account shall windows be cleaned by scraping with glass.

PAINTING AND DECORATING

- A. The Contractor's attention is drawn to Section "U" of the Standard Method of Measurement and the requirements of the following British Standards and Codes of Practice shall be observed:-

British Standards

- B. B.S 2521 + 2523 Lead based joint
- C. B.S. 3698 Calcium plumbate priming paints
- D. B.S. 4756 Ready mixed aluminium priming paints for woodwork
- E. B.S. 1336 Knotting
- F. B.S. 3842 Treatment of plywood with preservatives
- G. B.S 4800 Paint colours for building purposes
- H. B.S. 2660 Colours for building and decorative paints
- I. B.S. 2524 Red-Oxide-Linseed oil priming paint
- J. B.S. 2525-7 Undercoating and finishing paints
- K. B.S. 1215 Oil stains

Codes of Practice

- L. C.P. 231 Painting for buildings
- M. C.P. 3012 Cleaning and preparations of metal surfaces
- N. All work under this trade must be executed by an approved specialist unless otherwise permitted.
- O. The Contractor's Programme in this area shall be so arranged that all other trades are completed and away from the area to be painted prior to the commencement of painting. Before painting the Contractor must remove all concrete and mortar droppings and the like from all work to be decorated and remove all strains from and obtain uniform colour to work to be oiled and polished.

(03) GENERAL SPECIFICATIONS**PAINTING AND DECORATING (CTD.)**

- A. All plaster, metal, wood or other surfaces which are to receive finishes of paint, stain, polish, distemper or paint work of any description are to be carefully inspected by the Contractor before he allows any of his painters to commence work. The Contractor will be held solely responsible for all defective work as a result of his painters' failure to insist on receiving from the other trades surfaces in the proper condition to allow first class finishes to the various kinds specified being applied to them.
- B. All painting and decorating schemes shall be carried out in colours selected by the Architects.
- C. Paints shall be ready mixed, oil based priming paint shall comply with the requirements of the relevant standards mentioned earlier.
- D. The oil shall comply with the requirements of B.S 1215.
- E. All materials shall be of the best quality and shall be of an approved proprietary brand selected from the latest Schedule of Approved Paints issued by the Ministry of Works.
- F. Materials to be applied externally shall be of exterior quality and/or recommended by the manufacturers for external use.
- G. Materials shall be delivered to site intact in the original sealed drums or tins and shall be mixed and applied strictly in accordance with the manufacturer's instructions and to the approval of the Architect.

Unless specifically instructed or approved by the Architect, no paints, distemper etc. are to be thinned or otherwise adulterated, but are to be used as supplied by the manufacturers and direct from the tins.
- H. If required by the Architect the Contractor shall provide at his own expense samples of paints etc. with containers and cases to be forwarded, carriage paid, by the Contractor for analysis to a laboratory.
- I. The priming, undercoat, and finishing coats shall each be of differing tints, and the priming and undercoat shall be the correct brands and tins to suit the respective finishing coats, in accordance with the manufacturer's instructions. All finishing coats shall be of colours and tints selected by the Architect. Each coat must be approved by the Architect before the next coat is applied.
- J. Each coat shall be properly dry and in the case of oil or enamel paints shall be well rubbed down with fine glass paper before the next is applied. The paintwork shall be finished smooth and free from brush marks.

(03) GENERAL SPECIFICATIONS**PAINTING AND DECORATING (CTD.)**

- A. Colour cards of all paints etc. shall be submitted to, and samples prepared for approval of the Architect before laying on, and such samples, when approved, shall become the standard for the works.
- B. All paints, emulsion paints, and distempers shall be applied by means of a brush or spray gun or rollers of an approved type, where so agreed by the Architect.
- C. No painting is to be done in wet weather or on surfaces which are not thoroughly dry.
- D. Woodwork to be painted shall be rubbed down and all knots and resin pockets shall be scorched back and coated with knotting. After priming all nail holes and other imperfections shall be stopped and the whole surface be rubbed down and all dust brushed off. The surface of woodwork shall be lightly sand prepared between the coats.
- E. All woodwork in contact with walling or plaster shall be treated after cutting and preparations but before assembly or fixing with one coat of "Timside" wood preservative manufactured by Timsales, P.O. BOX 18080, Nairobi. the solution is to be brushed on all faces of all timbers, unless exposed to view and painted. The Contractor shall note that this solution is poisonous and shall take all necessary precautions and instruct his workmen accordingly.
- F. Wax polish shall be furniture polish of an approved brand, and wood surfaces shall be clean smooth free from oil or grease or any other blemishes. A minimum of two coats shall be applied to approval.
- G. Plaster surfaces shall be perfectly smooth free from defects and ready for decorations. All such surfaces shall be allowed to dry a minimum period of six weeks, stopped with approved plaster compound stopping and rubbed down flush as necessary, and then thoroughly, immediately prior to decorating.
- H. Plaster Surfaces which are to be finished with emulsion, oil or enamel paint, shall be primed with an alkali resisting primer complying with the particular paint manufacturer's specifications and applied in accordance with their instructions.
- I. Fibre board or similar surfaces shall be lightly brushed down to remove all dirt, dust and loose particles and have all nail holes or other defects stopped with an approved plaster compound stopping rubbed down flush and left with a texture to match surrounding materials and shall receive one coat petrifying liquid at last or two coats polyurethane or clear lacquer.

(03) GENERAL SPECIFICATIONS**PAINTING AND DECORATING (CTD.)**

- A. All metal surfaces shall be thoroughly brushed down with wire brushes and scraped where necessary to remove all scale, rust etc. immediately prior to decorating. Where severe rust exists and if approved by the Architect a proprietary de-rusting solution may be used in accordance with the manufacturer's instructions.
- B. Shop primed and unprimed surfaces shall be given one coat of metal chromate primer.
- C. Galvanised surfaces shall be treated before painting with an approved proprietary or de-greasing solution before priming.
- D. Coated surfaces already treated with bituminous solution shall be scrapped to remove soft parts and then receive two isolating coats of aluminium primer or other approved anti-tar primer.
- E. Existing painted and decorated surfaces shall be prepared as described above. Painted plaster, metal or wood surfaces shall then be rubbed down to expose the material beneath and old paint burnt off with blow torches if necessary in the Architect's opinion.
- F. Emulsion paint on ceilings and all undercoats of emulsions paint and complete oil painting on walls shall be completed before PVC floorings are laid. Final coats of emulsion paints on walls shall be applied after such flooring has been laid complete.
- G. Three coats of emulsion paints shall be applied to receiving surfaces using a thinning medium or water only if and as recommended by the manufacturer. An approved plaster primer tinted to match may be substituted for the first coat.
- H. Enamel paint shall be applied in two undercoats and one finishing coat after preparation and priming as specified above.
- I. All ironmongery shall be removed from joinery steel windows and louvre before painting is commenced and shall be cleaned and renovated if necessary and refixed after completion of painting.
- J. Rates for painting shall be deemed to include for preparing and priming surfaces above described.
- K. Rates for paints, distemper etc. shall allow for covering up all floors, fittings, etc with dust sheets when executing the work and for removing, covering when no longer required and for cleaning off, touching up and leaving perfect at completion.

(03) GENERAL SPECIFICATIONS**DRAINAGE**

- A. The contractor's attention is drawn to Section "V" of the Standard Method of Measurement and the requirements of the following British Standards and Codes of Practice shall be observed:-

British Standards

- B. B.S 556 Parts 1+2 Concrete cylindrical pipes and fittings (including manholes, inspection chambers and street gullies)
- C. B.S. 4101 Concrete unreinforced tubes and fittings (with ogee joints for surface water drainage)
- D. B.S. 437 part 1 Cast iron spigot and socket drain pipes and fittings
- E. B.S. 1247 Manhole step irons (in malleable cast iron)
- F. B.S. 2760 Pitch-impregnated fibre drainage pipes and fittings
- G. B.S 1211 Centrifugally cast (spun) iron pressure pipes for water, gas and sewage
- H. B.S. 1130 Cast iron drain fittings

Codes of practice

- I. C.P.301 Building drainage
- J. C.P. 2005 Sewerage
- K. C.P. 2010 Pipelines
- L. The preambles and other clauses as directed to "Excavating" "concreting" "Walling" and paving are to apply where relevant to the items of this Bill.
- M. Cast iron drain pipes shall be coated cast spigot and socket pipes conforming with B.S 437 in all respects and with fittings of B.S 1130 referred to above. Pipes shall be jointed with asbestos yarn and caulked with molten lead or jointed with special jointing compound all to approval.
- N. Concrete drain pipes shall be spigot and socket pipes of approved local manufacturer and complying with the requirements of the relevant Standard mentioned above. Pipes shall be jointed with tarred spun yarn and cement and sand (1:2) neatly haunched.

(03) GENERAL SPECIFICATIONS**DRAINAGE (CTD.)**

- A. Pitch-impregnated fibre pipes shall comply with the requirements of B.S 2760 and of approved manufacturer. Joints shall be made with straight couplings in accordance with the Standard and the laying, cutting and jointing shall be carried out, strictly in accordance with manufacturer's printed instructions.

The pipes are obtainable from Key Terrain Limited. (UK) or Crown Paints Limited., Nairobi.

- B. Drainpipes have been measured over all bends, junctions and other fittings and the Contractor shall include in his prices for all joints, short lengths, cutting and waste. Rates for bends, junctions etc. shall include for the extra joints, cutting and waste and any labour required.
- C. Lines of drains shall be accurately set out and trenches excavated and bottom trimmed to accurate gradients to approval before pipe laying commences.
- D. Generally the drainage is to be executed in suitable sections to cause the minimum interference to the continual use of any existing drains. The location and depths of any existing drains shall be ascertained before other work is commenced and the rates are to include for all costs of complying with this requirement.
- E. Excavations for drain trenches shall be not less than 300mm wider than the external diameter of the pipes and rates shall include for grading ground under beds, carefully filling in earth to avoid damaging pipes, ramming and carting away surplus excavated material, keeping excavations free from water, if necessary executing such works and installing such pumps as may be required to keep the excavations dry at all times, and any necessary planking and strutting.
- F. No subsoil water shall be discharged into the sewers without the written permission of the architect.
- G. Excavations shall be made to such depths and dimensions as may be required by the Architect to obtain proper falls and firm foundations. No permanent construction shall be commenced on any bottom until the excavation has been examined and approved by the architect. Should Contractor in error or without the instructions of the Architect, make any excavation below the required level of the drain or bed, as the case be, he will be required to refill such excavation to the correct levels with concrete (1:4:8 - 38mm gauge).

Rates shall include for excavating in all materials met with and for trimming bottoms to the necessary falls and working space.

DRAINAGE (CTD.)

- A. The first back filling of pipe trenches is to be soft material free from stone and shall be watered and carefully tamped over and around the pipes in 300mm layers until they are covered to a depth of

(03) GENERAL SPECIFICATIONS

600mm. Subsequent filling is to be in 150mm layers watered and rammed, only materials approved by the Architect are to be used as backfilling.

- B. Where hardcore is used for backfilling it is not to exceed 150mm gauge and all interstices shall be properly filled with small pieces and fine binder. Surplus excavated materials are to be removed from site.

If in the opinion of the Architect care has not been exercised in refilling trenches, he may order a fresh test to be made on the drain. In the event of the drain failing to pass the test the contractor will be required to remedy the fault at his expense.

- C. Concrete beds and surrounds shall be of concrete 1:3:6 - 20mm gauge to the thickness falls, and widths specified. Hollows shall be left to receive the collar of the pipe, so that the pipes sufficiently wide to form hard-holds to permit the joining of pipes, and after resting drains shall be haunched to both sides to half the diameter of the pipe in similar concrete.

Where pipes are specified to be surrounded, the concrete shall be carried up from the bed in a square section with a minimum of 150mm in thickness over the barrel of the pipe.

- D. Rates for beds and surrounds shall include for forming recesses and filling with concrete, for mortar layer etc. and for any necessary formwork.
- E. Each pipe shall be carefully examined on arrival, any defective pipes shall be removed immediately from the site and not used in the works. Minor damage to the protective coating of cast iron pipes shall be made good by painting with hot tar; if major defects in the coating exists such pipes shall be rejected and removed from the site.
- F. Drains are to be laid in a straight line from point to point and each pipe is to be properly bowed in so that the invert is a true and even gradient in order to achieve a fall giving a self cleansing velocity. The Contractor shall provide suitable equipment and set up and maintain all sight rails, bowing rods, and bench marks etc. necessary for the purpose.
- G. All drains shall be kept free from earth Debris, superfluous cement and other obstructions or water during laying and until completion of the Contract when they shall be handed over in a clean condition.

(03) GENERAL SPECIFICATIONS**DRAINAGE (CTD.)**

- A. Pipes shall be laid with sockets leading uphill and shall rest on solid and even foundations for the full lengths of the barrel, socket recesses shall be formed in the foundations, as short as practicable but sufficiently deep to allow the pipe jointer room to work right round the pipe. Such recesses shall be filled with cement mortar (1:4) on completion of laying.
- B. All joints are to be accurately made by butting the pipes together, caulking with tarred rope neat cement finished externally with a bold fillet neatly pointed. As each pipe is laid it is to be drawn with a badger and left free of all obstructions.
- C. Rates of bends junctions and other fittings in drains shall include all cutting and waste and extra joints.
- D. The testing of drains shall be done at completion and before the trenches are filled in. They shall be tested in the presence of the Architect and a representative of the Local Authority by filling with water having a head not less than 1.5m at the highest point of the section under test. A second and similar test may be applied, after the drain trenches are filled in and the work complete.
- E. Manholes shall be constructed in the positions indicated on the Drawings or as required by the Architects. Such chambers shall be to the depths required to obtain even gradients in the drain and of sufficient size to contain the requisite main channel and any branches thereto and all the entire satisfaction of the Architect and Local Authority.
- F. Rendering to manholes shall be trowelled smooth coved at all internal angles and rounded at arrises.
- G. Manholes are to be tested for water-tightness in the same way as to drains by filling with water but not exceeding 1.5m head. The contractor shall supply all testing apparatus and materials necessary for these tests and provide all labour and assistance required. Any failure whatsoever in the drainage system to withstand the specified tests and any defects appearing are to be made good and the drains re-tested to the satisfaction of the Architect and Local Authority.
- H. For connections to public drainage the Contractor shall make all arrangements with the Local Authority and pay all fees that may be required for connections to main sewers.

(03) GENERAL SPECIFICATIONS

EXTERNAL WORKS

- A. Contractor's attention is drawn to the requirements of the following British Standards and shall be observed:-

British Standards

- | | | |
|----|--|--|
| B. | B.S 1621 | Bitumen Macadam (with crushed rock or slag aggregate) |
| C. | B.S. 340 | Precast concrete kerbs, channels, edgings and quadrants. |
| D. | B.S. 368 | Precast Concrete flags |
| E. | B.S. 4428 | General Landscape operations (excluding hard surfaces) |
| F. | B.S. 3882 | Recommendations and classification for top soil |
| G. | B.S 3936 | Nursery stock |
| H. | B.S 3998 | Recommendations for tree work |
| I. | <u>Preamble to preceding trades</u> where applicable shall apply equally to the work contained herein. | |

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<p><u>DEFINITION OF TERMS</u></p> <p>The following terms, whenever used hereinafter and in all Contract Documents shall be interpreted as hereunder:-</p> <p>a) “Employer/Client” shall be held to mean THE VICE CHANCELLOR, UNIVERSITY OF EMBU of P. O. BOX 6-60100, EMBU</p> <p>b) “The Architect” shall be held to mean ARCH. MICHAEL KYEVA , UNIVERSITY OF EMBU of P. O. BOX 6-60100, EMBU</p> <p>c) “The Quantity Surveyor” shall be held to mean QS. HURIA KARUGU , UNIVERSITY OF EMBU of P. O. BOX 6-60100, EMBU</p> <p>d) “Contractor” shall be held to mean the person or persons partnership, firm or company whose tender for the Works has been accepted and who has or have signed a written Contract with the Employer and shall include his or their heirs, executors, administrators, assigns, successors and duly appointed representatives.</p> <p>e) “Employer/Client's Representative” – shall be held to mean persons duly authorised to represent the Employer or the successors in office of such persons and also such persons as may be deputed by such representatives to act on their behalf for the purpose of this Contract.</p> <p>f) “Works” shall be held to mean all or any portion of work, materials and articles wherever the same are being manufactured or prepared which are to be used in the execution of this Contract, and whether the same be on the site of the building or not.</p> <p>It shall also be deemed to include the work of all sub-contractors and all variations.</p> <p>g) “Contract” shall be held to mean the the agreement entered into by the Employer abd the Contractor as recorded in the form of agreement and signed by the Parties.</p> <p>h) “Site” shall be held to mean the Lands and other places on, under, in or through which the works are to be executed or carried out and other lands or places provided by the Employer for the purpose of the Contract.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<p><u>DEFINITION OF TERMS CTD</u></p> <p>i) “Approved, Directed and Selected” shall be held to mean the written approval, direction and selection of or by the Employer or Employers Representative.</p> <p>j) “Singular and plural” – words importing the singular only shall also include the plural and vice versa where the context requires.</p> <p>k) “remove” shall mean taking down, dismantling, hacking up, breaking down etc. and clearing from site or as directed.</p> <p><u>LOCATION OF SITE</u></p> <p>The site is situated within the Municipality of Embu within Embu County, approximately 139 km from Nairobi by road. The site for the works is located within the University of Embu.</p> <p>The Contractor shall be deemed to have visited the site (at his own cost) and satisfied himself as to:</p> <p>(a) The nature of the site.</p> <p>(b) The amount of bush, rubbish or debris to be cleared away before commencement.</p> <p>(c) The nature, current usage, proximity and size of adjoining property and buildings.</p> <p>(d) The topography of the site</p> <p>(e) The nature of existing communication by road or otherwise.</p> <p>(f) The current construction stage and nature of the existing incomplete building.</p> <p>(g) The materials on site and the nature of existing temporary structures.</p> <p>h) The availability of land for the erection and positioning of all temporary structures and materials necessary for the execution of the works</p> <p><u>Note</u></p> <p>The contractor must obtain the Architect's approval and directions regarding the use of any material found on the Site. Any such material utilized in the execution of the Contract shall be measured and value assessed by the Quantity Surveyor and the amount credited to the Employer.</p> <p>The Contractor's attention is drawn to the fact that they shall confine themselves to the area necessary for executing the works as instructed by the Architect.</p> <p>No claims for extras will be considered on account of lack of knowledge in this respect.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>WORKING CONDITIONS</u> The contractor's attention is drawn to the fact that the site is located in a learning institution and should endeavour to reduce activities that may disrupt normal learning process		
B	<u>SCOPE AND DESCRIPTION OF THE WORKS</u> The Works under this contract comprise completion of: - An auditorium of approx. 900 M2 with and including all services installations as per the drawings and bills of quantities - The construction of the auditorium has been done as follows: a) The substructure b) Partial masonry and reinforced concrete walling c) Partial reinforced concrete superstructure works The standards of workmanship and materials used must be of the highest levels achievable in accordance with the specifications provided for the works. The Employer shall have the right to hire others to carry out work falling under this contract if the Contractor fails to meet the required standards of materials and workmanship. The Employer has the authority to issue variations through the Architect or the Project Manager to either increase or decrease the scope of works. In event of such happenings, the Contractors rates will be used as allowed in the Conditions of Contract. However such variations will not entitle the Contractor to claims for loss of profit and other related expenses in case of omissions being made to the scope of works. The Employer therefore reserves the right to omit any section(s) of the Works before or after the award.		
A	<u>CONDITIONS OF CONTRACT</u> The parties shall enter into a contract which shall be the current Conditions of Contract for Building Works, issued by the public procurement oversight authority excepting in so far as may be deleted/varied herein or thereafter. The said conditions are included in the main tender document. Tenderers are expected to be familiar with the said conditions of contract. That notwithstanding, they can seek clarification from the Quantity Surveyor in respect of any clause, or any addition or amendment to any clause as contained herein.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
B	<p>The Contractor is referred to the main document for full information as number and titles of the clauses only are hereafter given with such additional information as is required. <u>All clauses carrying a monetary value to be priced out opposite to the numbers and titles of each clause.</u></p> <p><u>CLAUSES</u></p> <p>1. Definitions</p> <p>2. Interpretation</p> <p>3. Language and Law</p> <p>4. Project Manager's Decision</p> <p>6. Delegation</p> <p>7. Communications</p> <p>8. Subcontracting</p> <p>9. Other Contractors</p> <p>10. Personnel Note: The Contractor shall employ and constantly keep upon the Works a competent site agent to the approval of the Project Manager who is able to understand and interpret the contract documents and to supervise Works. The site agent shall be literate in the English language and shall be accredited by the relevant national public authority responsible for such accreditation.</p> <p>11. Works</p> <p>12. Safety & Temporary Works Note: The Contractor shall comply with all health and safety regulations applicable during the entire contract period.</p> <p>13. Discoveries</p> <p>14. Works Program Note: The Contractor shall prepare daily site reports in a format acceptable to the Project Manager. Further, periodic progress reports as shall be agreed with the Project Manager during the execution of the works, including photographs shall be prepared by the contractor and submitted to the Project Manager and copied to all consultants and the Employer.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<p><u>CLAUSES (cont'd)</u></p> <p>15. Possession of Site</p> <p>16. Access to Site</p> <p>17. Instructions</p> <p>18. Extension or Acceleration of Completion Date</p> <p>19. Management Meetings</p> <p>20. Early Warnings</p> <p>21. Defects</p> <p>22. Bills of Quantities</p> <p>23. Variations</p> <p>24. Payment Certificates, Currency of Payments and Advance Payments</p> <p>25. Compensation Events</p> <p>26. Retention</p> <p>27. Liquidated Damages</p> <p>28. Securities Note: The Performance Security shall be valid until a date 180 days beyond the date of issue of the Certificate of Completion.</p> <p>29. Dayworks</p> <p>Any Daywork ordered under this Clause shall be executed at the following rates:-</p> <p>Labour: The Prime Cost to which * _____ per centum shall be added.</p> <p>Materials: The Prime Cost (delivered to Site) to which * _____ per centum shall be added.</p> <p>Plant: The Nett Hire Charge to which * _____ per centum shall be added.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<u>CLAUSES (cont'd)</u> These percentage additions shall cover all insurances, use of small tools and non-mechanical plant, sharpening tools, water, supervision, watching, lighting, establishment and overhead charges and profit. Dayworks will be allowed only where specifically ordered by the Architect in writing. All Daywork Sheets must be signed by the Architect and the Contractor or their authorised representatives. 30. Liability and Insurance 31. Completion and Taking Over 32. Final Account 33. Termination 34. Payment upon Termination 35. Force Majeure 36. Release from Performance 37. Corrupt gifts and payment commission 38. Settlement of Disputes 39. Confidentiality		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>APPENDIX TO CONDITIONS OF CONTRACT</u>		
a	The EMPLOYER is The Vice Chancellor University of Embu (UoEm) P. O. Box 6 - 60100 Embu		
b	The name of the Contract is COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU		
c	The Works consists of COMPLETION OF THE CONSTRUCTION OF AN AUDITORIUM ALL ASSOCIATED MECHANICAL AND ELECTRICAL WORKS AS DETAILED IN THE DRAWINGS, SPECIFICATIONS AND BILLS OF QUANTITIES		
d	The start date shall be AGREED WITH THE EMPLOYER		
e	The Intended Completion Date for the whole of the Works shall be AS SHALL BE AGREED WITH THE EMPLOYER		
f	The following documents also form part of the Contract: PROGRAMME OF WORKS SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE PROJECT MANAGEMENT TEAM.		
g	The Contractor shall submit a revised program for the Works within 14 DAYS of delivery of the Letter of Acceptance.		
h	The amount to be withheld for late submission of an updated program is: <u>ANY FULL CERTIFICATE DUE.</u>		
i	The Site Possession Date shall be AGREED WITH THE EMPLOYER		
j	The Site is located approximately 3.5 Kms FROM EMBU TOWN CENTRE, WITHIN EMBU MUNICIPALITY, INSIDE THE UNIVERSITY.		
k	The Defects Liability period is 6 CALENDER MONTHS DAYS AFTER DATE OF PRACTICAL COMPLETION.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<u>Appendix to Conditions of Contract C'td</u>		
a	The minimum insurance covers shall be;		
b	The minimum cover for insurance of professional fees shall be 15% of CONTRACT SUM.		
c	The minimum cover for loss or damage to Equipment is KSHS. 10% OF CONTRACT SUM		
d	The minimum for insurance of other property is KSHS. 10% OF CONTRACT SUM		
e	The minimum cover for personal injury or death insurance:		
	i) For the Contractors' employees is 10% OF CONTRACT SUM		
	ii) For other people is 5% OF CONTRACT SUM		
f	The following events shall also be Compensation Events: NONE		
g	The period between Program updates is 14 DAYS.		
h	The amount to be withheld for late submission of an updated Program is ANY FULL CERTIFICATE DUE.		
i	The proportion of payments retained is 10% OF CERTIFIED AMOUNT		
j	The Price Adjustment Clause SHALL NOT APPLY. THIS IS A FIXED PRICE CONTRACT		
k	The liquidated damages for the whole of the Works is KSHS. 200,000.00 (per calendar week of delay or part thereof)		
l	The Performance Security shall be for the following minimum amounts equivalent as a percentage of the Contract Price 10 PERCENT (%)		
m	The Completion Period for the Works is SHALL BE AGREED UPON BY THE CLIENT AND THE CONTRACTOR AT CONTRACT SIGNING STAGE		
n	The rate of exchange for calculation of foreign currency payments is NOT APPLICABLE		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<u>Appendix to Conditions of Contract C'td</u>		
a	The schedule of basic rates used in pricing by the Contractor is as attached <i>Tenderer [to attach]</i> .		
b	Advance Payment: NOT APPLICABLE		
CARRIED TO COLLECTION			

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 1 - PARTICULAR PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<u>COLLECTION</u>		
	Brought forward from page PP/1		
	Brought forward from page PP/2		
	Brought forward from page PP/3		
	Brought forward from page PP/4		
	Brought forward from page PP/5		
	Brought forward from page PP/6		
	Brought forward from page PP/7		
	Brought forward from page PP/8		
	Brought forward from page PP/9		
	TOTAL FOR PARTICULAR PRELIMINARIES CARRIED TO MAIN SUMMARY		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<p><u>METHOD OF MEASUREMENT</u></p> <p>The Bills of Quantities have been prepared in accordance with the general principles of the Standard Method of Measurement of Building Works for East Africa, Second Edition (Metric), published by the Architectural Association of Kenya, Chapter of Quantity Surveyors in June 2008</p> <p>Exception to the Standard method of measurements include:</p> <p>i) Composite descriptions:the contractor shall include for all works necessary to complete the works</p> <p>ii) All works in this contract that are subject to adjustment have been defined as 'Provisional'.</p>		
B	<p><u>ABBREVIATIONS</u></p> <p>Throughout these Bills of Quantities, units of measurements and terms are abbreviated and shall be interpreted as follows;</p> <p>mm shall mean millimeters cm shall mean centimeters m shall mean metres M1 shall mean linear metres M2 shall mean square metres M3 shall mean cubic metres Kgs. shall mean kilograms NO. shall mean number Prs. shall mean pairs n.e shall mean Not Exceeding B.S.: shall mean current British Standard Institution, 2 Park Street, London, WI England KEBS.: shall mean the current Kenya Bureau of Standards DITTO: Shall mean the whole of preceding description except as qualified in the description in which it occurs. Where it occurs in description of succeeding items it shall mean the same as in the first description of the series in which it occurs expect as qualified in the description concerned. Where it occurs in brackets it shall mean whole of the preceding description which is contained with the appropriate brackets. Approved: shall mean approved by or to the approval of the Client or Client's Representative.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<p><u>ABBREVIATIONS C'TD</u></p> <p>As directed: shall mean as directed by the Client or Client's Representative (m.s.) shall mean measured separately (b.m.s.) shall mean both sides measured (p.c.) shall mean prime cost 100 to 200 shall mean exceeding 100mm but not exceeding 200mm girth and all items described in this manner shall be similarly construed</p> <p>Works the term 'the works' wherever used hereinafter and in all contract documents shall mean all or any portion of the works materials and articles wherever the same are to be used in the execution of this contract and whether the same be on site or not</p> <p>Omitted works shall mean works completely removed from the scope and not to be done at all within the contract. This shall not apply to works removed from the main/builders works and instead executed by a specialist subcontractor within the current contract. Where this arises, the main contractor shall be paid for profit and attendance in the prime cost section of the bills of quantities. No claim for loss of profit and or expense shall arise.</p> <p><u>SPECIAL CLAUSES</u></p> <p>A <u>SAFETY</u></p> <p>The Contractor shall take all precautions as necessary to ensure maximum safety for all materials and persons, engaged upon or visiting the works. The Contractor shall comply at all times with the requirements of the Factory Act (Cap 514), Building Construction Rules, Supplement 18, Legal Notice No. 40 dated 5th April, 1984 ensure that the safety of their workpeople and authorised visitors to the Site is protected at all times.</p> <p>The Contractor shall appoint a Safety Officer who shall be qualified in compliance with the Factory Act and shall have experience in First Aid.</p> <p>The Project Manager shall be empowered to suspend work on the Site should he consider these conditions are not being observed, and no claim arising from such a suspension will be allowed.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>TRESPASS AND NUISANCE</u> 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 to any 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 Client or, if given verbally, shall at once be communicated by him to the Client 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 The Contractor shall take all precautions to eliminate as far as possible the danger to the public and other persons arising from the entry and exit of vehicles to and from the site.		
B	<u>HOARDING</u> The contractor shall enclose the site by hoarding of appropriate length as required and of minimum 2.50m high constructed with 30 gauge painted galvanized iron sheets fixed to approved timber framing complete with access gate all to the approval of the Architect. However; it is brought to the Contractor's attention that there is an existing hoarding that requires some repairs and hence the contractor is strongly advised to take note of its existing nature before pricing for this item The contractor's attention is drawn to the fact that some areas adjacent to the site are already built up and shall be in use during the execution of this project. As such the contractor must allow for keeping his/her employees from interfering with such other users and preventing and minimising any nuisance arising from dust ,noise or by way of trespass.		
C	<u>CONTRACT RATES TO APPLY</u> Rates inserted in the tender Bills of Quantities shall apply throughout the period of contract. Any changes will be strictly in accordance with the contract.		
D	<u>PRICING BILL OF QUANTITIES</u> The Contractor shall price out individually and in detail all items in this Bill of Quantities and under no circumstances will lump sums be allowed. All rates and figures entered in the Bill of Quantities must be done in indelible ink. Any item not priced for in this Bills of Quantities shall be deemed to be provided for for free or its rate is included elsewhere in these Bills of Quantities		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<p><u>PRICING BILL OF QUANTITIES CONT'D</u></p> <p>The Contractor is advised to check Bill of Quantities and should he find any pages missing or in duplicate or the figures in writing indistinct or any ambiguity in description, he must inform the Employer/Client at once and have the same rectified.</p> <p>Without authority the Contractor shall not alter or otherwise qualify the text of the Bill of Quantities, otherwise such alterations shall be ignored.</p> <p>All expense incurred by the Contractor in preparation of this tender shall not be allowed.</p>		
A	<p><u>TOOLS, PLANTS AND SCAFFOLDING</u></p> <p>Provide all necessary cranes, hoists and other plant including ladders, staging, access gangway tackle tarpaulins, tools, moulds, template etc., necessary for the proper execution of the works and properly maintaining them during the contract performance.</p> <p>All materials and workmanship used in the execution of the works shall be of the best quality and description for the due and satisfactory completion of the works and shall remove the same on completion.</p> <p>The Contractor shall provide, erect and maintain all temporary scaffolding, sufficiently strong and efficient for the due performance of the Works, including Sub-contract Works, provide special scaffolding as and when required during the Works including all sub-contracted works and remove on completion and make good.</p> <p>Scaffolding is not measured hereinafter, and the Contractor must allow here or in his rates for the above.</p>		
B	<p><u>SANITATION FOR THE WORKS</u></p> <p>The Contractor shall provide and maintain proper sanitation of the Works to the satisfaction of the County Authorities, Labour Department and the Project Management Team and remove when no longer required. .</p>		
C	<p><u>SECURITY OF WORKS</u></p> <p>The Contractor shall be entirely responsible for the security of all the works, stores, materials, plant, personnel, etc. both his own and sub-contractor's and must provide all necessary watching, lighting and other precautions as necessary to ensure security against theft, loss of damage and the protection of the public.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<u>SECURITY OF WORKS CONT'D</u> All articles and materials supplied by the Client must be signed for by the Contractor at the time of taking delivery as having received them in good order and thereafter the Contractor shall be responsible for any damage or loss.		
A	<u>LABOUR REGULATIONS</u> The Contractor shall strictly adhere to the relevant Current Labour Regulations regarding emoluments, working hours and working conditions. These regulations must be displayed at all times during the execution of this contract for the information of employees in all places used for the execution of the contract. The Contractor shall recognise the freedom of employees to belong to Trade Unions and maintain daily records in English of the time worked and wages paid to individual employees.		
B	<u>SUPERVISION AND WORKING HOURS</u> <u>The work shall be executed under the direction and reasonable satisfaction of the Client and Project Management Team who shall at all times during the normal working hours have access to all Works or any other places where such work is being prepared for the Contract.</u> Working hours shall be those generally in force in the Building and Civil Engineering Trades in Kenya. No work shall be carried out at night or on gazetted holidays unless the Employer shall so direct or the approved program of works so indicates. No work shall be covered up nor shall any concreting be carried out in the absence of the Clerk of Works without the prior approval of the Client/ Project Management Team in writing.		
C	<u>BLASTING OPERATIONS</u> Blasting will only be allowed with the express permission of the Client or the Architect. Any blasting operations shall be carried out at the Contractor's sole risk and cost in accordance with any Government Regulations in force for the time being and any special regulations laid down by the Architect governing the use and storage of explosives.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU**BILL 2 - GENERAL PRELIMINARIES**

ITEM	PARTICULARS	KSHS	CTS
A	<u>INSURANCES</u> The Contractor shall insure as required in Clause on liability and insurance in the Articles of Agreement. No payment on account of the work executed shall be made to the Contractor until he has satisfied the Employer or his representative either by production of an Insurance Policy or an Insurance Certificate that the foregoing insurance clauses have been complied with.		
B	<u>PUBLIC AND PRIVATE ROADS</u> Maintain as required throughout the execution of the Works and make good any damage to public or private roads arising from or consequent upon the execution of the Works to the satisfaction of the owners and the project management team.		
C	<u>WATER FOR WORKS</u> The Contractor shall provide at his own risk and cost all necessary clean and fresh water for the works including that required by sub-contractors on site, and for any temporary plumbing, meter and storage facilities and clear way on completion and make good works disturbed. Nominated sub-contractors are to be made liable for the cost of any water used or any installations specially provided for their own use.		
D	<u>LIGHTING AND POWER FOR THE WORKS</u> The Contractor shall provide at his own risk and cost the required electricity supply for the works including that required by sub- contractors and others on site. Nominated sub- contractors are to be made liable for the cost of any electrical power used and for any installations provided specially for their own use.		
E	<u>EXISTING PROPERTY</u> The contractor shall take all precautions to avoid damage to all existing property including buildings, roads, cables, drains and other services and he will be held responsible for and shall make good all such damages arising from the execution of this contract at his own expenses to the satisfaction of the Architect.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>EXISTING SERVICES</u> Prior to commencement of any work the Contractor is to ascertain from the relevant Authorities the exact position, depth and level of all existing electric cables, water pipes or other services in the area and they shall make whatever provisions may be required by the Authorities concerned for the support and protection of such services. Any damage or disturbance caused to any services shall be reported immediately to the Architect and the relevant Authority and shall be made good to their satisfaction at the Contractor's expense.		
B	<u>ACCESS TO SITE AND TEMPORARY ROADS</u> Means of access to the site shall be agreed with the Architect and the Client prior to commencement of the work and the contractor must allow for constructing and maintaining the necessary temporary access roads, removing them and making good and reinstating all works and surfaces disturbed to the satisfaction of the project management teamt.		
C	<u>SITE OFFICE</u> The Contractor shall provide a site office to accommodate the Client's Representative, Clerk of Works and visiting staff as follows: 1 No. meeting room for site meetings etc. 1 No. office for contractor's use The following furniture shall be provided by the contractor: 1 No. table and at least 20 seats 2 No. pin up boards 1200mm x 2400mm Provide for all power and lighting points. The Contractor shall also provide on-site at all times a modern and accurate level together with a levelling staff, ranging rods and one 5 metre; one 30 metre and one 50 metre tapes, digital camera and stationery for use only by the Clerk of Works or Employer's Representatives. The contractor to allow for provision of snacks and soft drinks to participants during site inspections and meetings. However; it is brought to the Contractors attention that there is an exisiting site office that requires some modifications and/or enlargement hence the contractor is strongly adviced to take note of its exisiting nature before nricing for this item		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<p><u>URGENCY OF THE WORKS</u></p> <p>The Contractor is notified that these “works are urgent” and should be completed within the period stated in these Particular Preliminaries. The Contractor shall allow in this tender for any costs he deems that he/she may incur by having to complete the works within the stipulated contract period.</p>		
B	<p><u>SITE PHOTOS</u></p> <p>The contractor shall allow for taking digital site photographs on a daily basis to the satisfaction of the consultants. Copies of each shall be provided to the employer and consultants as required and a weekly record shall be placed in an Album in the site office. The album shall be handed over to the Employer upon completion.</p>		
C	<p><u>STORAGE OF MATERIALS</u></p> <p>The Contractor shall provide onsite weatherproof lock up sheds for safe storage and custody of materials for the works and shall remove them on completion of the works, making good disturbed surfaces to the satisfaction of the project management team.</p> <p>Nominated Sub-Contractors shall be made liable for the cost of any special additional storage accommodation provided over and above the normal requirement specifically for their Use.</p> <p>However; it is brought to the Contractors attention that there is an existing site store that requires some modifications and/or enlargement hence the contractor is strongly advised to take note of its existing nature before pricing for this item</p>		
D	<p><u>TRANSPORT</u></p> <p>Allow for transport of workmen, materials, etc. to and from the site at such routes as may be permitted by competent authorities.</p>		
E	<p><u>LABOUR CAMPS</u></p> <p>Labour camp will not be permitted on the site and the contractor must make arrangement for transport of workers in accordance with all existing traffic laws.</p>		
F	<p><u>PROGRESS CHART</u></p> <p>As indicated elsewhere in this Document, the Contractor shall prepare a full detailed programme and progress chart in the form of bar chart, precedence diagram or network analysis to coincide with various sectional completion dates if any.</p> <p>The programme must be updated on monthly basis throughout the progress of Works.</p> <p>The draft is to be submitted and approved by the project management team.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>PROVISIONAL WORK</u> All work measured provisionally shall be left uncovered by a reasonable time to allow all measurements needed for such adjustment to be taken by the Quantity Surveyor when such work is completed. Should the Contractor default in these respects, he shall, if the Employer/ Employer's Representative so directs uncover the work at his own expenses to enable measurements to be taken.		
B	<u>PROTECTIVE CLOTHING</u> The Contractor shall provide all protective or any other special clothing or equipment for their employees and visitors that may be necessary. These shall include, inter-alia, safety helmets, gloves, goggles, earmuffs, gumboots, steel toed boots, overalls, face masks etc according to the type of work. The Contractor shall ensure that all safety and protective gear are worn by all staff on site at all times.		
C	<u>SHOP DRAWINGS</u> The contractor shall prepare for scrutiny and issue to the architect, copies of detailed shop drawings of all specialists works. The contractor shall immediately amend after the architect has checked the drawings and when approved shall issue to the architect four copies for general use. The scrutiny of these drawing shall be for general conformity including conformity with the works of others and to co-ordinate the contract work in pace. Such approvals shall not imply any further indication or correctness.		
D	<u>EXISTING AND ADJACENT PROPERTY</u> The Contractor must take all steps necessary to safeguard existing and adjacent property, make good at their own expense any damage to persons or property caused thereon, and hold the Employer indemnified against any such claim arising. The Contractor will be held fully responsible for the safety of the existing and adjacent buildings and for any damage caused in consequence of these Works. They must reinstate all damages at his own expense and indemnify the Employer against any loss. The Contractor must take such steps and exercise such care and diligence as to minimise nuisance from dust, noise or any other cause to the occupiers of the existing and adjacent property.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>IMPORTED MATERIALS AND SPECIAL ITEMS</u> Where imported materials or special items of goods, materials, or equipment form part of the Contract, the Contractor shall be entirely responsible for making all necessary arrangements and placing all necessary orders to ensure their prompt and timely arrival on site to suite the building operations. No claim for an extension of time shall be entertained by the Architect unless the Contractor can produce reasonable proof that he has taken all possible precautions to prevent delay and that the delay is beyond his control.		
B	<u>PRIME COST AND PROVISIONAL ITEMS</u> Interpretation of these items shall be as in Clause A7 of the Standard Method of Measurement and sums of money included under these terms shall be subject to adjustment at final account.		
C	<u>MATERIALS ARISING FROM EXCAVATIONS</u> Materials of any kind obtained from the excavations shall be the property of the Employer and unless directed otherwise such materials shall only be used in the works in substitution of materials which the Contractor would otherwise have had to supply, with the written permission of the Employer. Should such permission be given the Contractor shall make due allowance for the value of the materials so used at a price to be agreed.		
D	<u>PROTECTION OF THE WORKS</u> Provide protection of the whole of the works contained in the Bills of Quantities, including casing up, covering or such other means as may be necessary to avoid damage to the satisfaction of the project management team and remove such protection when no longer required and make good any damage which may nevertheless have been done at completion free of cost to the Employer.		
E	<u>REMOVAL OF RUBBISH AND CLEANING</u> Remove all rubbish and debris from the buildings and site as it accumulates and at completion of the works and remove all plant, scaffolding and unused materials at completion, or as directed by the project management team from time to time. Before final inspection and handing over date, the Contractor must clean the building both internally and externally to make the Works perfect and fit for immediate occupation by the Employer.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<p><u>WORKS TO BE DELIVERED UP CLEAN</u></p> <p>All works in this contract should be delivered up clean. i.e. as shall be deemed necessary; clean and flush all gutters, rainwater and waste pipes, manholes and drains, wash (except where such treatment might cause damage) and clean all floors, sanitary fittings, glass inside and outside, and any other parts of the works which may require it, remove all marks, blemishes, stains and defects from joiner, fittings and decorated surfaces generally, polish door furniture and bright parts of metal-work and leave the whole of the buildings water-tight, clean, perfect and fit for occupation to the approval of the project management team.</p>		
B	<p><u>FIRM PRICE CONTRACT</u></p> <p>Unless otherwise specifically stated, this is a firm price contract and the Contractor must allow in his tender for any increases in the cost of labour and/or materials during the currency of the Contract. No claim for increased costs will be entertained except only in increased costs arising from fluctuation in duties as defined in Condition No.50 of the Conditions of Contract.</p>		
C	<p><u>SAMPLES</u></p> <p>The Contractor should allow for providing and testing <u>any number of samples of materials or workmanship</u> required by the project management team at the earliest possible opportunity for approval or rejection and any further samples in the case of rejection until such samples are approved. Materials or workmanship not to the standard of approved samples shall be rejected. Such samples, when approved, shall be the minimum standard for the work to which they apply.</p>		
D	<p><u>CONCRETE CUBE TESTS</u></p> <p>The contractor should allow for making, delivery and testing of concrete cube tests during all stages of the Works. Such cubes should be made in accordance with Engineer's instructions and the Contractor shall allow for all costs and expenses associated thereof.</p>		
E	<p><u>STATUTORY OBLIGATIONS, NOTICES, FEES AND CHARGES</u></p> <p><u>The Contractor should allow in his tender for all costs incurred in complying with all Statutory Requirements and payment of all Levies currently in force and affecting the Construction Industry</u></p> <p>This Clause will cover among others, Training Levy as in Legal Notice No. 237 of October 1971 as well as the Standards Levy Order 1990 as in Legal Notice No.267 of 1st July 1990, Value Added Tax act 1989 and all amendments enacted upto tender date.</p>		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>DIRECT PROCUREMENT OF EMPLOYER</u> Certain items may be directly procured by the Employer for incorporation in the Works. In such cases the Employer will be required to list such items for notification to the Contractor before the date of possession. Such items shall then rank and be treated as P.C. Sums items for the purposes of the evaluation of profit and attendance. No other claim shall be made against such items by the Contractor except as in accordance with the Contract. Where such items are fixed by the Contractor a fixing rate shall be determined by the Quantity Surveyor in accordance with the Contract.		
B	<u>WITHHOLDING TAX</u> The contractor to comply fully with all the requirements under the Act currently in force and affecting the building industry.		
C	<u>NOISE CONTROL</u> The Contractor shall take all precautions to minimise noise levels and shall comply with all statutory requirements to that effect.		
D	<u>NUISANCE</u> The contractor shall endeavour to avoid nuisance during demolition from noise, water, smoke, dust and the like.		
E	<u>OVERLOADING</u> The Contractor shall avoid damage to existing building and adjoining structures and shall avoid excessive loads by way of plant materials, debris etc. on any part of the existing building without prior approval of the Architect.		
F	<u>INTERPRETATION OF TERMS</u> “Demolish” shall be deemed to mean cutting away, pulling down, breaking up, taking down etc. as the context may require and shall include clearing away and removing from site all debris arising. “Remove” shall mean taking down, dismantling, hacking up, breaking down etc. and clearing from site or as directed.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
A	<u>SIGN BOARD</u> The Contractor shall provide and erect a sign board on the site showing the title of the project, the name and address of the Employer, the Consultants, Nominated Sub-contractors, Nominated Suppliers and such other information as may be required by the project management team. The board shall be maintained in good condition and removed after the Expiry of the Defects Liability Period or any other earlier time if directed by the Architect. A drawing of the sign board may be inspected in the office of the Architect. The project manager shall direct on the actual location of the board <u>VISITORS BOOK AND SITE DIARY</u>		
B	The Contractor shall keep on the site a visitors book for recording the names of all persons who visit the site for the purpose of the project. He shall also maintain on site a diary in which he shall record site activities on a daily basis and particularly any occurrence which bears on the progress of the works in any way. The visitors' book and the diary or their extracts shall be surrendered to the project management team at the completion of the project or at any other time that he may direct		
C	<u>NOTES:</u> 1 The Contractor shall exercise extreme care during demolitions to avoid unwarranted damage. Any damage caused through want of care shall be at the Contractor own expense. 2 Where the items require the salvaged materials to be handed over to the Employer, the Contractor shall make every effort to minimise damage to such items during removal and subsequent handling. 3 All reusable material arising from demolition work shall be the property of the Employer and will be handed over to the Employer or stored in a secure place as directed by the Employer .Such materials shall be identified by the Employer before demolition starts. 4 Where such reusable materials are to be reused in the Works, this will be at the sole discretion of the Employer and the Contractor shall give due credit to the Employer.		
D	<u>COPYRIGHT</u> The copyright of these Bills of Quantities is vested in the Quantity Surveyor and no part thereof may be reproduced without their express permission given in writing.		
	CARRIED TO COLLECTION		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 2 - GENERAL PRELIMINARIES

ITEM	PARTICULARS	KSHS	CTS
	<u>COLLECTION</u>		
	Brought forward from page GP/1		
	Brought forward from page GP/2		
	Brought forward from page GP/3		
	Brought forward from page GP/4		
	Brought forward from page GP/5		
	Brought forward from page GP/6		
	Brought forward from page GP/7		
	Brought forward from page GP/8		
	Brought forward from page GP/9		
	Brought forward from page GP/10		
	Brought forward from page GP/11		
	Brought forward from page GP/12		
	Brought forward from page GP/13		
	TOTAL FOR GENERAL PREIMINARIES CARRIED TO MAIN SUMMARY		

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 4 - REMEDIAL WORKS

ITEM	DESCRIPTION	UNIT	RATE	AMOUNT
	<p><u>BILL NO.4:-</u></p> <p><u>REMEDIAL WORKS</u></p> <p><u>(ALL PROVISIONAL)</u></p> <p><u>Notes</u></p> <p><u>Bidders are strongly advised to read and understand the following notes before pricing this section. Any query on the notes should be referred to the Quantity Surveyor.</u></p> <p>1 Bidders are advised to visit the site to verify the nature of the existing building before pricing this section</p> <p>2 The works under this section/bill will be carried out prior to commencement of other construction activities at the auditorium upper ground floor slab</p> <p>3 After completion of the works under this bill, the slab and beam structure will be load tested as described later in this bill.</p> <p>4 Works under this bill MUST be approved by the Structural Engineer</p> <p><u>Carried to Collection</u></p>			

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 4 - REMEDIAL WORKS

ITEM	DESCRIPTION		UNIT	RATE	AMOUNT
	<u>Remedial works on columns</u>				
	<u>The following works to be done on 12 No. columns C20</u>				
A	Hack irregular concrete surfaces using appropriate means; maximum depth 25mm to Engineer's details and approval	147	M2		
	<u>Steel fabric mesh reinforcement to B.S. 4483</u>				
B	Supply and fix with appropriate means BRC mesh fabric reinforcement Ref A142 sorround to columns (measured net-no allowance made for laps) to Engineer's details and approval	147	M2		
C	Supply and fix approved chicken mesh (one inch); sorround to columns	147	M2		
	<u>Prepare and apply epoxy bonding agent as 'MasterBrace 1414' or other equal and approved as described to:-</u>				
D	Sides of columns	147	M2		
	<u>50mm thick (maximum) two coat lime plaster including skimming; Plaster;first coat of cement and sand (1:6); second coat of cement and lime putty (1:10); steel trowelled smooth; as described to:-</u>				
E	Sides of columns	147	M2		
	<u>Remedial works on beams</u>				
	<u>The following works to be done on 5 No. beams B1</u>				
F	Hack irregular concrete surfaces using appropriate means; maximum depth 25mm to Engineer's details and approval	227	M2		
	<u>Carried to collection</u>				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 4 - REMEDIAL WORKS

ITEM	DESCRIPTION		UNIT	RATE	AMOUNT
	<u>Steel fabric mesh reinforcement to B.S. 4483</u>				
A	Supply and fix with appropriate means BRC mesh fabric reinforcement Ref A142 sorround to beams (measured net-no allowance made for laps) to Engineer's details and approval	244	M2		
B	Supply and fix approved chicken mesh (one inch); sorround to beams	244	M2		
	<u>Prepare and apply epoxy bonding agent as 'MasterBrace 1414' or other equal and approved as described to:-</u>				
C	Sides of beams	244	M2		
	<u>50mm thick (maximum) two coat lime plaster including skimming; Plaster;first coat of cement and sand (1:6); second coat of cement and lime putty (1:10); steel trowelled smooth; as described to:-</u>				
D	Sides of beams	244	M2		
	<u>Jacking of slab</u>				
E	Supply equipment for and jack exisiting slab to level it as shall be directed by the structural engineer. Approx 16SM.		Item		
	<u>Load testing of beams and slab</u>				
F	Supply and place 300mm thick sand layer on top of suspended slab (performance of the structure to be observed for 14 days). Allow for removal of the same to cart away for re-use as shall be directed.	99	M3		
	Carried to collection				
	<u>COLLECTION</u>				
	From page RW/2				
	From Above				
	Total for Remedial Works carried to Main Summary				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>BUILDERS WORKS & SERVICES</u>				
	<u>ELEMENT NO. 1</u>				
	<u>R.C. SUPERSTRUCTURE</u>				
	<u>(ALL PROVISIONAL)</u>				
	<u>Vibrated Reinforced concrete class C20/25 achieving characteristic compressive strength of 25N/mm² at 28days of 150mm cubes as per BS Standard of 15th August, 2005 in :-</u>				
A	1200/1950 x 300mm wide beam B5	9	M3		
B	850 x 300mm wide beam B6	4	M3		
C	850 x 200mm wide beam B8	2	M3		
D	450 x 200mm wide beam B9	2	M3		
E	450 x 200mm wide beam B9; sloping	2	M3		
F	450 x 200mm wide beams	6	M3		
G	450 x 200mm wide sloping ramp beams	10	M3		
H	Ring beams generally	35	M3		
I	Ditto slopping	3	M3		
J	Columns	37	M3		
K	Concrete Gutter	44	M3		
L	Suspended Steps	2	M3		
M	Stepped rib beams	3	M3		
N	150mm thick suspended slab; horizontal	103	M2		
O	200mm thick suspended roof slab	72	M2		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Supply and fix reinforcement to BS 4449:1997 , Grade 460B high strength type 2 Ribbed bars with proof stress of 460 N/mm2; Including all necessary cutting, bending, fixing, wastage, overlaps and provision of spacer blocks and stools to S.E's detail</u>				
	<u>Beams</u>				
A	32mm diameter bars	1,459	KG		
B	25mm diameter bars	565	KG		
C	20mm diameter bars	866	KG		
D	16mm diameter bars	3,218	KG		
E	12mm diameter bars	1,323	KG		
F	8mm diameter bars	1,407	KG		
	<u>Columns</u>				
G	32mm diameter bars	2,825	KG		
H	20mm diameter bars	539	KG		
I	16mm diameter bars	245	KG		
J	8mm diameter bars	362	KG		
	<u>Floor Slab</u>				
K	12mm diameter bars	13	KG		
L	10mm diameter bars	522	KG		
M	8mm diameter bars	923	KG		
N	8mm diameter bars (steps)	791	KG		
	<u>Gutters</u>				
O	8mm diameter bars	2,635	KG		
P	16mm diameter bars	69	KG		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Ablution Roof Slab</u>				
A	12mm diameter bars	685	KG		
B	10mm diameter bars	535	KG		
C	16mm diameter bars	47	KG		
	<u>Fairface formwork as described to: allow for setting to curve where required, special propping, strutting, fillets to</u>				
D	Vertical sides and soffits of beams	773	M2		
E	Vertical sides and soffits of sloping beams	184	M2		
F	Vertical sides and soffits of stepped ribs	14	M2		
G	Vertical sides and soffits of concrete gutter	564	M2		
H	Horizontal soffits of suspended slab	284	M2		
I	Horizontal soffits of suspended steps n.e. 3.5m high	20	M2		
J	Horizontal soffits of suspended steps; 3.5-5m high	20	M2		
K	Vertical sides of columns	380	M2		
L	Vertical edges of slab and ramp 150-225mm high	169	M1		
M	Vertical edges of risers 75-150 mm high	51	M1		
	<u>Waterproofing</u>				
	<u>Provide a written guarantee of ten (10) years to the employer (effective from the date of application) for all water proofing works measured herein in these bills from an approved sub-contractor</u>				
	<u>All areas indicated shall be waterproofed by the SIKA-1 system or equal and approved, to manufacturer's specifications and instructions as described:</u>				
N	Surfaces of concrete gutter	275	M2		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
A	Waterproofing				
	<u>MASTERSEAL® 501/502 SYSTEM CRYSTALLINE WATERPROOFING</u>				
	<u>Provide a written guarantee of ten (10) years to the employer (effective from the date of application) for all water proofing works measured herein in these bills from an approved sub-contractor/supplier</u>				
	<u>All areas indicated shall be waterproofed by the MASTERSEAL® 501/502 system as manufactured by BASF, or equal and approved, to manufacturer's specifications and instructions as described:</u>				
	Two coat slurry application: MASTERSEAL® 501: 1kg per m² per coat, minimum 2 coats to seal all expansion joints, holes, repaired areas and angle fillet				
	Application of render coat: MASTERSEAL® 502: 10kg per m² at 4.5mm thick on walls				
	Sides of retaining walls	182	M2		
	Carried to Collection				
	<u>COLLECTION</u>				
	From page BW/1				
	From page BW/2				
	From page BW/3				
	From above				
	Total for R.C Superstructure to Summary				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 2</u>				
	<u>STAIRCASES AND RAMPS</u>				
	<u>Vibrated Reinforced concrete class C20/25 achieving characteristic compressive strength of 25N/mm² at 28days of 150mm cubes as per BS Standard of 15th August, 2005 in :-</u>				
A	Staircase waist; sloping	3	M3		
B	Steps	2	M3		
C	Beams	2	M3		
D	Suspended slopping ramps	12	M3		
E	175mm Thick Landing	5	M2		
	<u>Supply and fix reinforcement to BS 4449:1997 , Grade 460B high strength type 2 Ribbed bars with proof stress of 460 N/mm²; Including all necessary cutting, bending, fixing, wastage, overlaps and provision of spacer blocks and stools to S.E's detail</u>				
	<u>Ramps</u>				
F	8mm diameter bars	514	KG		
G	10mm diameter bars	17	KG		
	<u>Stair & stair beams</u>				
I	8mm diameter bars	19	KG		
J	10mm diameter bars	73	KG		
K	12mm diameter bars	224	KG		
K	16mm diameter bars	27	KG		
	<u>Fairface formwork as described to: allow for setting to curve where required, special propping, strutting, fillets to</u>				
L	Horizontal soffits of landing	5	M2		
M	Sloping soffites of staircases and ramps	86	M2		
N	Vertical edges of risers 150 - 225mm high	48	M1		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
A	Edges of landing and ramps 150 - 225mm high	150	M1		
B	Opening edge of string of 300 mm wide (extreme) including cutting to profile of treads and risers	35	M1		
	<u>Balustrading and Railing</u>				
C	Supply materials for, fabricate and fix 1200mm high Mild Steel railing comprising 50 x 50 x 3mm thick SHS balustrades grouted to concrete at 600mm cc, 25 x 25 x 1.8mm thick SHS vertical members at 200 cc welded to handrail and bottom rail (ms); 50 x 50 x 3mm thick intermediate and bottom railing and 50mm diameter x 3mm thick CHS handrail fixed to masonry (ms) all welded to approved pattern and painted in one undercoat and two finishing coats of gloss oil paint to approval	10	M1		
D	25mm Diameter CHS vertical members at 1200mm cc, 300mm high, fixed to masonry wall using approved means and painted to architect's approval.	124	NO		
E	25mm Diameter CHS handrail fixed to masonry/block walling on one side and concrete on the other side using approved means and painted to architect's approval	149	M1		
	<u>Finishes</u>				
	<u>Terrazzo Paving</u>				
F	20mm Thick polished terrazzo paving to floors including plastic dividing strips; on and including 20mm thick cement sand screed	74	M2		
G	Ditto to treads 300mm wide	44	M1		
H	Ditto to risers 150mm high	48	M1		
I	100 x 20 mm skirting with rounded top coved at junction with paving	220	M1		
J	Extra over tread for 25mm wide non slip caborundum strip	44	M1		
	<u>Two coat lime plasterwork 15 mm thick to: -</u>				
K	Closed or open edge of staircase, 300 mm wide (extreme) and to profile of treads and risers	35	M1		
L	To soffit of staircases and ramps	86	M2		
M	To soffits of landing	5	M2		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

Q840

BILL 5 - BUILDERS WORKS SERVICES

Q840

BILL 5 - BUILDERS WORKS SERVICES

Q840

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 5</u>				
	<u>WINDOWS</u>				
	<u>Pre-cast Concrete Works:-</u>				
A	Window cill size 200 x 50 mm once sunk, weathered and throated, with 10mm drip paint to approval	50	M1		
	<u>Supply and fix the following Windows to Architects approval</u>				
	<u>Steel Casement Windows</u>				
	<u>Supply, assemble and fix the following medium duty Z- section steel casement framed windows comprising small panes in various sizes in openable and fixed lights, with and including 25 x 4mm thick flat bars framing and vertical members, all primed before fixing, complete with 6mm thick tinted glass in panes 0.5-1M2 and all necessary approved ironmongery and fittings as window fasteners, stays, hinges etc fixed to opening including fixing framing to concrete or masonry, making good disturbed surfaces and including two layers of 1 and 5mm mosquito gauze and painting in three coats of gloss oil paint all to architect's drawings and approval.</u>				
B	Window overall size 600 x 1500mm high; W1	36	No		
C	Window overall size 600 x 900mm high; W2	8	No		
	<u>Supply, assemble and fix the following Steel Casement windows as above described but with 4mm thick obscure glazing ditto</u>				
D	Window overall size 600 x 1350mm high;W3	14	No		
E	Window overall size 1800 x 1350mm high;W4	2	No		
	<u>Supply, assemble and fix the following fixed louvres comprising 50 x 50 x 2mm thick SHS framing fixed to masonry walls and 10mm thick custom made mild steel sheet welded to frame; including one undercoat and two finishing coats of gloss oil paint all to approval of the Architect</u>				
F	Louvres; 600 x 600mm high	46	No		
	<u>Total for Windows to Summary</u>				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 6</u>				
	<u>DOORS</u>				
	<u>Supply and fix the following Doors to Architects approval and details as shown in the attached openings schedule</u>				
	<u>Steel Doors</u>				
A	Medium duty metal casement door overall size 1500 x 2550mm high, in 2No.equal openable leaves; comprising of 100 x 50mm thick framing; top panel overall size 1500 x 800mm high in Equal panes of size 230 x 230mm infilled with 4mm thick clear glass and with 25mm wide mild steel flat burglar proofing ; bottom panel overall size 1500 x 1600mm high infilled with 1.8mm thick parttened mild steel sheet on both sides to approval ; with and including heavy duty bushes, 2 No. custom made steel tower bolts, 1 pair of custom made steel door handle, 3 lever dead lock and padlock clasps and all other necessary iron mongery and fittings; painted on both sides in three coats of gloss oil paint door type D1 all to architect's approval and details	7	NO		
	<u>Timber Doors</u>				
B	Supply and fix 45mm thick mahogany veneered and embosed panel door to approval; overall size 900 x 2400mm high comprising 1 No openable leaf meeasuring 900 x 2100mm high and 900 x 300mm high glazed fanlight (ms) ; Door type D2	2	NO		
C	Supply and fix 45mm thick (finished) semi - solid core flush door with mahogany veneer on both sides and 2mm thick hardwood lipping all round; overall size 900 x 2100mm high; Door type D5	10	No.		
D	Ditto but double door; overall size 1500 x 2400mm high in 2 No. equal openable leaves (double swing) each measuring 750 x 2100mm high and 1500 x 300mm high glazed fanlight (ms); Door type D3	2	No.		
E	Ditto but double door; overall size 1200 x 2100mm high in 2 600 x 2100mm high; Door type D4	2	No.		
	<u>Louvred Door</u>				
F	Double leaf hardwood louvred door size 1350x2550mm high; (service duct areas)	1	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

Q840

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>PAINTING AND DECORATING</u>				
	<u>Prepare and apply one coat aluminium primer on back of wood before fixing</u>				
A	Surfaces not exceeding 100 mm girth	184	M1		
B	Surfaces 200 - 300mm girth	97	M1		
	<u>Knot, prime, stop and apply three coats polyurethane clear lacquer to woodwork as described</u>				
	<u>Internally on:-</u>				
C	General surfaces over 100 and not exceeding 200 mm girth	184	M1		
D	Surfaces 200 - 300mm girth	97	M1		
E	General surfaces of doors	78	M2		
	Carried to Collection				
	<u>COLLECTION</u>				
	From page BW/11				
	From page BW/12				
	From Above				
	Total for Doors to Summary				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 7</u>				
	<u>ROOF CONSTRUCTION AND COVERING</u>				
	<u>(PROVISIONAL)</u>				
	<u>Flat Roof Finishes</u>				
	<u>Cement and sand screed (1:4) as described</u>				
A	10mm (average) thick screed; sloping to receive water proofing material	72	M2		
B	20mm (average) thick screed; sloping to receive interlocking tiles	72	M2		
	<u>Provide a written guarantee of ten (10) years to the employer (effective from the date of application) for all water proofing works measured herein in these bills from an approved sub-contractor</u>				
	<u>Attatatic poly-propylene (APP) roofing membrane with protective chippings as manufactured by Messrs Italbuild Imports Ltd. or other equal and approved laid in accordance with manufacturers printed instructions by an approved sub-contractor</u>				
C	4mm Thick Membrane	72	M2		
	<u>Concrete Tiles</u>				
D	300 x 300 x12mm thick interlocking concrete tiles jointed and pointed in cement and sand mortar (1:4) and laid on prepared screed (m.s)	72	M2		
	<u>STRUCTURAL STEELWORK (All provisional)</u>				
	<u>The Contractor to allow in his rate for welding, making holes, gusset plates, cleats, brackets, bolts, back plates etc to the structure connections, priming with red oxide primer and including hoisting approximately 12000mm above ground level; all to Engineers approval</u>				
	<u>The following in 1No. steel roof truss type T1</u>				
E	50 x 50 x 3mm thick SHS external members	35	M1		
F	50 x 50 x 3mm thick SHS internal members	35	M1		
	<u>Carried to Collection</u>				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>The following in 1No. steel roof truss type T2</u>				
A	50 x 50 x 3mm thick SHS external members	27	M1		
B	50 x 50 x 3mm thick SHS internal Members	29	M1		
	<u>The following in 1No. steel roof truss type T3</u>				
C	50 x 50 x 3mm thick SHS external members	35	M1		
D	50 x 50 x 3mm thick SHS internal Members	42	M1		
	<u>The following in 1No. steel roof truss type T4</u>				
E	50 x 50 x 3mm thick SHS external members	35	M1		
F	50 x 50 x 3mm thick SHS internal Members	48	M1		
	<u>The following in 1No. steel roof truss type T5</u>				
G	50 x 50 x 3mm thick SHS external members	35	M1		
H	50 x 50 x 3mm thick SHS internal Members	55	M1		
	<u>The following in 1No. steel roof truss type T6</u>				
I	50 x 50 x 3mm thick SHS external members	36	M1		
J	50 x 50 x 3mm thick SHS internal Members	62	M1		
	<u>The following in 2No. steel roof truss type T7</u>				
K	50 x 50 x 3mm thick SHS external members	48	M1		
L	50 x 50 x 3mm thick SHS internal Members	43	M1		
	<u>The following in 3No. steel roof truss type T8</u>				
M	50 x 50 x 3mm thick SHS external members	19	M1		
N	50 x 50 x 3mm thick SHS internal Members	12	M1		
	<u>The following in 2No. steel roof truss type T9</u>				
M	50 x 50 x 3mm thick SHS external members	9	M1		
N	50 x 50 x 3mm thick SHS internal Members	6	M1		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>The following in 1No. steel roof truss type T9A</u>				
A	50 x 50 x 3mm thick SHS external members	4	M1		
B	50 x 50 x 3mm thick SHS internal Members	3	M1		
	<u>Z Purlins</u>				
C	100 x 50 x 20 x 2mm mild steel "Z" purlins bolted to and including 75 x 50x 6mm unequal angle cleats and 75 x 150mm long plates with and including M16 mild steel bolts complete with head, nut and washers	378	M1		
D	150 x 50 x 20 x 2mm mild steel "Z" purlins ditto	12	M1		
	<u>Tie Beam</u>				
E	50 x 50 x 3mm thick SHS tie beam	149	M1		
	<u>Antisag rods</u>				
F	12mm diameter mild steel anti sagrods	60	M1		
	<u>Sheet covering</u>				
	<u>Approved pre-painted corrugated box profile roofing sheets gauge 28 fixed to steel roof trusses with appropriate means and as per manufacturers instructions including all required accessories as ends, barrels, trims, and flashings</u>				
G	Roof covering	643	M2		
H	Ridge Cap to match	44	M1		
I	Valley flushing to match	6	M1		
	<u>Rainwater Disposal (All Provisional)</u>				
	<u>Approved PVC Rain water goods</u>				
J	150 mm Diameter down pipes fixed to wall with and including brackets at 1200c/c	180	LM		
K	Approved fullbora outlets fixed with appropriate means to concrete gutter	15	No		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Extra - over for</u>				
A	150 mm Diameter outlets	15	No.		
B	Ditto rainwater swanneck bend	15	No.		
C	Ditto rainwater anti-splash shoe	15	No.		
	<u>PCC coping</u>				
D	300 x 50mm thick precast concrete coping fixed on top of concrete gutter with apporved means	128	M1		
	Carried to Collection				
	<u>COLLECTION</u>				
	From page BW/14				
	From page BW/15				
	From page BW/16				
	From above				
	Total for Roofing to Summary				

BILL 5 - BUILDERS WORKS SERVICES

Q840

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	ELEMENT NO. 9				
	INTERNAL WALL FINISHES				
	<u>12mm thick (minimum) gauged lime plaster; 9mm thick first coat of cement and sand (1:6), 3mm thick cement lime putty (1:10) steel trowelled smooth; complete with wire gauze anticrack mechanism at the intersection of masonry walling and concrete beams as necessary as described to:-</u>				
A	Sides of walls and concrete surfaces	1,289	M2		
B	Door and window reveals not exceeding 100mm girth <u>15mm thick cement sand (1:4) in:</u>	418	M1		
C	Backing to receive ceramic wall tiles (measured seperately) <u>300 x 200 x 6 mm thick approved ceramic wall tiles on screed backing (m.s) with straight joints and pointing in matching cement as described</u>	193	M2		
D	To walls generally PAINTING AND DECORATING <u>Prepare and apply three coats first quality silk vinyl matt paint to :-</u>	193	M2		
E	Plastered walls	1,289	M2		
F	Door and window reveals not exceeding 100 mm girth	418	M1		
	Total for Internal Wall Finishes to Summary				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 10</u>				
	<u>FLOOR FINISHES</u>				
	<u>Cement and sand (1:4) screed as described in:-</u>				
A	32 mm Thick backing to receive Non Slip Granito Floor Tiles	239	M2		
B	Ditto to treads 1000mm wide	195	M1		
C	Ditto to treads 900mm wide	269	M1		
D	Ditto 400mm wide	186	M1		
E	Ditto to risers 300mm high	202	M1		
F	Ditto to risers 100mm high	476	M1		
G	32 mm Thick backing to receive Non Slip Ceramic Floor Tiles	78	M2		
	<u>Supply & fix approved non-slip granito tiles on screed backing (m.s) with appropriate tile adhesive; straight joints and pointing in matching waterproof grout; including pvc spacers and expansion joints as necessary as described in</u>				
H	600 x 600 x 10mm Thick Tiling to floors	239	M2		
I	Ditto to treads 1000mm wide	195	M1		
J	Ditto to treads 900mm wide	269	M1		
K	Ditto 400mm wide	186	M1		
L	Ditto to risers 300mm high	202	M1		
M	Ditto to risers 100mm high	476	M1		
N	100mm high skirting including cutting to profile of treads and risers	238	M1		
	<u>Supply & fix approved non-slip ceramic floor tiles on screed backing (m.s) with appropriate tile adhesive; straight joints and pointing in matching waterproof grout; including pvc spacers and expansion joints as necessary as described in</u>				
O	400 x 400 x 8mm Thick Tiling to floors	78	M2		
P	100mm high skirting	44	M1		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Corner strip</u>				
A	Approved aluminium corner strip fixed to edges of risers	678	M1		
	<u>Terrazzo Pavings</u>				
B	20mm Thick polished terrazzo paving to floors including plastic dividing strips; on and including 20mm thick cement sand screed	202	M2		
C	100mm high skirting with rounded top coved at junction with paving	101	M1		
	Carried to Collection				
	<u>COLLECTION</u>				
	From page BW/19				
	From Above				
	Total for Floor finishes to Summary				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 11</u>				
	<u>CEILING FINISHES</u>				
	<u>15mm thick two coat gauged lime plaster to:-</u>				
A	Horizontal soffits of suspended slab	149	M2		
	<u>Prepare and apply one undercoat and three finishing coats of interior quality paint as Crown Solo Pure Satin emulsion or other equal and approved to:</u>				
B	Soffits of horizontal suspended slab	149	M2		
	<u>Acoustic Ceiling as described</u>				
	<u>Suspended "Armstrong Minaboard" accessible tile system: 600 x 600 x 15mm thick fine fissured mineral fibre tiles: Trulok F4 24mm exposed grid suspension system; comprising 20 x 7mm x 24 gauge epoxy protected tee clips at 600mm cc; supported by piped tabs into 36 x 26mm x 24 gauge epoxy acrylic protected snap tee runners at 1200mm cc in 3 meters lengths; jointed with 29 x 20 x 24mm gauge edge trim; suspended on pre-straightened annealed iron wire hangers at maximum 1200mm cc; fixing with screws to backgrounds requiring plugging; measured over light fittings; including all necessary cutting, trimming to light fittings all stepped to the details and approval of the Architect</u>				
C	Ceiling surfaces generally	722	M2		
	<u>Chipboard Ceiling as described</u>				
D	12.5mm thick approved chipboard ceiling fixed to and including 50 x 50mm pressure impregnated timber bracing at 300mm centres both ways	130	M2		
	<u>Wrot Cypress</u>				
E	75mm wide cornice	150	M1		
	<u>Prepare and apply one undercoat and three finishing coats of interior quality paint as Crown Solo Pure Satin emulsion or other equal and approved to:</u>				
F	Chipboard surfaces	130	M2		
	<u>Prepare and apply three coats of polyurethane woodseal to boarding, according to manufacturers specifications</u>				
G	Surfaces of wood 0 - 100mm girth	150	M1		
	Total for Ceiling Finishes to Summary				

BILL 5 - BUILDERS WORKS SERVICES

Q840

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 12</u>				
	<u>PLUMBING, DRAINAGE & FIRE FIGHTING (to be done by an approved domestic sub contractor)</u>				
A	Cutting chases for small pipes on masonry walling and making good all disturbed surfaces	200	M1		
1	<u>Supply,fit fix and test the following plumbing materials and fittings as specified or other equal and approved</u>				
	<u>Water closet (WC) suite</u>				
B	Water Closet Suite comprising of Water Closet bowl with horizontal outlet, plastic seat and cover ,WC connector P or S trap as Twyford's 'NOCTURNE' OR equal and approved.	5	No		
	<u>Asian type WC</u>				
C	Asian type water closet Suite wash down WC in vitreous China complete with all fixing accessories; pan to be as hindustan or equal and approved	4	No		
	<u>Flush valve</u>				
D	Quiet Concealed Closet Flush Valve Rough Brass, for either left or right hand supply.25mm LPS wheel handle Bak-Chek angle stop , adjustable tailpiece ,vacuum breaker ,elbow flush connection and spud coupling for 40mm concealed back spud, metal oscillating non hold open for wall 0-25 mmthick.Exposed parts chrome plated. Valve to be as SLOAN ROYAL flush valve or equal and approved.	9	No		
	<u>Disabled unit</u>				
E	Disable toilet suite comprising: WC with horizontal outlet, wash hand basin with no overflow and no chain waste fitting, 5 No. Doc M support rails, Doc M hinged support rail, toilet roll holder, pair wall hanger, grid waste, Doc. M cistern and fittings, Doc. M seat ring, stainless steel seat hinges, No. 1240WH P trap connector or equal and approved.	2	No		
	<u>Toilet paper dispensor</u>				
F	Jumbo Toilet Paper Dispensor Size 28 x26.5x 12cm made of good plastic material, transparent and staple structure.	2	No		
	<u>Carried to Collection</u>				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Countertop washhand basin</u>				
A	Wash hand basin with one tap hole, size 565 x 425 mm in white vitreous china, complete chrome plated basin monoblock tap, 32 mm chrome waste, chrome plated bottle trap with extension pipe to wall . As Twyford's "ADVENT 540" or equal and approved.	11	No		
	<u>Soap dispenser</u>				
B	MEDICLINICS DJ0030 liquid soap dispenser in 0.8mm steel with white epoxy finish, size 116mm x 117mm x 206mm with the following features: Anti-dripping and anti-corrosion valve, 3mm thick thermoplastic container, capacity 1-1.2ml quantity dispenser per pulsation, suitable for all soaps except surgical. Or equal and approved.	4	No		
	<u>Mirrors</u>				
C	6mm thick polished glass, silver backed mirror with bevelled edges, size 2000 x 500mm plugged and screwed to wall with 10 No. chrome plated capped screws and 5mm thick foam back rest	4	No		
	<u>Dhobi sink</u>				
D	Precast terrazzo dhobi sink, size 750 x 500mm as manufactured by M/S Linotic Floor Company Ltd, Nairobi or other equal and approved complete with Catalogue No. 200 - 15 15mm diameter, long neck Bibcock, Rough brass Bricon tap. Twyford's No. WF 8461 CP 32mm chrome plated bottle P trap 75mm seal, No. WF 8468 CP chrome plated 32mm extension pipe to the wall with flange and No. WF 43333 CP 32mm chrome plated chain waste fitting slotted for overflow. OR equal and approved.	1	No		
	<u>Urinal bowl</u>				
E	Twyford's bathrooms LTD, Clifton white vitreous china urinal bowl ref. No. VC 7002 WH with concealed pipework complete with pair bowl supports, plastics 1 1/2 diameter domed outlet plated urinal grating complete with all accessories as COBRA waterech model no. FJ6000chrome plated push button 3/4 inch flush master junior exposed urinal flush valve, top entry with integral ball - o stop valve and wall plate, complete with exposed chrome plated urinal flush and tall pipe with inlet adaptor and back mount spray rose, 1/2 dia. plastic extension pipe to wall and wall flange. Twyford's bathrooms Ltd 305 mm wide x 620mm high bowl urinal division Ref. No. VC 8051 WH and Ref. No. SR 5706 XX hangers	4	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
<u>2</u>	<u>Internal Plumbing</u> <u>General Note:-</u> <u>Price of pipework to include the cost of couplings, connectors, fixing brackets, holderbats, plugs and jointing to fittings etc., together with marking of pipe routes on walls and Floors for wall chasing and holes cutting by others all as required in the pipework installation.</u> <u>The following in PN 20PPRC conforming to the current European standards for PPR installations and to the Engineers approval, pipe jointing shall be by polyfusion or use of electric coupling. Rates must allow for all Metal/Plastic threaded adaptors where required for the connection of sanitary fixtures, support raceways, isolating sheaths, elastic materials, expansion arms and bends, crossovers etc.</u> <u>Cold water supply system</u> <u>Pipework</u>				
A	50mm diameter pipe	40	M1		
B	40mm diameter pipe	50	M1		
C	32mm diameter pipe	35	M1		
D	25mm diameter pipe	10	M1		
	<u>Bends</u>				
E	50mm diameter pipe	8	No		
F	40mm diameter	8	No		
G	32mm diameter	4	No		
H	25mm diameter	25	No		
	<u>Tees</u>				
I	50 x 50 x 50mm diameter	3	No		
J	50 x 40 x 40mm diameter	8	No		
K	50 x 40 x 32mm diameter	3	No		
L	40 x 32 x 40mm diameter	12	No		
M	32 x 25 x 25mm diameter	10	No		
N	25x 25 x 20 mm diameter	20	No		
	<u>Carried to Collection</u>				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Angle valves</u>				
A	20mm diameter	12	No		
	<u>Sockets</u>				
B	50mm diameter	8	No		
B	40mm diameter	8	No		
C	32mm diameter	8	No		
D	25mm diameter	8	No		
	<u>Unions</u>				
E	40mm diameter	5	No		
F	32mm diameter	4	No		
G	25mm diameter	2	No		
	<u>Copper tubing</u>				
H	15mm Diameter to be a maximum length of 300mm each complete with connecting couplers per length.	12	No		
	<u>Bip tap</u>				
I	0.5" Hose union bip tap with double check valve, as PEGLER HU bip tap or equal and approved.	2	No		
	<u>Water meters</u>				
J	32mm diameter water meter as "Kent" or equal and approved.	1	No		
	<u>Polyethylene cold water tanks</u>				
K	i) Supply and install a polyethylene cold water storage tank of capacity 5,000 litres in roof space. size: diameter 2200mm, height 1850mm. The tank to be assembled complete with medium-pressure ball valve inlet, outlet connections including ball valve and on a platform and other necessary item for float.	2	No		
	<u>Ball valves</u>				
L	32 mm high pressure Ball Valve as PEGLAR or equal and approved	2	No		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Connection</u>				
A	Allow for connection to the existing water supply, complete with gate valve in a masonry chamber with fitting masonry cover. (approx. 100meters)		Sum		
	<u>Sterilization</u>				
B	Allow for flushing out and sterilization of the cold water system as required to the satisfaction of the engineer.		Sum		
3	<u>Internal drainage</u>				
	<u>Supply, install, test and commission the following complete:</u>				
	<u>General Note.</u>				
	<u>Prices for pipework shall include the cost for couplings, connectors and jointing to fittings appliances etc., and fixing brackets all as required in the pipework installation, together with for wall chasing and holes cutting by others.marking pipe routes on walls and floors</u>				
	<u>Note for U.P.V.C. pipework:</u>				
	<u>All UPVC couplings, branches, tees etc., are to be formed strictly in accordance with the manufacture's interactions.</u>				
	<u>Jointing pipework by " heat formed sockets" etc., shall not be accepted.</u>				
	<u>U.P.V.C. Soil, Waste and Ventilation Pipes and fittings to B.S. No. 5255</u>				
	<u>Pipework</u>				
C	40mm waste pipe fixed to wall or wall chase including approved pipe clips or brackets.	15	M1		
D	50mm – ditto-	20	M1		
E	100mm drain pipe fixed to wall surface or boxed to architect's detail.	20	M1		
	<u>No. 101 "TERRAIN" SWEEP BEND</u>				
F	40mm	27	No		
G	50mm	15	No		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Tees</u>				
A	100mm diameter	8	No		
B	50mm diameter	4	No		
C	40mm diameter	12	No		
	<u>No. 136 "TERRAIN" ACCESS CAP</u>				
D	40mm	2	No		
E	50mm	2	No		
F	100mm	8	No		
	<u>BOSS CONNECTIONS</u>				
G	40mm	2	No		
H	50mm	2	No		
I	No. 125 WC connector	6	No		
J	Weathering apron terrain No. 131	3	No		
K	Vent cowl terrain No. 150.2	3	No		
L	No. 104 "TERRAIN" single branch	2	No		
	<u>UNDERGROUND UPVC PIPEWORK TO BS 4660:1963 GOLDEN BROWN SERIES</u>				
M	100mm soil and waste pipe laid in or under concrete Floor slab or underground	20	M1		
N	100mm long radius bends	5	No		
O	100mm short radius bends	5	No		
	<u>Floor traps</u>				
P	Floor trap as " Key Terrain" 281.3 trapped Floor gully, 282.6 Floor gully inlet and grating.	5	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Gully traps</u>				
A	Gully trap chamber size 250 x 250mm, approximately 400mm deep in 150mm block work with cement mortar joints, on 150mm thick mass concrete slab, and plastered inside, for 100mm trap and hopper. 40mm thick , 250 x 250mm p.c.c. cover to gully trap chamber and provided with 40mm ventilating hole.	2	No		
	<u>Inspection chamber</u>				
B	Inspection chambers not to exceed 1070 x 910mm and depth not to exceed 2000mm below finished floor or ground level. Wall thickness should be 150mm blockwork and it should have concrete base and rendered concrete benchinching 1:3:6 mix. The cover to be cast iron Grade "B" medium duty to BS 497 with double seal.	4	No		
4	<u>Fire fighting</u>				
	<u>Fire fighting hosesreels</u>				
	<u>Supply and install</u>				
C	Make: Similar or equal and approved to 'TG' Series Hose Reels type with the following characteristics: Manual operation, swinging type, Delivery valves 25mm BSP inlet to, B.S 1010, Mild steel feed to B.S 1387	2	No		
D	<u>Pipework</u> <u>All pipework shall be galvanized mild steel to B.S 1387. Class 'B'</u>				
	i) 25 mm diameter pipe	2	M1		
	ii) 40 mm diameter pipe	12	M1		
E	<u>Bends</u>				
	i) 25 mm diameter pipe	6	No		
	ii) 40 mm diameter pipe	4	No		
F	<u>Tees-equal/unequal</u>				
	i) 50 x 40 x 40 mm diameter	2	No		
	ii) 40 x 40 x 25 mm diameter	2	No		
G	<u>Gate valves BS 5151:1974</u>				
	i) 25mm diameter	2	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
A	<u>Union</u>				
	i) 40mm union joint	2	No		
	ii) 25mm union joint	2	No		
B	<u>PORTABLE FIRE EXTINGUISHER</u>				
	i) 9 litre water Co2, fire extinguisher complete with refill cartridges and wall fixing brackets complying with B.S 5423.	2	No		
	ii) 4.5kg carbon dioxide gas extinguisher carbon dioxide gas extinguisher brackets and complying with B.S 5423	2	No		
	iii) 4.5 kg dry chemical powder portable fire extinguisher conforming to B.S 740 Part 2:1952	2	No		
	iv) 9 inch or 255mm wall mounted manual Bell	2	No		
	Carried to Collection				
	<u>COLLECTION PAGE</u>				
	From page BW/23				
	From page BW/24				
	From page BW/25				
	From page BW/26				
	From page BW/27				
	From page BW/28				
	From page BW/29				
	From above				
	Total for Plumbing , Drainage & Fire Fighting Carried to Summary				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<p>SCHEDULE OF RATES</p> <p>The tenderer shall insert unit rates against the items in the following schedules and may add such other items as he considers appropriate.</p> <p>The unit rates shall include for supply, transport, insurance, delivery to site, storage as necessary, assembling, cleaning, installing, connecting, profit and maintenance in defects liability and any other obligation under this contract.</p> <p>The unit rates will be used to assess the value of additions or omissions arising from authorised variations to the contract works.</p> <p>Where trade names or manufacturer's catalogue numbers are mentioned in the specification, the reference is intended as a guide to the type of article or quality of material required. Alternative brands of equal and approved quality will be accepted.</p>				
				RATE	
	Sluice valve 80mm		No.		
	10,000 litres capacity pressed steel tank		No.		
	15mm flow controlled pillar taps		No.		
	32mm flush valve		No.		
	Semi recessed toilet roll holder		No.		
	Fire blanket		No.		
	Drainage sump pump(specify capacity)		No.		
	Fire exit sign		No.		
	Fire Instruction Notice		No		
	Pressed Steel Plates 1000x1000x6mm thick		No		
	Hand Pump(Specify Make)		No		
	100mm air release valve		No		
	150mm Golden Brown PVC Pipe (heavy		No		
	9Kg Dry chemical powder fire extinguisher		No		
	Trenching to a maximum of 600mm and backfilling		LM		
					N/A

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>ELEMENT NO. 13</u>				
	<u>ELECTRICAL INSTALLATIONS (to be done by an approved domestic subcontractor)</u>				
1	SCHEDULE 1.0				
1.1	<u>POWER SUPPLY/SUB MAIN CABLE (ALL PROVISIONAL - ACTUAL QUANTITIES TO BE MEASURED ON SITE)</u>				
	<u>Supply, install, test and commission the following items;</u>				
A	125A TPN MCCB for outgoing supply to new Auditorium.	1	No		
B	35mm ² 4C armoured cable from POWER TAP OFF POINT to NEW Distribution Board for Auditorium.	50	M1		
C	Cable glands complete with locknut and PVC shroud for the above cable	2	No		
D	Excavation,tiling and backfilling.	50	M1		
E	Allow for 100mm diameter pvc hg duct encased in concrete anywhere necessary along the cable route.	30	M1		
F	Manhole where necessary along the cable route in item A above.	3	No		
G	Cable loop in box.	1	No		
H	Earthing		Item		
I	5x 16mm ² single core pvc insulated copper cables in 38mm diameter pvc hg conduit from Distribution Board for Lower ground floor to Distribution Board 'G' for Ground floor.	30	M1		
2	SCHEDULE 2- LOWER GROUND FLOOR				
2.1	<u>LIGHTING</u>				
	<u>Supply, install, test and commission the following items;</u>				
J	Lighting point wired using 3 x 1.5mm ² single cables in 20mm diameter PVC HG conduit for one way switching.	63	No		
K	As above but for two way switching	14	No		
L	One way one gang switch	2	No		
M	Two way One gang switch	3	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Lighting Cont'd</u>				
A	Two way Two gang switch	2	No		
B	Two way Four gang switch	1	No		
C	Two way Eight gang switch	1	No		
2.2	<u>TYPES OF LUMINAIRES</u>				
D	Type F	8	No		
E	Type F2	3	No		
F	Type D	14	No		
G	Type DL	35	No		
H	Type DS	5	No		
I	Type SL	2	No		
J	Type UDL	1	No		
K	Type K	6	No		
L	EXIT sign.	3	No		
2.3	<u>POWER</u>				
M	Power point wired using 3 x 2.5mm ² single cables in 20mm diameter PVC HG conduit.	28	No		
N	13A twin switched socket outlet	27	No		
O	20A DP Switch with neon indicator for Hand drier.	1	No		
P	Access point linked in 25mm diameter pvc hg conduit.	8	No		
Q	200 x 150 x 75mm adaptable box.	2	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
2.4	<u>POWER POINTS ON TRUNKING FIXED ON SEATS IN SITTING AREA(ALL PROVISIONAL).</u>				
A	Power point wired using 3 x 2.5mm ² single cables in trunking.	120	No		
B	13A twin switched socket outlet	120	No		
C	2x32mm diameter pvc hg conduit links to trunking .	100	M1		
D	100 x 50mm 1 compartment powder coated, oven cured metallic trunking complete with cover, fixing screws, bends and all other necessary accessories as manufactured by M/s Schneider Electric OR other equal and approved manufacturer.	300	M1		
E	Twin face plates.	120	No		
2.5	<u>DISTRIBUTION BOARD /CONSUMER UNIT AND PROTECTIVE DEVICES(ALL PROVISIONAL).</u>				
F	100A 9 way TPN MCB Distribution Board 'L' in Lower Ground floor excluding protective devices.	1	No		
G	10A SP MCB	6	No		
H	20A SP MCB	1	No		
I	30A SP MCB	13	No		
J	63A TP MCB	1	No		
K	Blanking plates	4	No		
2.6	<u>FIRE ALARM SYSTEM</u>				
	<u>Supply, install, test and commission the following items;</u>				
L	20A DP unswitched switch with neon indicator.	1	No		
M	Fire alarm circuit from the spur outlet to fire alarm detection panel wired using 4.0mm ² 2C FP200 fire resistant cable plus earth aluminium tape screen LOSH sheath 300/500v in 20mm diameter PVC HG conduit.	15	M1		
N	1 Zone Addressable fire alarm Detection panel.	1	No		
O	Final fire alarm circuits from fire alarm detection panel to fire alarm detectors wired using 1.5mm ² 2C FP200 fire resistant cable plus earth aluminium tape screen LOSH sheath 300/500v in 20mm diameter PVC HG conduit.	16	No		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
A	Addressable manual call point complete with all necessary accessories.	2	No		
B	Addressable optical smoke detector complete with all necessary accessories.	12	No		
C	Addressable multi - mode heat detector complete with all necessary accessories.	0	No		
D	Addressable 24 V DC 150mm base fire alarm sounder complete with all necessary accessories.	2	No		
E	Allow for testing and commissioning of the entire fire alarm system by The Fire Alarm Specialist supplier.	1	ITEM		
3	SCHEDULE 3 - GROUND FLOOR				
3.1	<u>LIGHTING</u>				
	<u>Supply, install, test and commission the following items;</u>				
F	Lighting point wired using 3 x 1.5mm ² single cables in 20mm diameter PVC HG conduit for one way switching.	74	No		
G	As above but for two way switching	12	No		
H	One way one gang switch	0	No		
I	Two way one gang switch	2	No		
J	Two way two gang switch	2	No		
K	Two way four gang switch	1	No		
L	Two way Eight gang switch	1	No		
3.2	<u>TYPES OF LUMINAIRES</u>				
M	Type A	2	No		
N	Type F	9	No		
O	Type F2	0	No		
P	Type D	15	No		
Q	Type DL	45	No		
R	Type DS	5	No		
S	Type SL	4	No		
T	Type UDL	2	No		
U	Exit Sign.	4	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
3.3	<u>POWER</u>				
A	Power point wired using 3 x 2.5mm ² single cables in 20mm diameter PVC HG conduit.	23	No		
B	13A twin switched socket outlet	22	No		
C	20A DP Switch with neon indicator	1	No		
3.4	<u>POWER POINTS ON TRUNKING FIXED ON SEATS IN SITTING AREA(ALL PROVISIONAL).</u>				
D	Power point wired using 3 x 2.5mm ² single cables in trunking.	120	No		
E	13A twin switched socket outlet	120	No		
F	2x32mm diameter pvc hg conduit links to trunking .	100	M1		
G	100 x 50mm 1 compartment powder coated, oven cured metallic trunking complete with cover, fixing screws, bends and all other necessary accessories as manufactured by M/s Schneider Electric OR other equal and approved manufacturer.	300	M1		
H	Twin face plates.	120	No		
3.5	<u>DISTRIBUTION BOARD/CONSUMER UNITS AND PROTECTIVE DEVICES(ALL PROVISIONAL).</u>				
I	100A 9 way TPN MCB Distribution Board 'G' for Ground floor, excluding protective devices.	1	No		
J	10A SP MCB	5	No		
K	20A SP MCB	1	No		
L	30A SP MCB	12	No		
M	Blanking plates	9	No		
Carried to Collection					

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
<u>3.6</u>	<u>FIRE ALARM SYSTEM</u> <u>Supply, install, test and commission the following items;</u>				
A	Final fire alarm circuits from fire alarm detection panel to fire alarm detectors wired using 1.5mm ² 2C FP200 fire resistant cable plus earth aluminium tape screen LOSH sheath 300/500v in 20mm diameter PVC HG conduit.	18	No		
B	Addressable manual call point complete with all necessary accessories.	2	No		
C	Addressable optical smoke detector complete with all necessary accessories.	14	No		
D	Addressable 24 V DC 150mm base fire alarm sounder complete with all necessary accessories.	2	No		
E	Allow for testing and commissioning of the entire fire alarm system by The Fire Alarm Specialist supplier.	1	ITEM		
4	<u>PUBLIC ADDRESS SYSTEM PROVISIONS.</u>				
4.1	<u>PUBLIC ADDRESS SYSTEM (ALL PROVISIONAL)</u>				
F	Control room point in server room linked in 32mm diameter PVC HG conduit, complete with all necessary conduit boxes and other accessories, to speaker points.	60	M1		
G	Public system address speaker points linked in 3x25mm diameter PVC HG conduit, complete with all necessary conduit boxes and other accessories.	100	M1		
H	Public system address MIC point linked in 3x25mm diameter PVC HG conduit, complete with all necessary conduit boxes and other accessories, from control room.	80	M1		
I	200 x 150 x 75mm adaptable box	8	No		
5	<u>SCHEDULE 5</u>				
5.1	<u>LIGHTNING PROTECTION (ALL PROVISIONAL - ACTUAL QUANTITIES TO BE MEASURED ON SITE)</u> <u>Supply, install, test and commission the following items;</u>				
J	25mm x 3mm copper tape including roof hold fasts, bonding and all necessary accessories and works as described in the particular specifications	160	M		
K	Test clamp as Furse reference NO. 533 AA 01	8	No		
	Carried to Collection				

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
A	2m x 12mm diameter hard drawn copper earth rod for direct driving into ground complete with driving cap, couplers and clamps	8	No		
B	Lightning Arrestors as Furse	4	No		
C	Earth inspection pit as per BS 6651:1985	8	No		
D	Testing of the installation to comply with BS 6651:1985	1	ITEM		
E	Provide 38mm diameter PVC HG conduit for lightning protection down conductors.	80	M		
F	Allow for preparation of WORKING drawings.				
G	Allow for preparation of 'AS INSTALLED' drawings.				
H	Allow for attendance on other sub-contractors.				
Carried to Collection					

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

[illegible]

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<p>SCHEDULE OF RATES</p> <p>The tenderer shall insert unit rates against the items in the following schedules and may add such other items as he considers appropriate.</p> <p>The unit rates shall include for supply, transport, insurance, delivery to site, storage as necessary, assembling, cleaning, installing, connecting, profit and maintenance in defects liability and any other obligation under this contract.</p> <p>The unit rates will be used to assess the value of additions or omissions arising from authorised variations to the contract works.</p> <p>Where trade names or manufacturer's catalogue numbers are mentioned in the specification, the reference is intended as a guide to the type of article or quality of material required. Alternative brands of equal and approved quality will be accepted.</p>				
	<p>PVC/SWA/PVC copper cable per metre</p> <p>a) 25mm sq. 4 core</p> <p>b) 16mm sq. 4 core</p> <p>c) 10mm sq. 4 core</p> <p>b) 4mm sq. 2 core</p> <p>Single core copper cable per metre</p> <p>a) 3x25mm sq</p> <p>b) 5x25mm sq</p> <p>c) 3x16mm sq</p> <p>100A 4 Way TPN Distribution Board</p> <p>100A 12 Way SPN Distribution Board</p> <p>50mm x 200mm 2 compartment metal trunking spray painted</p> <p>200mm wide cable tray as manufactured by M/S Nationwide Electrical Industries Ltd</p> <p>2 Zone Conventional Fire alarm panel</p> <p>Conventional Smoke detector</p> <p>Conventional Heat detector</p> <p>Conventional Break glass contact</p> <p>Gunmetal bonding unit complete with Stainless Steel screws for bonding 25mm x 3mm copper tape to flat metal surfaces</p>			RATE	
					N/A

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 5 - BUILDERS WORKS SERVICES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>BUILDERS WORKS & SERVICES</u>				
	<u>SUMMARY</u>			<u>From Page</u>	
1	R.C. SUPERSTRUCTURE		BW/4		
2	STAIRCASE & RAMPS		BW/7		
3	EXTERNAL WALLING		BW/8		
4	INTERNAL WALLING		BW/9		
5	WINDOWS		BW/10		
6	DOORS		BW/13		
7	ROOFING		BW/17		
8	EXTERNAL WALL FINISHES		BW/18		
9	INTERNAL WALL FINISHES		BW/19		
10	FLOOR FINISHES		BW/21		
11	CEILING FINISHES		BW/22		
12	PLUMBING, DRAINAGE & FIRE FIGHTING		BW/31		
13	ELECTRICAL INSTALLATIONS		BW/40		
	Total for Builders Works & Services to Carried Main Summary				

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>EXTERNAL WORKS (All Provisional)</u>				
1.0	<u>Retaining wall backfilling</u>				
	<u>Backfilling</u>				
A	Take from heap, return fill and ram in stages of 1.5m selected excavated materials around the retaining wall to approval of the Engineer	148	M3		
B	Over 300mm thick hardcore filling rolled, levelled and compacted around the retaining wall to approval of the Engineer	66	M3		
2.0	<u>Floor slab</u>				
C	300mm thick hardcore filling handpacked, rolled, levelled and compacted to make up levels	74	M2		
D	50mm Stone dust blinding to surface of hardcore	74	M2		
	<u>Damp Proof Membrane</u>				
E	Single layer of 1000 gauge polythene sheeting laid on blinded hardcore with 150 mm side laps to receive concrete	74	M2		
	<u>Anti - termite treatment</u>				
F	Treat surface of hardcore with 'Dieldrin' or similar approved ant-termite solution applied strictly in accordance with the manufacturer's instructions	74	M2		
	<u>Vibrated Reinforced concrete class C20/25 achieving characteristic compressive strength of 25N/mm² at 28days of 150mm cubes as per BS Standard of 15th August, 2005 in :-</u>				
G	100mm Thick ground floor slab	74	M2		
	<u>Steel fabric mesh reinforcement to B.S. 4483</u>				
H	BRC mesh fabric reinforcement ref A142 laid in slabs (measured net-no allowance made for raps)	74	M2		
3.0	<u>Paved walkways</u>				
	<u>Precast Concrete Paving Slabs</u>				
I	Approved 600 x 600 x 50mm Thick precast concrete paving slabs on and including 50mm thick sand bed jointed and pointed in cement sand 1:4 mortar; including all necessary excavations, compaction, grading to falls and cross falls and herbicide surface treatment	145	M2		
	<u>Carried to Collection</u>				

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
4.0	<u>Storm water drainage</u>				
	<u>The following in 300mm invert block drain</u>				
	<u>Encased PVC pipe drain</u>				
A	Excavate for storm drain depth n.e. 1.5m and supply and install 300mm dia approved PVC pipe storm drain with and including 100mm thick plain concrete surround; including backfilling and cart away of surplus excavated materials all to approval of the Engineer.	24	M1		
	<u>The following in 2 No. Storm Catchpits</u>				
B	Excavate for storm catch pit depth n.e 1.5m	8	M3		
C	200mm thick base in plain concrete; class C20/20 on and including 50mm thick class 15 concrete blinding	5	M2		
D	200mm thick natural stone walling bedded and jointed in cement and sand (1:4) mortar including 12mm thick gauged lime plaster to walls internally	14	M2		
E	200mm thick base in plain concrete; class C20/20 including all necessary formwork	4	M2		
F	150mm thick top slab in vibrated reinforced concrete; class C20/20 including all necessary formwork	4	M2		
	<u>Manhole cover</u>				
G	Extra over the top slab for 450 x 600 reinforced concrete manhole cover on and including 4 No. 50 x 50 x 6mm equal angle section welded to lip to create manhole Z framed shape around concrete. Manhole cover to have 2 No. lifting eyelet fabricated from Y10 bar, 750mm long; all to the approval of the Civil Engineer	2	No		
	<u>Supply and fix bar reinforcement as described in:</u>				
H	10mm diameter bars	99	KG		
	<u>Headwall</u>				
I	Excavate for, provide all materials and construct 200 mm thick chisel dressed masonry headwalls for 300mm diameter PVC pipes including concrete Class 20 footings, average 1800mm long x 1290mm deep in accordance with detailed drawings	1	No		
	Carried to Collection				

to

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Invert Block Drain</u>				
A	Excavate trench n.e. 1.5M deep, for 300mm dia IBD including trimming, compaction and sloping (1:1) on sides to receive side slabs	252	M3		
B	Supply and install 300mm dia approved pre-cast concrete invert block drain; fair faced finished; and all jointed in cement sand (1:4) mortar on and including 50mm thick plain concrete bed to bottom and sides of trench, including backfilling and cart away of surplus excavated materials.	203	M1		
	<u>Side slabs</u>				
C	Supply and install 600 x 225 x 75mm thick approved pre-cast concrete sideslabs; fair faced finished; and all jointed in cement sand (1:4) mortar.	132	M2		
	<u>Drain pipes</u>				
D	100mm diameter PVC drain pipe outlets under footpaths and landscaped gardens; on and including imported granular material compacted to 80% MDD; including all necessary excavations and backfilling after installations	40	M1		
	<u>Headwalls</u>				
E	Excavate for, provide all materials and construct 150 mm thick class 25 concrete headwalls for 300mm diameter precast concrete culverts including concrete Class 20 footings, average 2340mm long x 1290mm deep in accordance with detailed drawings	4	No		
	<u>Excavations</u>				
F	Excavate trench not exceeding 1.5M deep, for 300mm diameter precast concrete culvert (m.s) including backfill after laying of pipes as per drawings, compact and cart away surplus material.	12	M1		
	<u>Culverts</u>				
G	300 mm Diameter culverts including laying and jointing in cement sand (1:3) grout and 100mm thick class 25 concrete surround as per drawings	10	M1		
	Carried to Collection				

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
5.0	<u>Foul water drainage</u>				
	<u>Excavations</u>				
A	Excavate trench n.e. 1.5M deep, for drainage pipe (m.s) including backfill after laying of pipes as per details, compact and cart away surplus material.	66	M3		
	<u>Pipe laying</u>				
B	Supply and install approved 150mm diameter medium duty PVC sewer pipe sloped as per details and drawings; on and including concrete class 20 bed, haunch and surround , backfill after laying of pipes as per drawings, compact and cart away surplus material as per engineers drawings and details	138	M1		
C	Extra over ditto for UPVC tee with access cap and plug	2	No		
D	Extra over ditto for 150mm diameter 95.5 degrees bend on 450 x 400 concrete block	2	No		
	<u>The following in 7 No. Sewer Manholes</u>				
E	Excavate for manhole pit depth n.e 1.5m	28	M3		
F	Ditto 1.5m - 3.0 meters	14	M3		
G	200mm thick base in plain concrete; class C20/20 on and including 50mm thick class 15 concrete blinding	19	M2		
H	200mm thick natural stone walling bedded and jointed in cement and sand (1:4) mortar including 12mm thick gauged lime plaster to walls internally	69	M2		
I	200mm thick base in plain concrete; class C20/20 including all necessary formwork	19	M2		
J	150mm thick top slab in vibrated reinforced concrete; class C20/20 including all necessary formwork	13	M2		
	<u>Manhole cover</u>				
K	Extra over the top slab for 450 x 600 reinforced concrete manhole cover on and including 4 No. 50 x 50 x 6mm equal angle section welded to lip to create manhole Z framed shape around concrete. Manhole cover to have 2 No. lifting eyelet fabricated from Y10 bar, 750mm long; all to the approval of the Civil Engineer	7	No		
	<u>Supply and fix bar reinforcement as described in:</u>				
L	10mm diameter bars	257	KG		
	Carried to Collection				

to

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Cast Iron steps</u>				
A	Supply and fix to masonry walling approved cast iron manhole steps 150mm wide x 200mm deep as per Engineers drawings and details	42	No		
	<u>Testing and connection</u>				
B	Allow for testing of sewer line to the satisfaction of the Engineer	ITEM			
C	Allow for connection of sewer line to existing septic tank	ITEM			
6.0	<u>Masonry Retaining Wall</u>				
	<u>Excavations</u>				
D	Excavate for column bases not exceeding 1.5m deep from stripped level	19	M3		
E	Excavate for strip foundation not exceeding 1.5m deep from stripped level	10	M3		
	<u>Disposal of excavated materials</u>				
F	Return fill and ram selected materials around foundations	29	M3		
G	Load cart away surplus excavated material to deposit as directed	24	M3		
	<u>Planking and Strutting</u>				
H	Allow for Planking and strutting to sides of all excavations including keeping excavations free from fallen materials		Item		
	<u>Concrete Work</u>				
	<u>Plain concrete class C12/15 achieving characteristic compressive strength of 15N/mm² at 28days of 150mm cubes as per BS Standard of 15th August, 2005 in :-</u>				
I	50mm thick blinding to column bases	13	M2		
J	Ditto strip footing	10	M2		
	<u>Vibrated Reinforced concrete class C20/25 achieving characteristic compressive strength of 25N/mm² at 28days of 150mm cubes as per BS Standard of 15th August, 2005 in :-</u>				
K	Columns, column bases and strip footing	10	M3		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>Supply and fix reinforcement to BS 4449:1997 , Grade 460B high strength type 2 Ribbed bars with proof stress of 460 N/mm2; Including all necessary cutting, bending, fixing, wastage, overlaps and provision of spacer blocks and stools to S.E's detail</u>				
A	8mm diameter bars	61	KG		
B	12mm diameter bars	120	KG		
C	20mm diameter bars	443	KG		
	<u>Sawn formwork to: -</u>				
D	Vertical sides of strip footing	7	M2		
E	Ditto columns	61	M2		
F	Ditto column bases	43	M2		
	<u>Approved dressed natural stone walling bedded and jointed in cement and sand (1:4) mortar including reinforcing with 25mm wide hoop iron every alternate course</u>				
G	200mm Thick Walling	88	M2		
	<u>15 mm thick cement and sand (1:4) as described to:-</u>				
H	To masonry and concrete surfaces	176	M2		
	<u>Prepare and apply one undercoat and two coats "WALL MASTER" (T6) or other equal and approved textured paint to:</u>				
I	Externally rendered surfaces	88	M2		
	<u>Prepare and apply 3 coats of fibre reinforced colas bitumen paint to:</u>				
J	Externally rendered surfaces	88	M2		
	Carried to Collection				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 6 - EXTERNAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (KES)
	<u>COLLECTION</u>				
	From page EW/1				
	From page EW/2				
	From page EW/3				
	From page EW/4				
	From page EW/5				
	From page EW/6				
	Total for External Works Carried to Main Summary				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

BILL 7 - PRIME COSTS AND PROVISIONAL SUMS

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	AMOUNT
	<u>PRIME COSTS & PROVISIONAL SUMS</u>				
	<u>PRIME COSTS</u>				
	<u>Seats</u>				
A	Allow for a Prime Cost Sum of KES.7,500,000.00 only for Supply and Fixing of Permanent seats to be done by a nominated sub contractor.		Item		7,500,000.00
B	Allow for Profit	%		
C	Allow for General Attendance		Sum		
	<u>Internet Services Installations</u>				
D	Allow for a Prime Cost Sum of KES.1,200,000.00 only for Internet Sevices Installations to be done by a nominated sub-contractor.		Sum		1,200,000.00
E	Allow for Profit	%		
F	Allow for General Attendance		Sum		
	<u>PROVISIONAL SUMS</u>				
	<u>Landscapping</u>				
H	Allow for a Provisional Sum of KES.350,000.00 only for Landscaping to be expended at the discretion of the Client.		Sum		350,000.00
	<u>Contingency Sum</u>				
I	Allow for a Provisional Sum of KES.1,000,000.00 only for Contingencies to be expended at the discretion of the Client.		Sum		1,000,000.00
	Total for P.C & Provisional Sums to Main Summary				

COMPLETION OF THE PROPOSED AUDITORIUM FOR THE UNIVERSITY OF EMBU

MAIN SUMMARY

BILL NO.	DESCRIPTION		AMOUNT
	<u>COMPLETION OF THE PROPOSED AUDITORIUM</u>		
	<u>MAIN SUMMARY</u>	<u>From Page</u>	
1	PARTICULAR PRELIMINARIES	PP/10	
2	GENERAL PRELIMINARIES	GP/14	
3	TRADE PREAMBLES	103	
4	REMEDIAL WORKS	RW/3	
5	BUILDERS WORKS & SERVICES	BW/42	
6	EXTERNAL WORKS	EW/7	
7	P.C & PROVISIONAL SUMS	PC/1	
	TOTAL COST OF COMPLETION OF THE PROPOSED AUDITORIUM CARRIED TO FORM OF TENDER		

CONTRACTOR'S NAME:.....

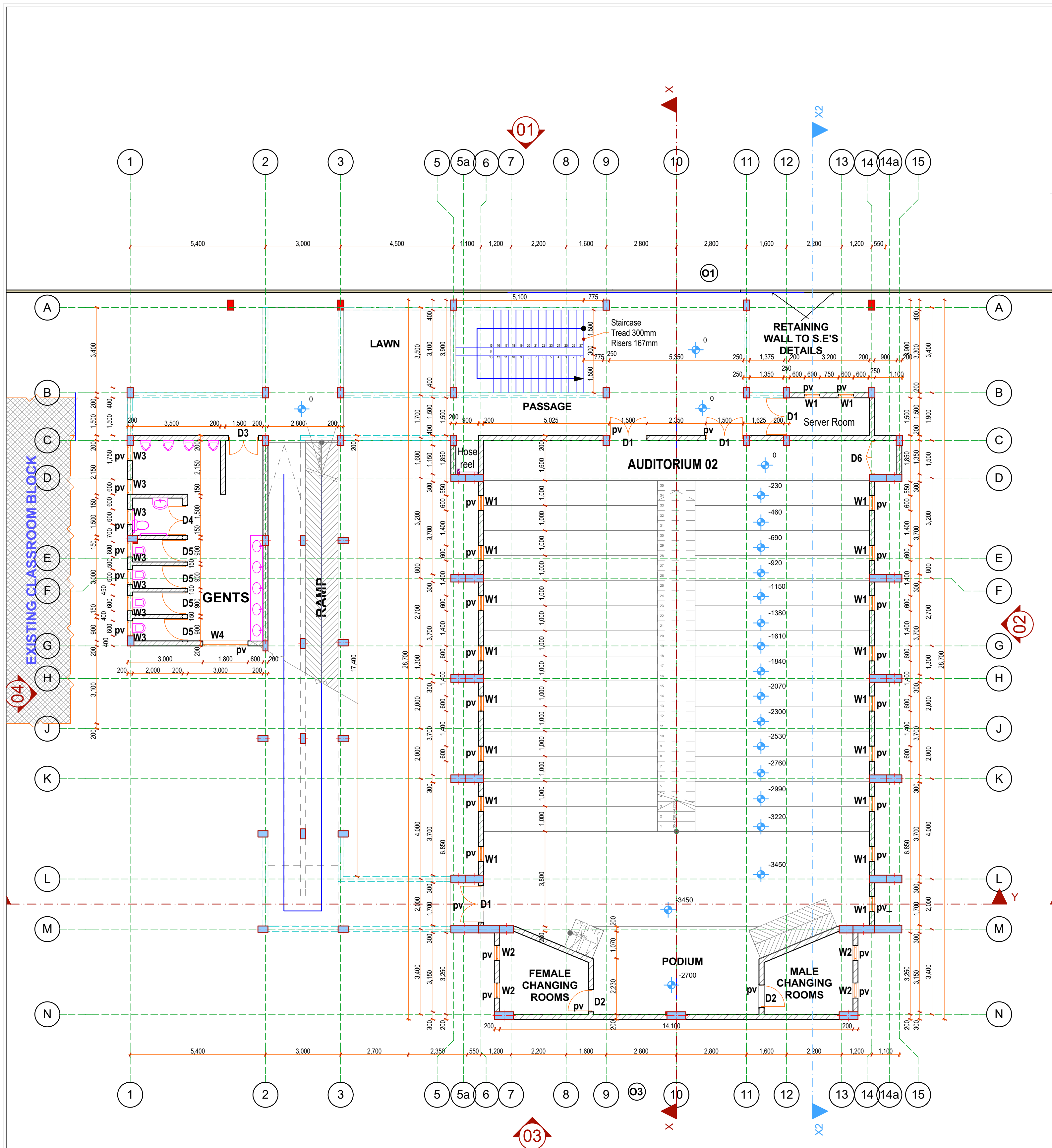
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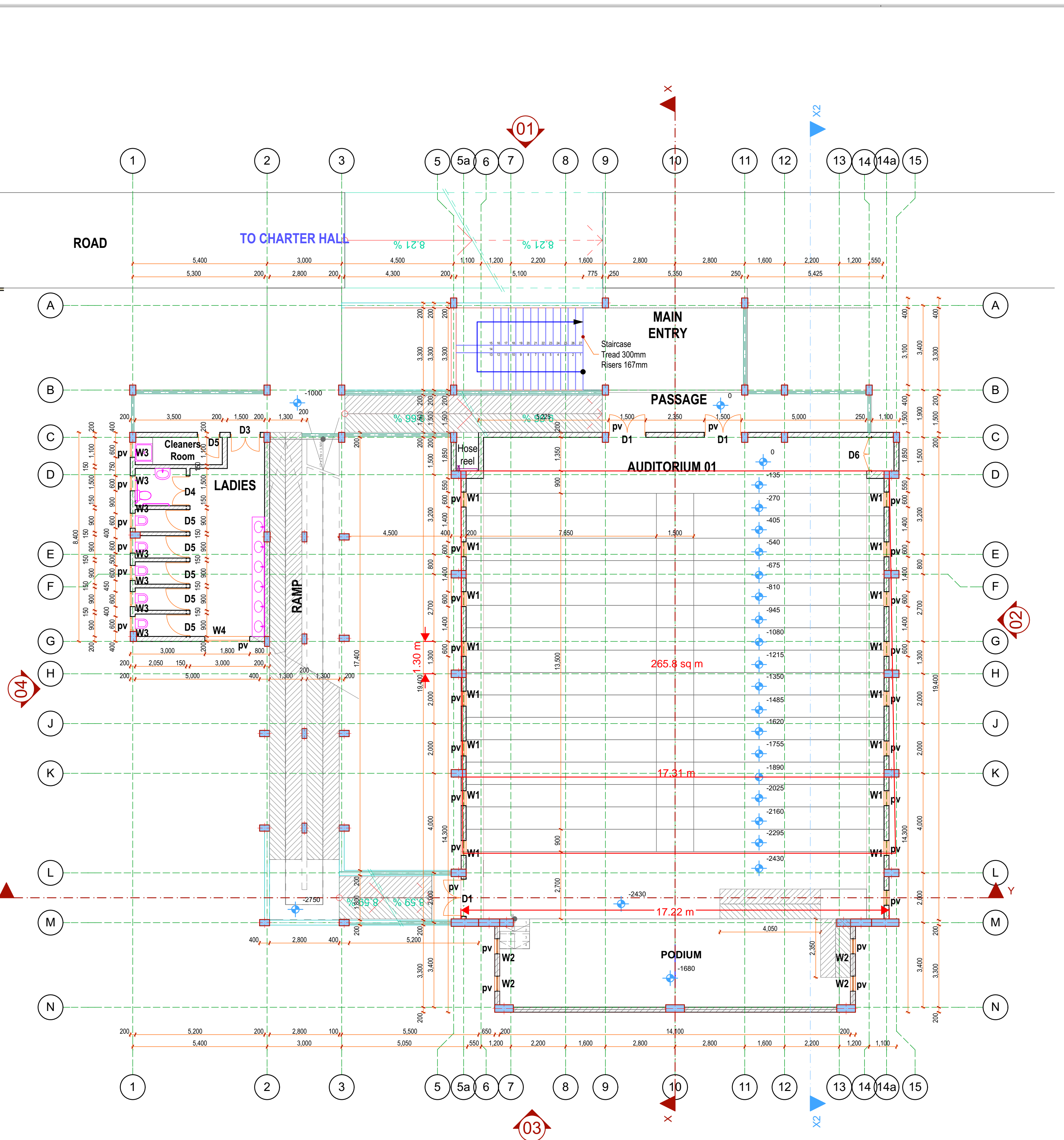
WITNESS'S NAME:.....

ADDRESS:.....

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



LOWER GROUND FLOOR PLAN



GROUND FLOOR PLAN

NOTES

GENERAL

All dimensions are in mm unless otherwise specified.
Drawing are not to scaled, only figured dimensions to be used
The contractor must check and verify all dimensions before commencement of any work.

CONSTRUCTION

All slab at ground level to be poured over 1000 gauge polythene sheet on 50mm thick murrum blinding on hardcore.
All soil under slab around and under foundation to be poisoned for termite control.

CIVIL

All soil on cut embankment to be stabilized. The slope not to exceed the natural angle of repose

STRUCTURAL

All black cotton soil to be removed from all buildings and paved surfaces

For all R.C work, refer to structural Engineer's details.

Depth of foundation to be determined on site to S.E.'s approval

All walls less than 150mm thick to be reinforced with hoop iron at every alternate course.

All adjacent R.C. work and masonry walls to be tied with hoop iron at every alternate course.

All plumbing and drainage to comply with relevant local authority
SVP denotes soil vent pipe to be provided at the head of the drainage system.

Drains pass beneath buildings & driveways to be encased in 150mm concrete surround.

The storm drain pipes to comply with BS 556 specification.

All underground foul and waste drain pipes shall be uPVC to comply with BS 5255.

All inspection chambers covers and framing shall be cast iron.

Minimum slope in the drains pipes to be 1 in 100

No chases will be allowed for pipes. Sleeves will be allowed with written approval of structural Eng's. No cutting of concrete without express approval of the Architect or structural Eng.

All testing of pipes must be completed before plastering.
All mechanical works must be co-ordinated with electrical and any conflict must be clarified before work begin.

FINISHES

All doors and windows to have permanent ventilations (PV) except w.c's and showers doors.

All floor finishes to be cement/sand screed unless otherwise instructed

REVISIONS

No.	Description	Date

Project Title

PROPOSED AUDITORIUM

Drawing title

Client Name:

UNIVERSITY OF EMBU
P.O BOX 6 - 60100,
EMBU



UNIVERSITY OF EMBU
ESTATE DEPARTMENT

Application

ARCHITECTURAL DRAWINGS

Drawn By:

Reg. Arch.
Michael Kyeva Mung'eli
Reg No. A 1605 - MAAK

Scale: 1:100 & 1:2500

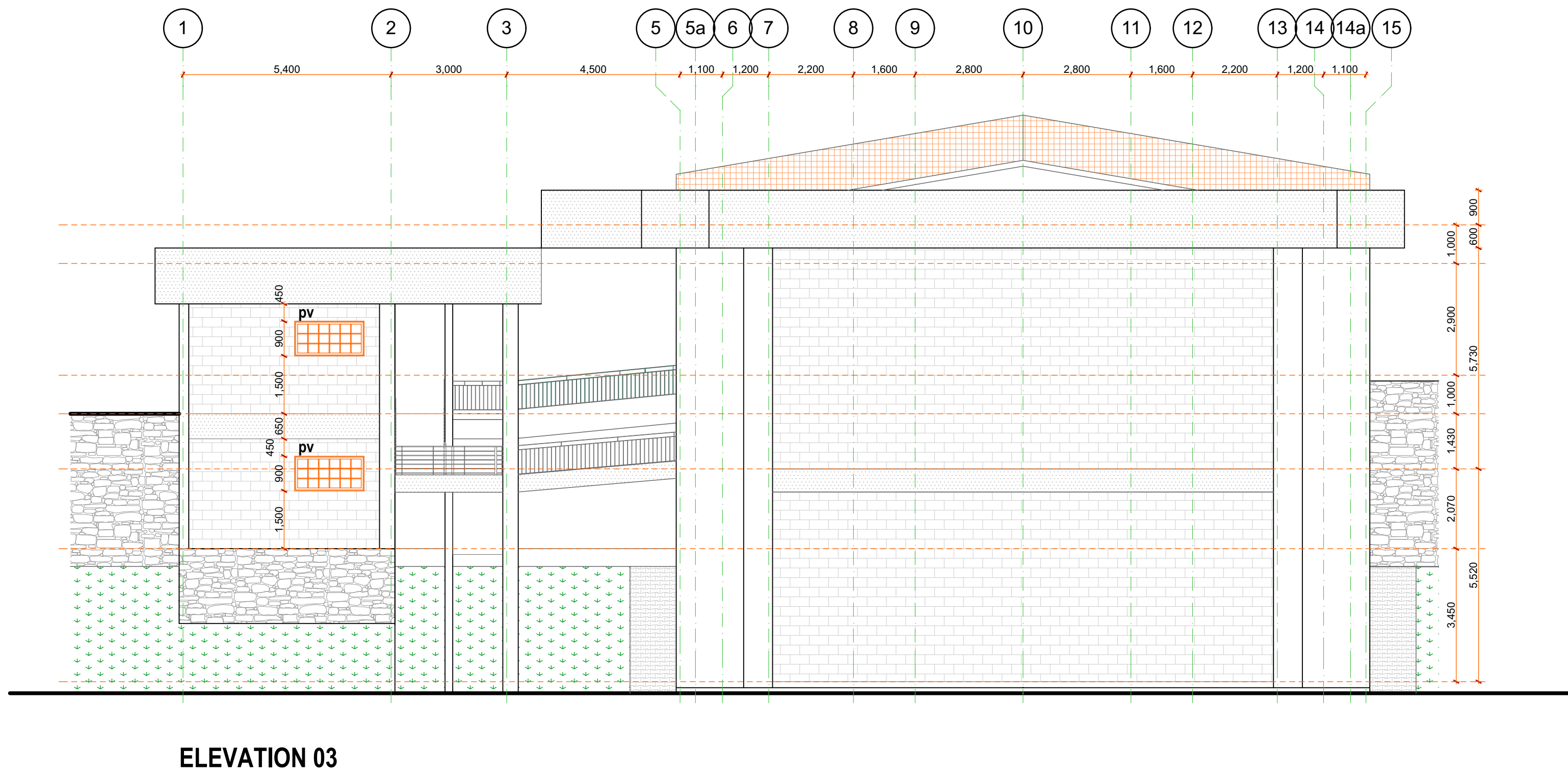
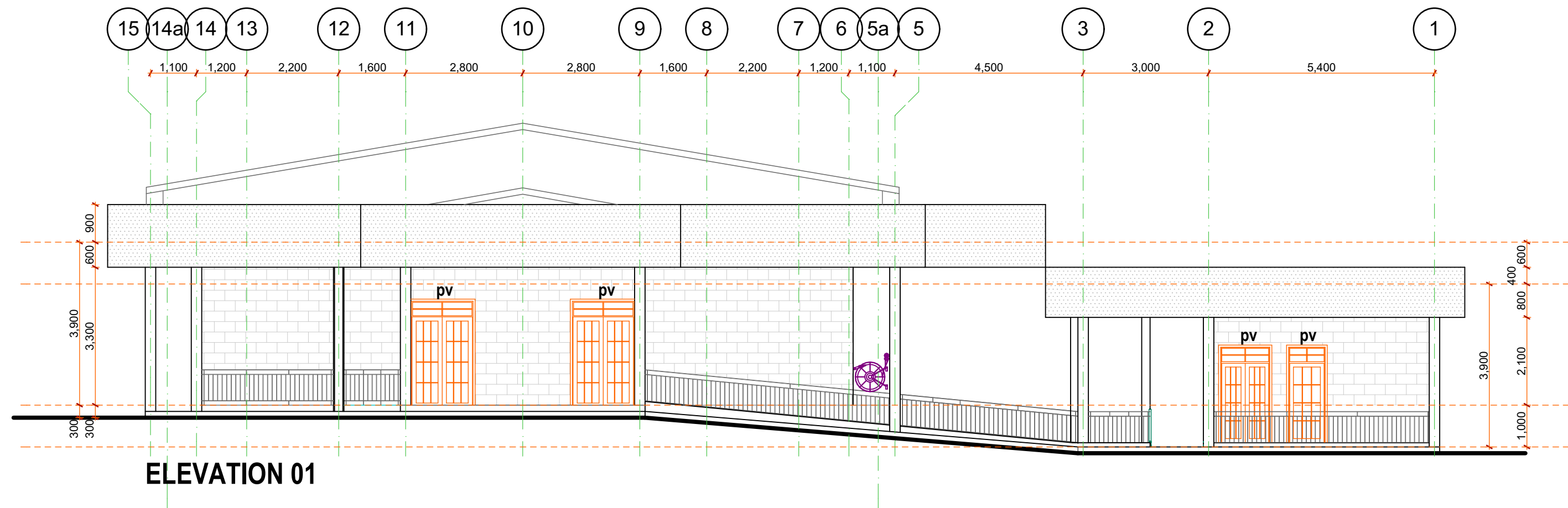
Date: Feb, 2019

Checked By:



Drg No:

Sheet No:
01-03



NOTES

GENERAL

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The contractor must check and verify all dimensions before commencement of any work.

CONSTRUCTION

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CIVIL

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REVISIONS

Project Title

PROPOSED AUDITORIUM

Drawing title

Client Name:

UNIVERSITY OF EMBU
P.O BOX 6 - 60100,
EMBU



UNIVERSITY OF EMBU
ESTATE DEPARTMENT

Application

ARCHITECTURAL DRAWINGS

Drawn By:

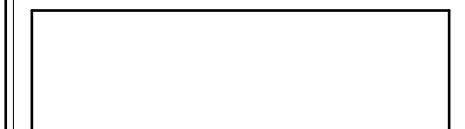
Reg. Arch.
Michael Kyeva Mung'eli
Reg No. A 1605 - MAAK

Sign.....

Scale: 1:100 & 1:2500

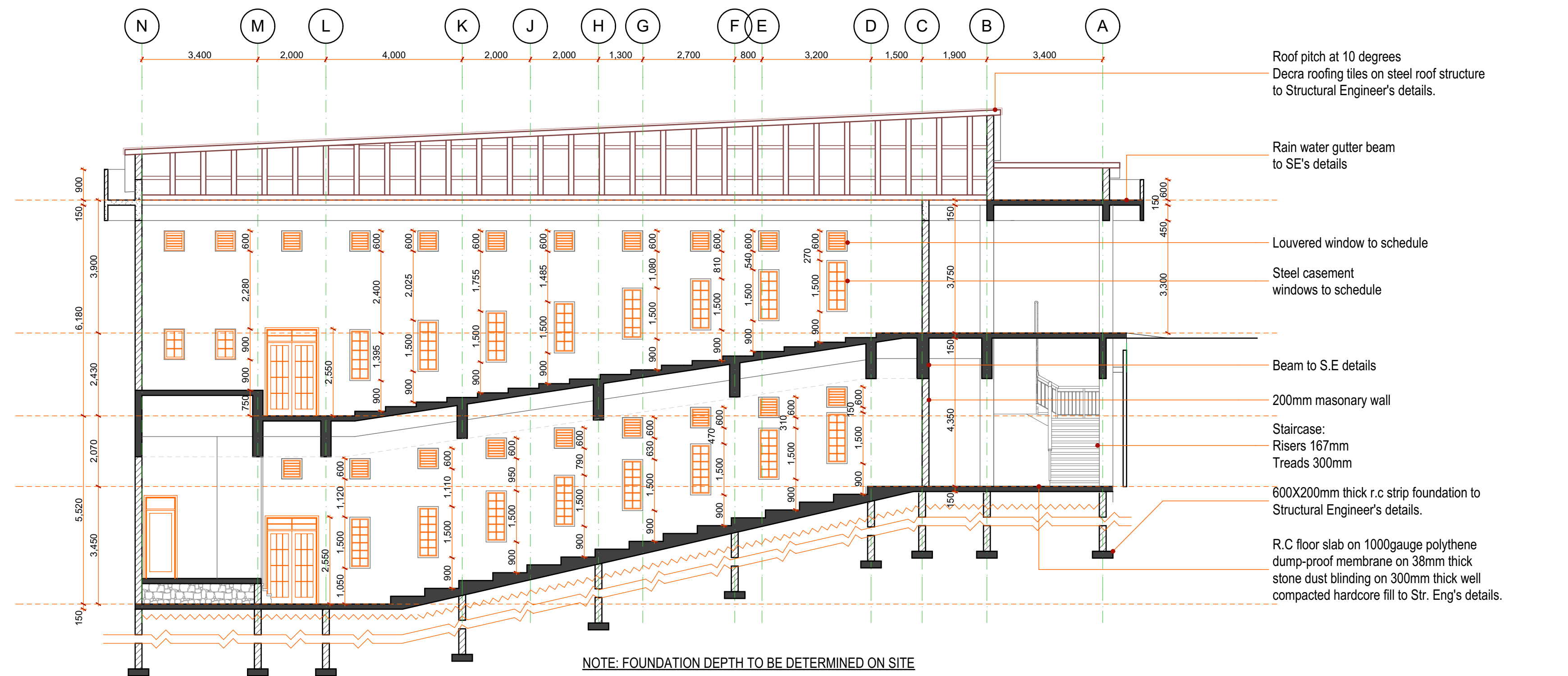
Date: Feb, 2019

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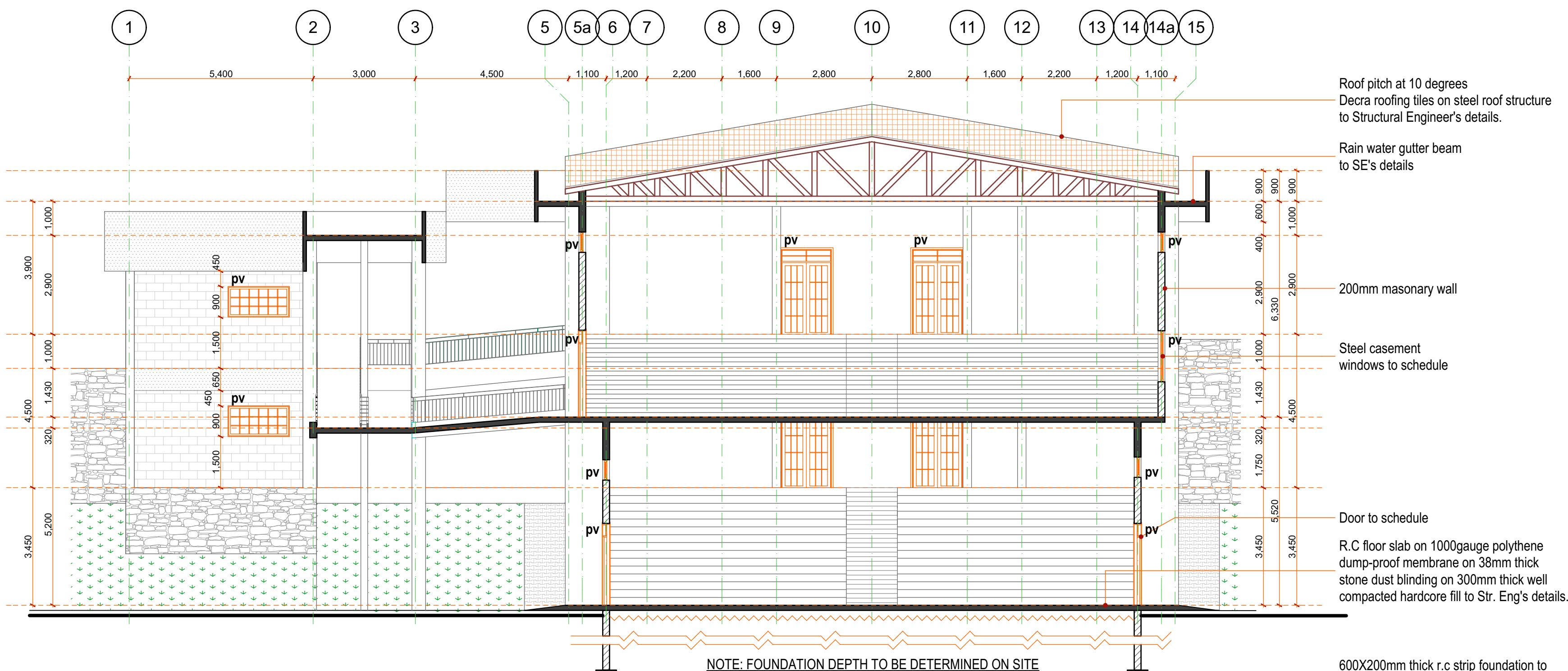


Drg No:

Sheet No:
02-03



SECTION X-X
Scale: 1:100



SECTION Y-Y
Scale: 1:100

NOTES

GENERAL

All dimensions are in mm unless otherwise specified.
Drawing are not to scaled, only figured dimensions to be used commencement of any work.

The contractor must check and verify all dimensions before commencement of any work.

CONSTRUCTION

All slab at ground level to be poured over 1000 gauge polythene sheet on 50mm thick murrum blinding on hardcore.

All soil under slab around and under foundation to be poisoned for termite control.

CIVIL

All soil on cut embankment to be stabilized. The slope not to exceed the natural angle of repose.

STRUCTURAL

All black cotton soil to be removed from all buildings and paved surfaces.

For all R.C work, refer to structural Engineer's details.

Depth of foundation to be determined on site to S.E's approval.

All walls less than 150mm thick to be reinforced with hoop iron at every alternate course.

All adjacent R.C work and masonry walls to be tied with hoop iron at every alternate course.

All plumbing and drainage to comply with relevant local authority. SVP denotes soil vent pipe to be provided at the head of the drainage system.

Drains pass beneath buildings & driveways to be encased in 150mm concrete surround.

The storm drain pipes to comply with BS 556 specification.

All underground foul and waste drain pipes shall be uPVC to comply with BS 5255.

All inspection chambers covers and framing shall be cast iron.

Minimum slope in the drains pipes to be 1 in 100.

No chases will be allowed for pipes. Sleeves will be allowed with written approval of structural Eng's. No cutting of concrete without express approval of the Architect or structural Eng.

All testing of pipes must be completed before plastering.
All mechanical works must be co-ordinated with electrical and any conflict must be clarified before work begin.

FINISHES

All doors and windows to have permanent ventilations (PV) except w.c's and showers doors.

All floor finishes to be cement/sand screed unless otherwise instructed.

REVISIONS

No.	Description	Date

Project Title

PROPOSED AUDITORIUM

Drawing title

Client Name:

UNIVERSITY OF EMBU
P.O BOX 6 - 60100,
EMBU



UNIVERSITY OF EMBU

ESTATE DEPARTMENT

Application

ARCHITECTURAL DRAWINGS

Drawn By:

Reg. Arch.
Michael Kyeva Mung'eli
Reg No. A 1605 - MAAK

Sign.....

Scale: 1:100 & 1:2500

Date: Feb, 2019

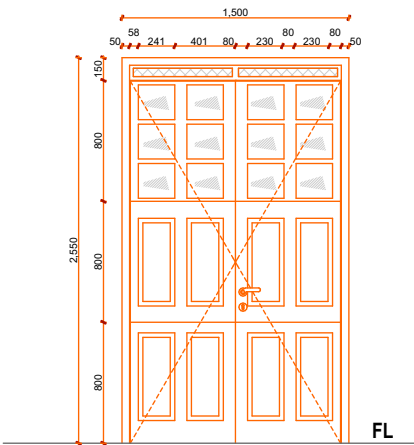
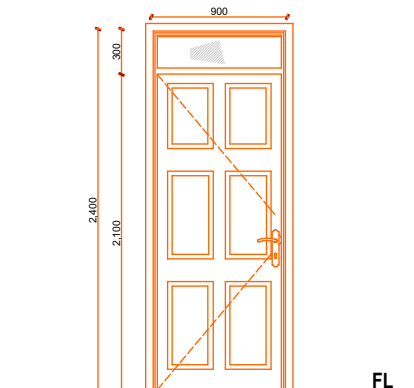
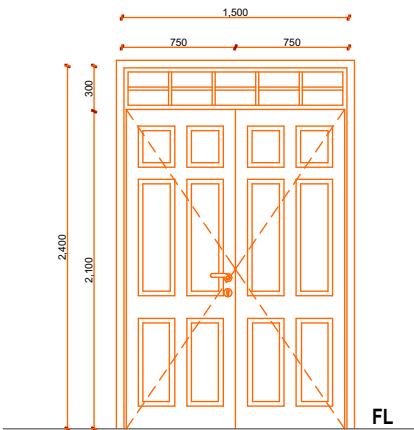
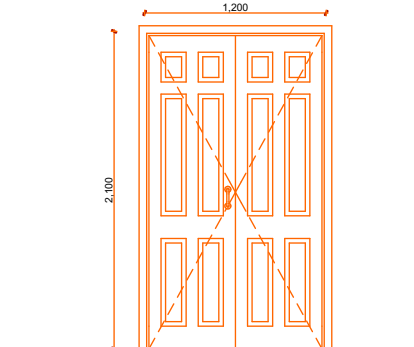
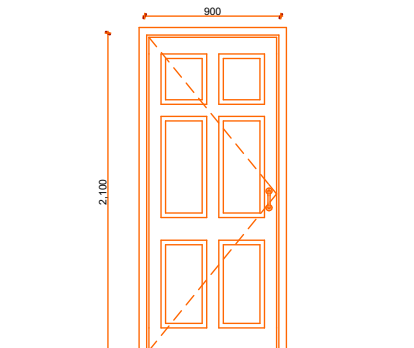
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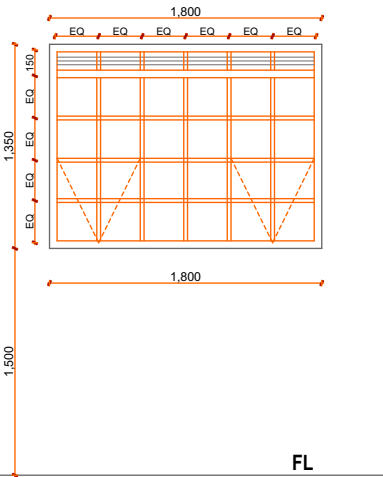
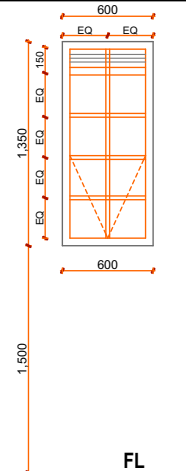
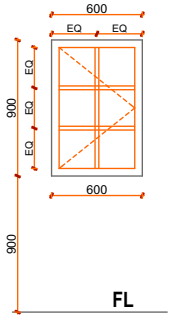
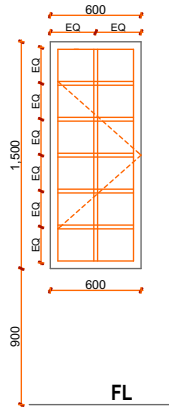
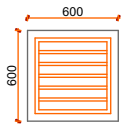


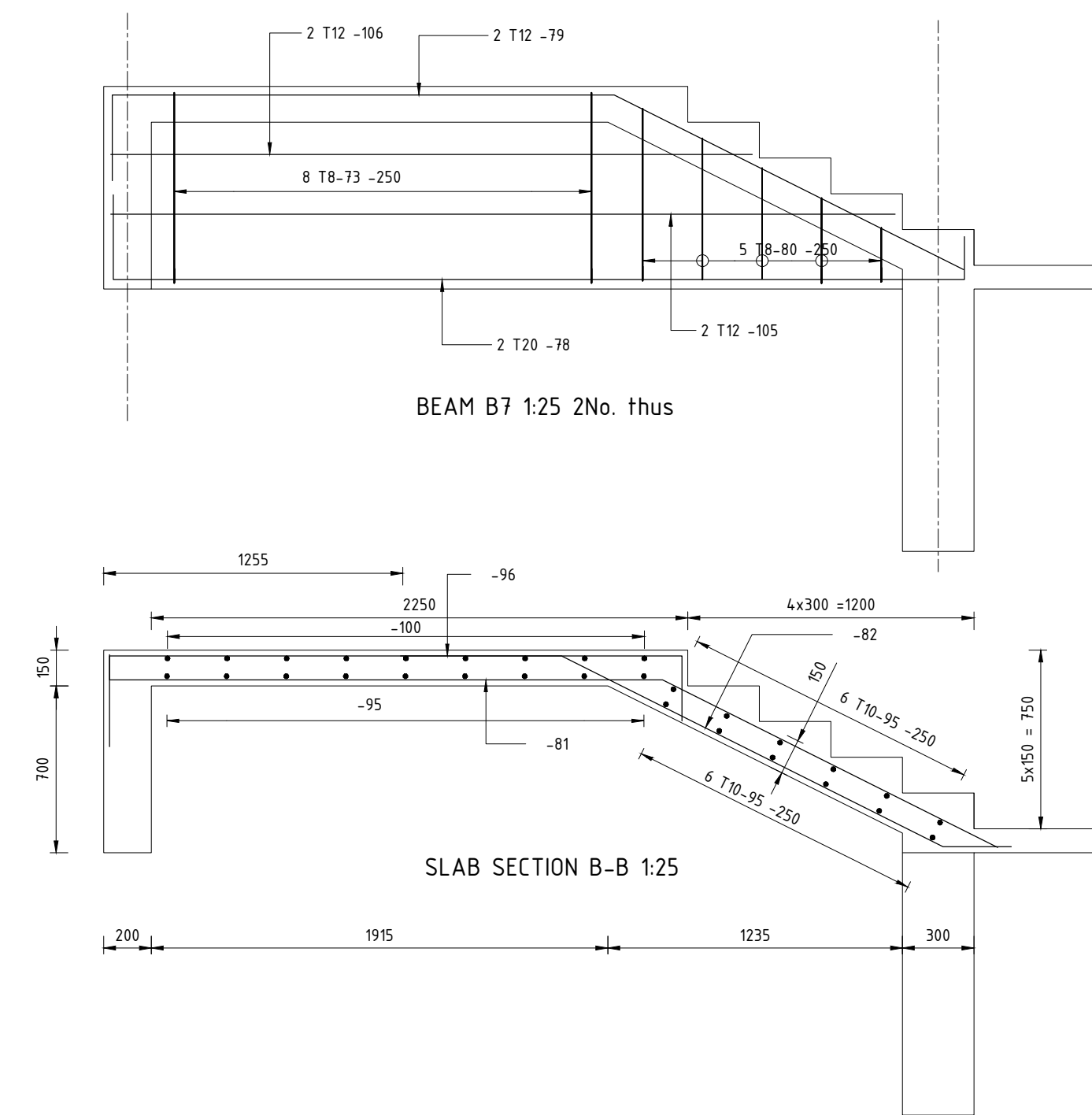
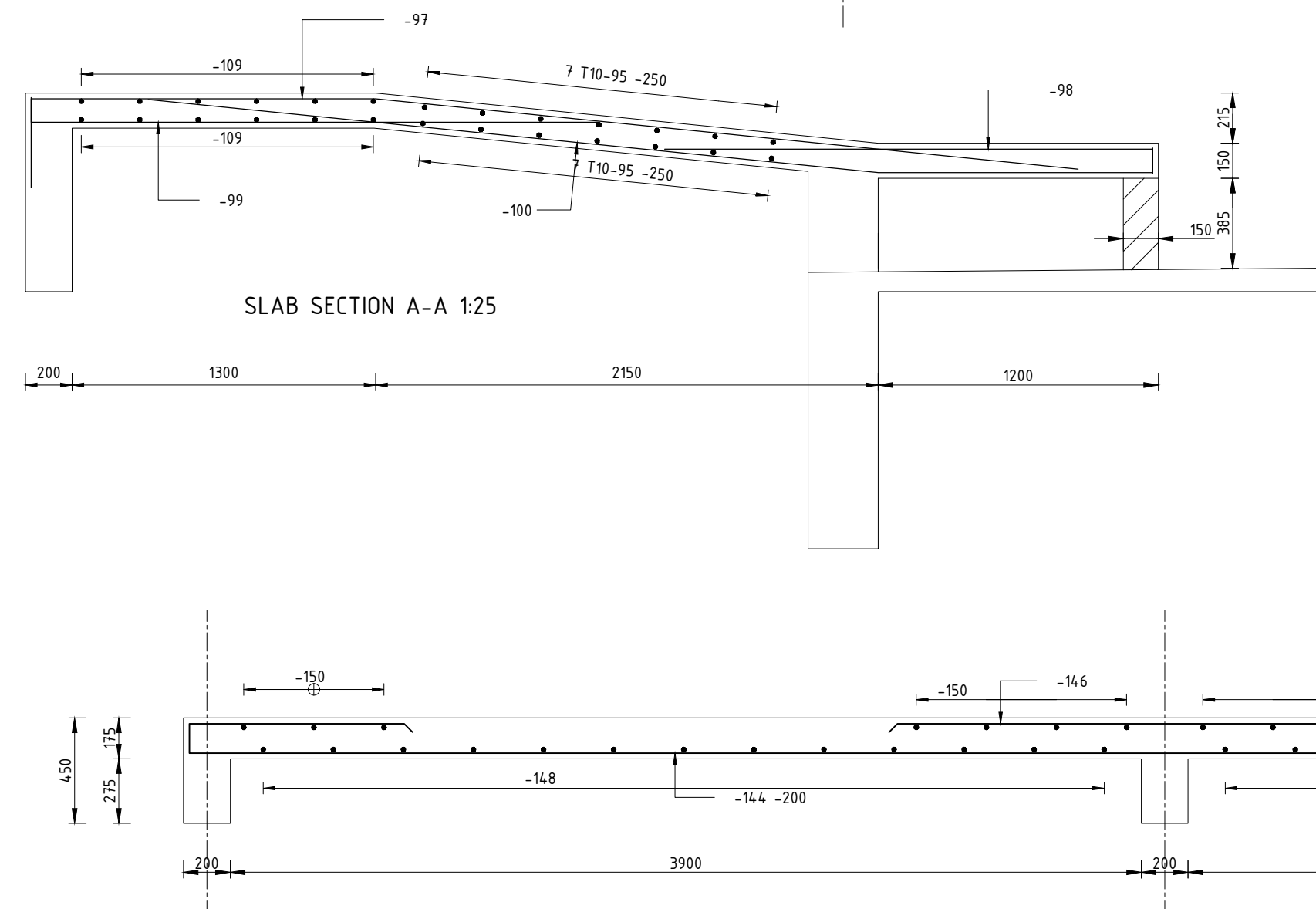
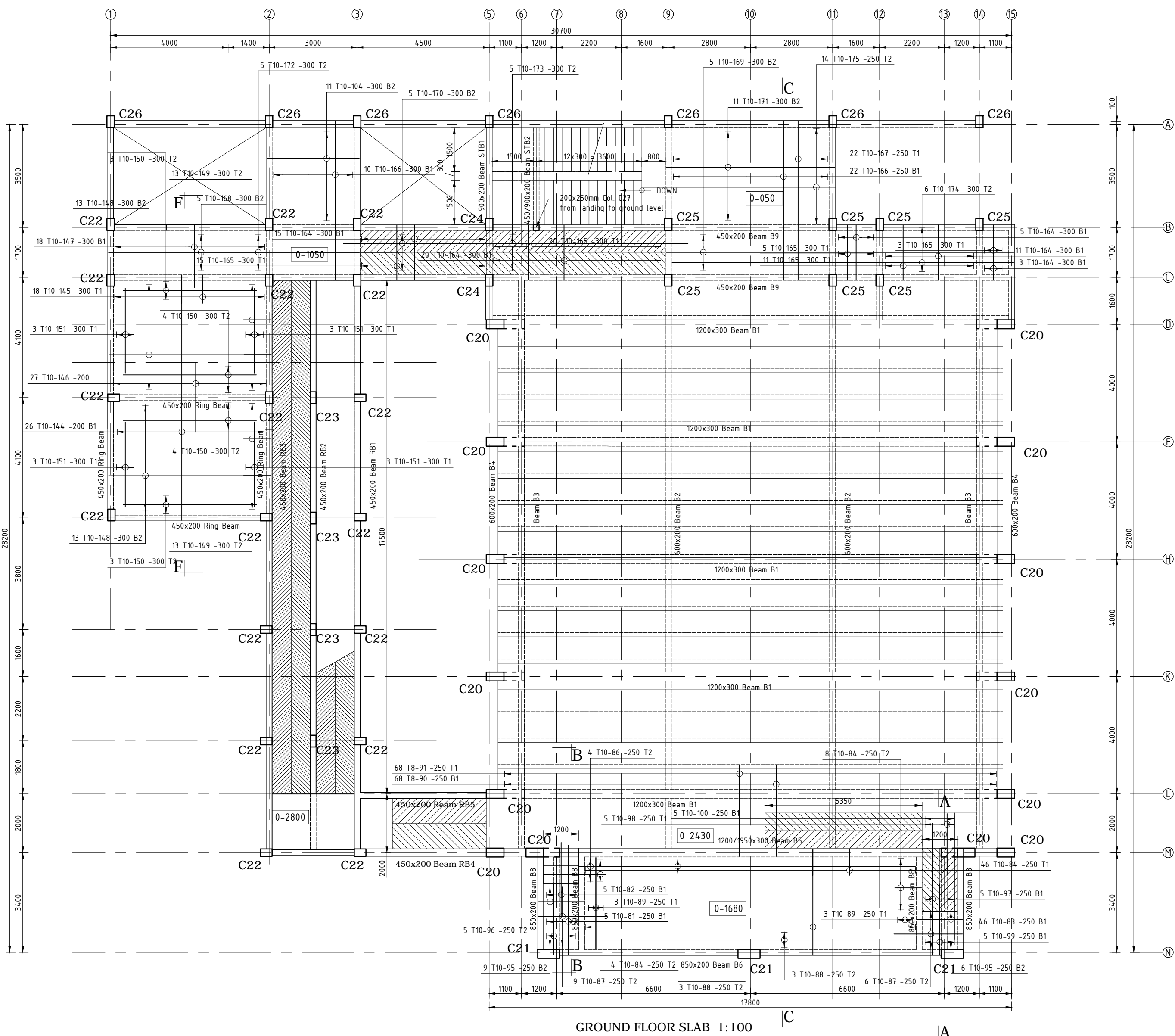
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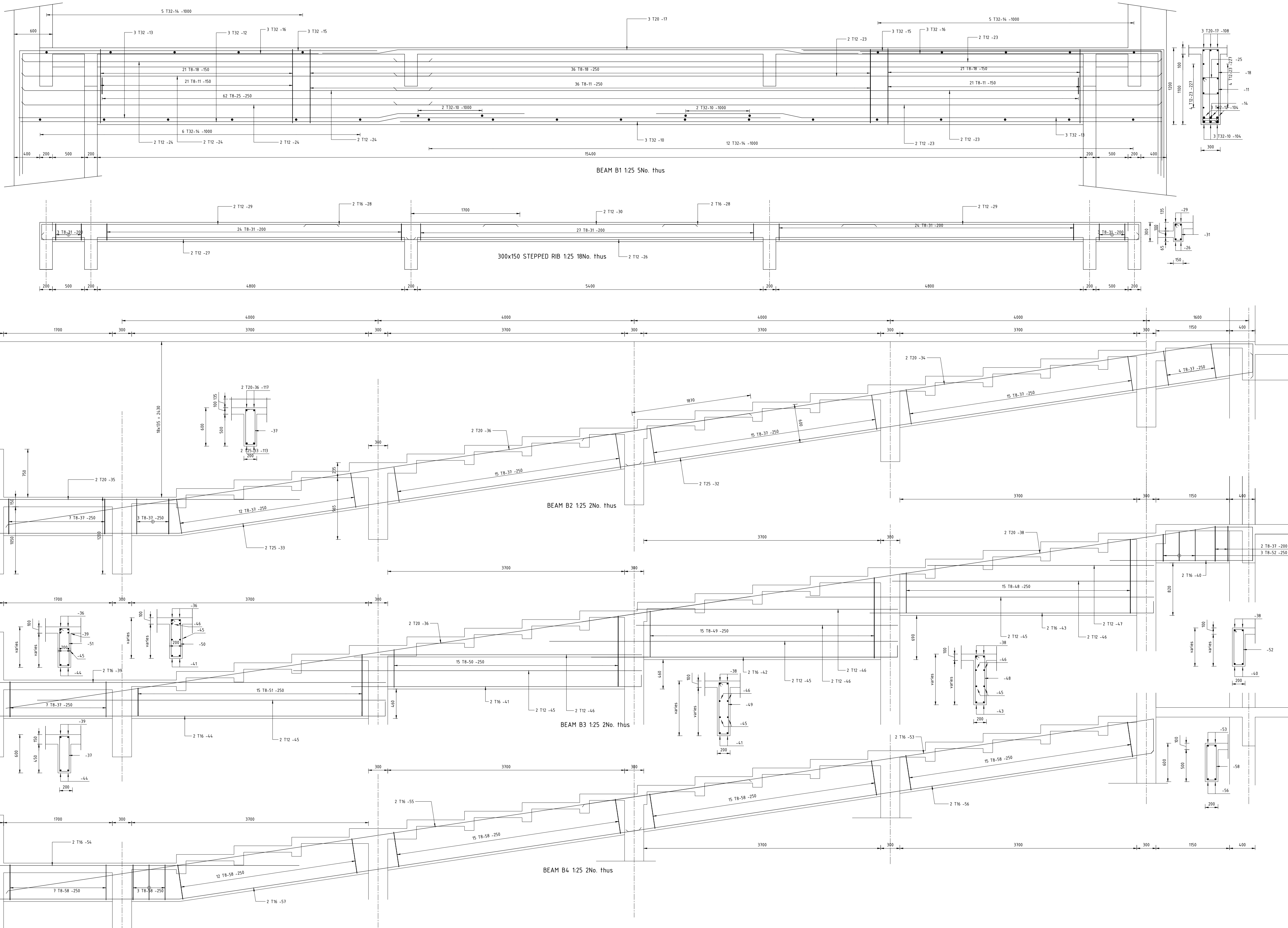
03-03


PROPOSED AUDITORIUM DOOR SCHEDULE						
S/NO.	WINDOW TYPE	WINDOW NUMBER	LOCATION	QUANTITY	SPECIFICATIONS	IRONMONGERY
01.		D1	ENTRANCE	6 NO.	Medium duty metal casement door overall size 1500 x 2450mm high, in 2No.equal openable leaves; comprising of 100 x 50mm thick framing; top panel overall size 1500 x 800mm high in Equal panes of size 230 x 230mm infilled with 4mm thick clear glass and with 25mm wide mild steel flat burglar proofing ; middle panel overall size 1500 x 800mm high infilled with 1.8mm thick mild steel sheet to approval and bottom panel overall size 1500 x 800mm high in 9No. equal panels infilled with 1.8mm thick mild steel panel to Approval; with and including hinges, 2 No. tower bolts, 3 lever dead lock and padlock clasps and all other necessary iron mongery and fittings; painted on both sides in three coats of gloss oil paint door type D1 all to architect's approval	
		D2	CHANGING ROOMS	2 NO.	45mm thick mahogany veneered and embosed panel door to approval; overall size 900 x 2400mm high comprising 1 No openable leaf meeasuring 900 x 2100mm high and 900 x 300mm high glazed fanlight (ms)	
		D3	WASHROOM ENTRY	2 NO.	45mm thick mahogany veneered and embosed panel door to approval; overall size 1500 x 2400mm high comprising 2 No openable leaf meeasuring 750 x 2100mm high and 900 x 300mm high glazed fanlight (ms)	
		D4	DISABLED TOILET	2 NO.	45mm thick mahogany veneered and embosed panel door to approval; overall size 1200 x 2100mm high comprising 2 No openable leaf meeasuring 600 x 2100mm high.	
		D5	TOILET	10 NO.	45mm thick mahogany veneered and embosed panel door to approval; overall size 900 x 2100mm high comprising 1 No openable leaf meeasuring 900 x 2100mm high.	

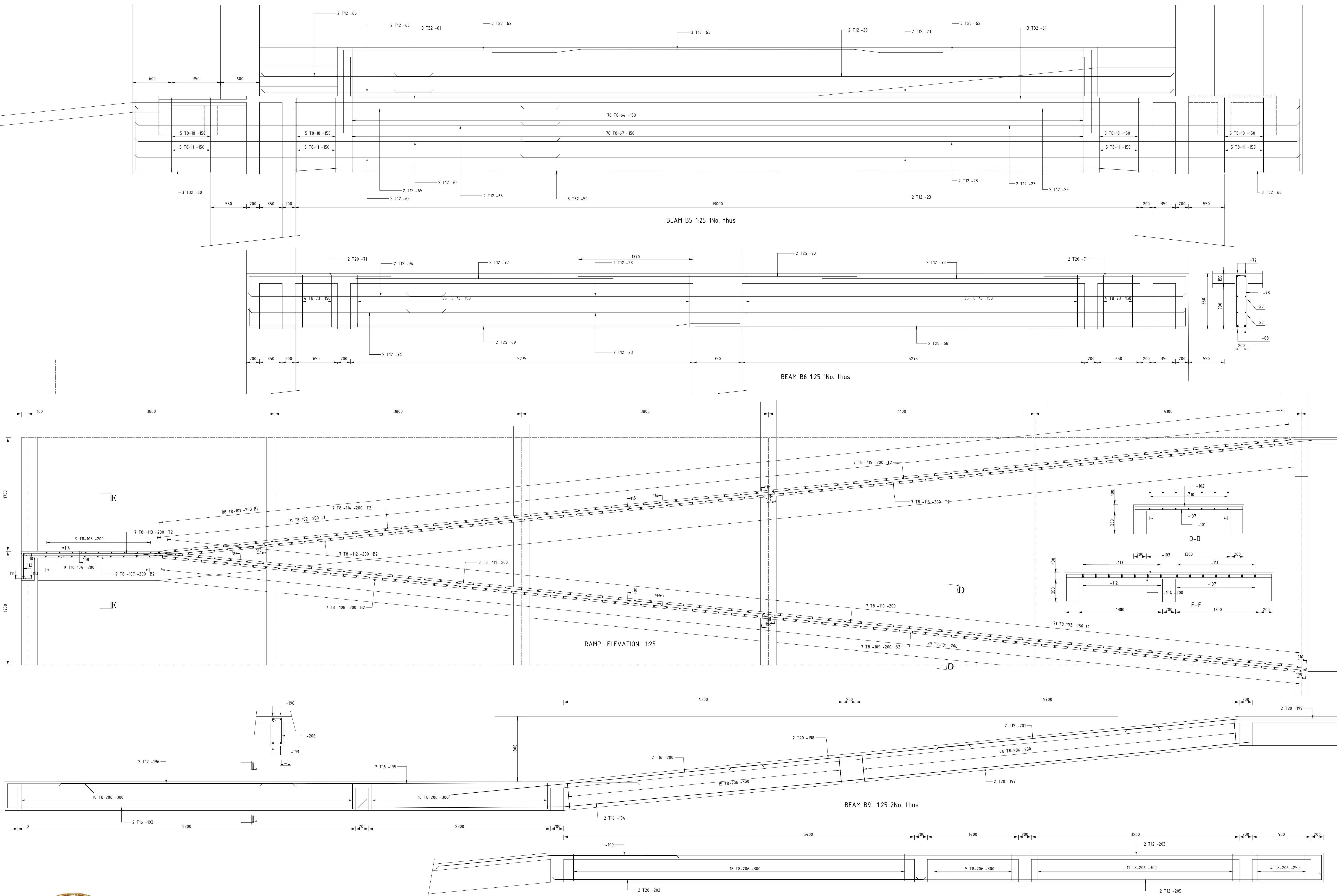
PROPOSED AUDITORIUM WINDOW SCHEDULE					
S/NO.	WINDOW TYPE	WINDOW NUMBER	LOCATION	QUANTITY	SPECIFICATIONS
01.		W4	WASHROOM	2 NO.	Medium duty Z- section steel casement framed windows comprising small panes in various sizes in openable and fixed lights, with and including mild steel framed burglar proofing comprising 16mm diameter round bars with 25 x 4mm thick flat bars framing and vertical members, all primed before fixing, complete with 4mm thick tinted glass and all necessary approved ironmongery and fittings fixed to opening including fixing framing to concrete or masonry, making good disturbed surfaces and including two layers of 1 and 5mm mosquito gauze and painting in three coats of gloss oil paint all to architect's approval.
02.		W3	WASHROOM	14 NO.	Medium duty Z- section steel casement framed windows comprising small panes in various sizes in openable and fixed lights, with and including mild steel framed burglar proofing comprising 16mm diameter round bars with 25 x 4mm thick flat bars framing and vertical members, all primed before fixing, complete with 4mm thick tinted glass and all necessary approved ironmongery and fittings fixed to opening including fixing framing to concrete or masonry, making good disturbed surfaces and including two layers of 1 and 5mm mosquito gauze and painting in three coats of gloss oil paint all to architect's approval.
03.		W2	AUDITORIUM PODIUM	8 NO.	Medium duty Z- section steel casement framed windows comprising small panes in various sizes in openable and fixed lights, with and including mild steel framed burglar proofing comprising 16mm diameter round bars with 25 x 4mm thick flat bars framing and vertical members, all primed before fixing, complete with 4mm thick tinted glass and all necessary approved ironmongery and fittings fixed to opening including fixing framing to concrete or masonry, making good disturbed surfaces and including two layers of 1 and 5mm mosquito gauze and painting in three coats of gloss oil paint all to architect's approval.
04.		W1	AUDITORIUM	36 NO.	Medium duty Z- section steel casement framed windows comprising small panes in various sizes in openable and fixed lights, with and including mild steel framed burglar proofing comprising 16mm diameter round bars with 25 x 4mm thick flat bars framing and vertical members, all primed before fixing, complete with 4mm thick tinted glass and all necessary approved ironmongery and fittings fixed to opening including fixing framing to concrete or masonry, making good disturbed surfaces and including two layers of 1 and 5mm mosquito gauze and painting in three coats of gloss oil paint all to architect's approval.
05.			AUDITORIUM	46 NO.	




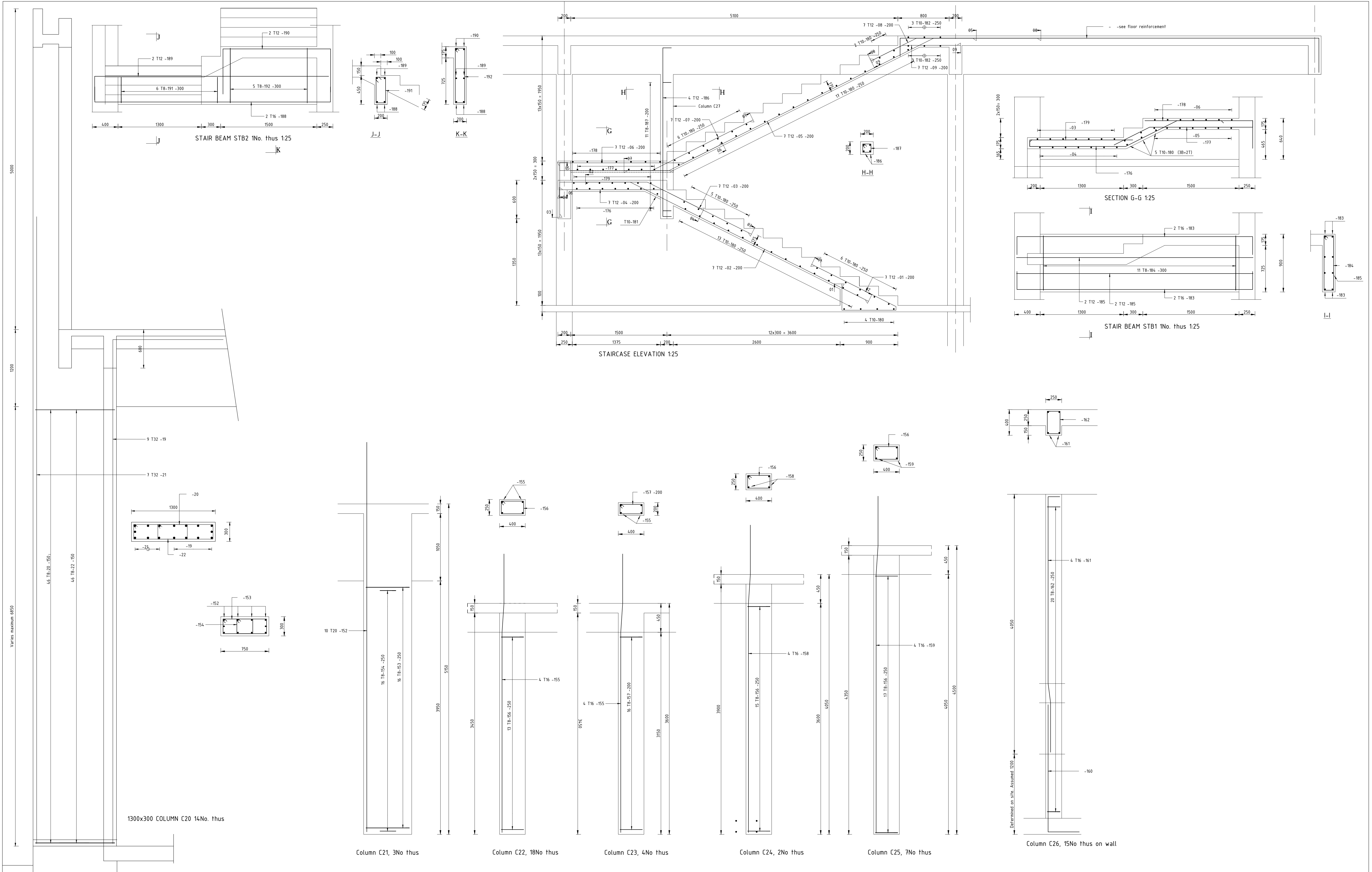
 <p>UNIVERSITY OF EMBU ESTATES DEPARTMENT</p>		<p>Client.</p> <p>UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA</p>	<p>Project..</p> <p>PROPOSED AUDITORIUM & LECTURE HALL</p>	<p>Architect's</p> <p>UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA</p>	<p>Drawing's title</p> <p>GROUND FLOOR SLAB DETAILS</p>
<p>Design: N.K.W</p> <p>Drawn: N.K.W</p>	<p>scale: 1:100 1:25</p>	<p>All dimensions in millimetres, Figured figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.</p>			
<p>Checked: Eng. Miring'u</p> <p>Date: OCTOBER 2018</p>	<p>Drawing No. S18.71.02</p>				




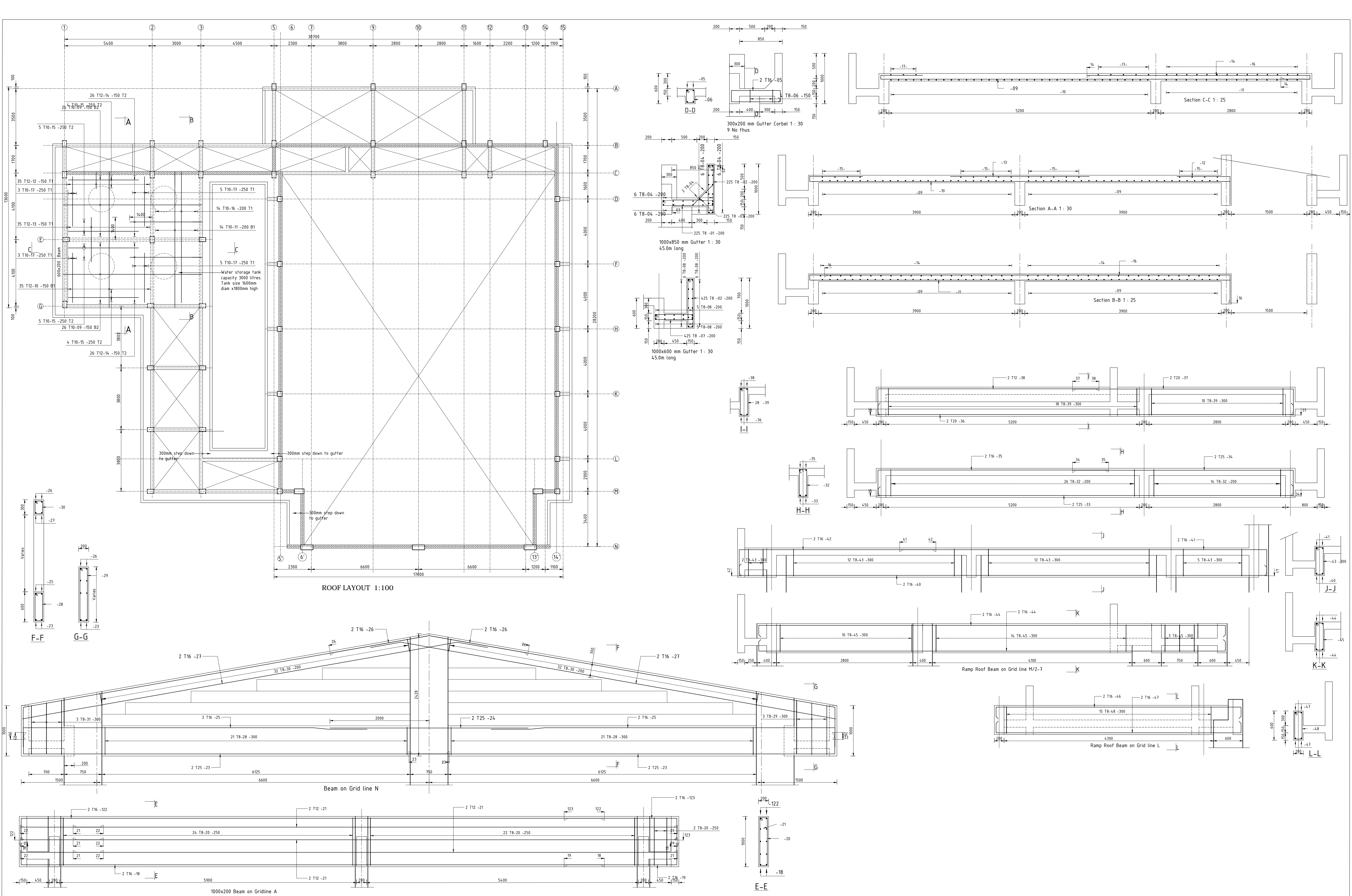
 UNIVERSITY OF EMBU ESTATES DEPARTMENT	Client. UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	Project.. PROPOSED AUDITORIUM & LECTURE HALL	Architects. UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	Drawing's title COLUMN AND SCHEDULE DETAILS	Design: N.K.W Drawn: N.K.W Checked: Eng. Miring'u Date:OCTOBER 2018	scale: 1:25 Drawing No. S18.71.03	All dimensions in millimetres. Figured figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.
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 UNIVERSITY OF EMBU ESTATES DEPARTMENT	Client.	Project..	Architects.	Drawing's title	Design: N.K.W	scale: 1:25	All dimensions in millimetres, Figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.
	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDITORIUM & LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	Beam Sheet 2 of 4 DETAILS	Drawn: N.K.W		
					Checked: Eng. Miring'u		
					Date:OCTOBER 2018 Drawing No. S18.71.04		



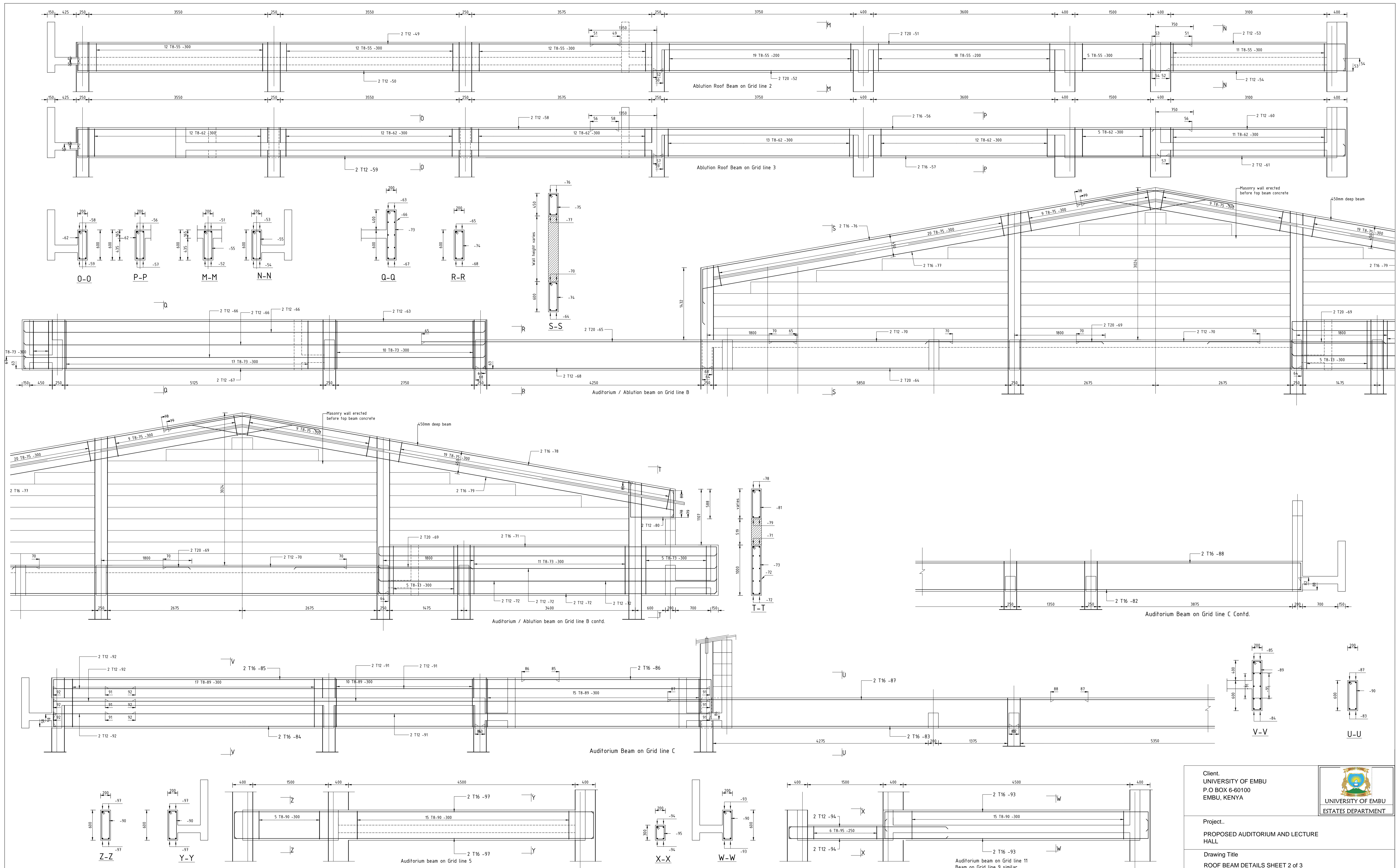
 UNIVERSITY OF EMBU ESTATES DEPARTMENT	Client.	Project..	Architects.	Drawing's title	Design: N.K.W	All dimensions in millimetres, Figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.	"T" denotes ribbed high yield bars to Bs 4461 'R' denotes round mild steel bars to BS 4449. Reinforcement in walls, columns must be inspected before being enclosed in the formwork All reinforcement, formwork & support must be approved by the Structural Engineer before concreting.
	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDITORIUM & LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	BEAM DETAILS SHEET 3 of 3	Drawn: N.K.W		
					Checked: Eng. Miring'u		
					Date:OCTOBER 2018	Drawing No. S18.71.06	




Client.	Project..	Architects.	Drawing's title	Design: N.K.W		scale: 1:100 1:30	Notes: 1. All dimensions in millimetres. 2. Figured dimensions should be used preference 3. This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. 4. Reinforced concrete to be grade 25/20 to BS 8110. 5. Cover to main reinforcement to as follows, (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.	<div><div>UNIVERSITY OF EMBU ESTATES DEPARTMENT</div></div>
UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDITORIUM AND LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	ABLUTION ROOF SLAB AND GUTTER LAYOUT	Drawn: N.K.W				
				Checked: Eng. Miring'u				
				Date:OCTOBER 2018	Drawing No. S18.71.10			

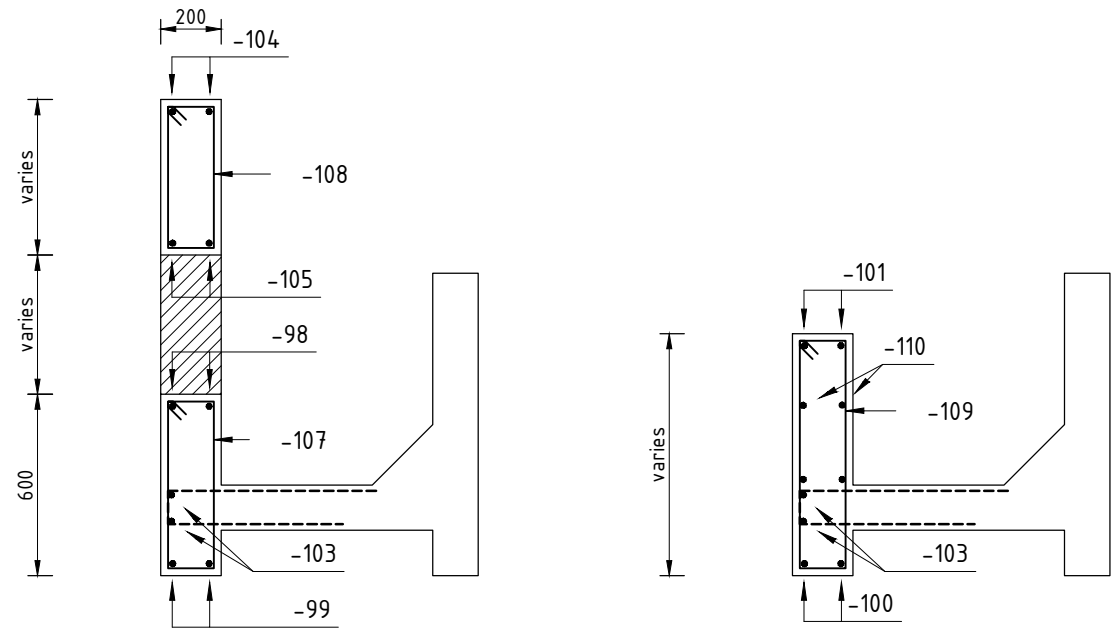
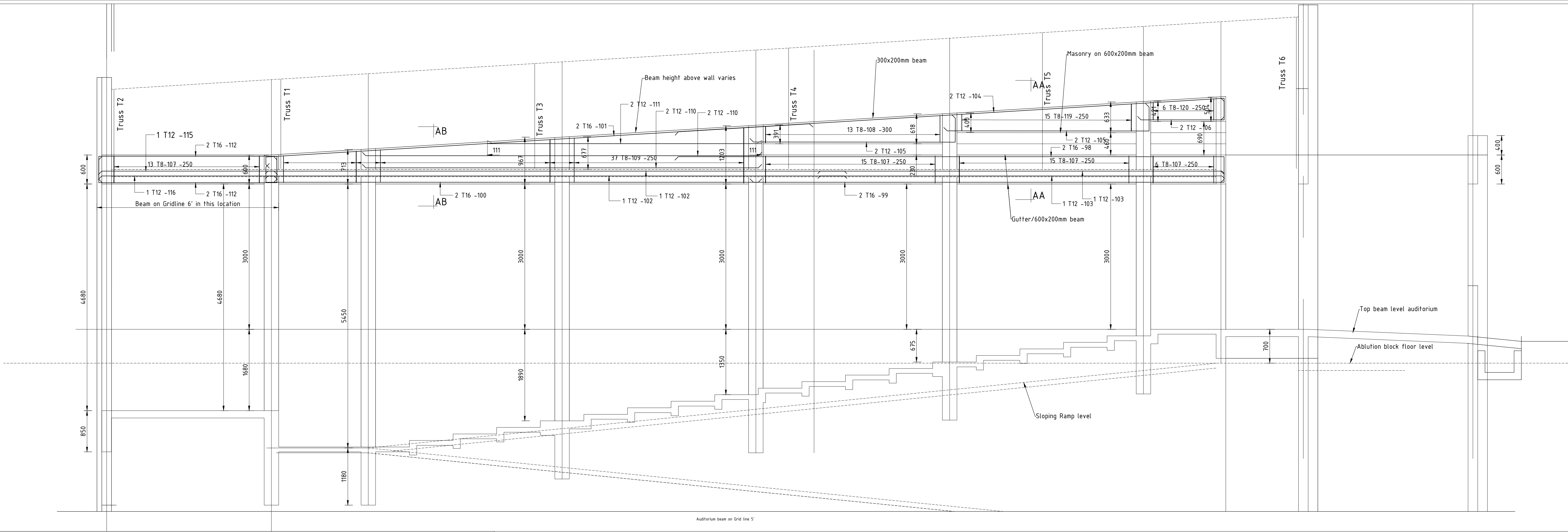


UNIVERSITY OF EMBU
ESTATES DEPARTMENT



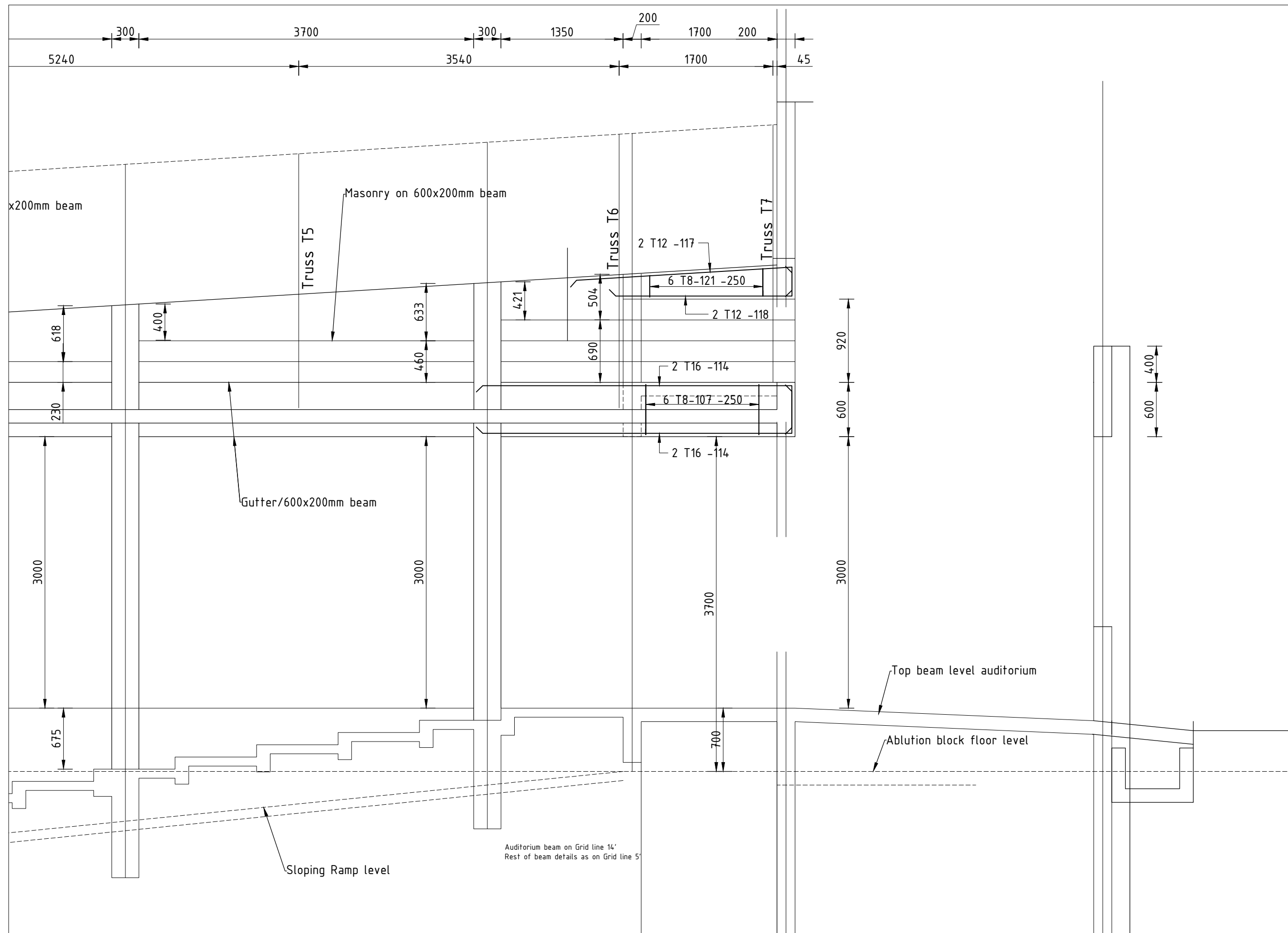
All dimensions in millimetres,
Figured dimensions should be used preference
This drawing should be read in conjunction with the relevant architectural, structural,
mechanical & electrical services drawings.
Reinforced concrete to be grade 25/20 to BS 8110.
Cover to main reinforcement to as below
(a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.

Client. UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA		 UNIVERSITY OF EMBU ESTATES DEPARTMENT
Project.. PROPOSED AUDITORIUM AND LECTURE HALL		
Drawing Title ROOF BEAM DETAILS SHEET 2 of 3		
Architects. UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA		
Design: N.K.W	scale: 1:30	
Drawn: N.K.W		
Checked: Eng. Miring'u	Drawing No. S18.71.11	
Date: OCTOBER 2018		



AA-AA

AB-AB



Client.	Project..	Architects.	Drawing's title	Design: N.K.W	scale: 1:100 1:25	<div>UNIVERSITY OF EMBU ESTATES DEPARTMENT</div> <p>All dimensions in millimetres, Figured: figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm</p>
UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDIRORIUM AND LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	ROOF BEAM DETAILS SHEET 3 of 3	Drawn: N.K.W		
				Checked: Eng. Miring'u		
				Date:OCTOBER 2018	Drawing No. S18.71.12	

Proposed UoEm Auditorium. Roof level Bar Schedules

Member		Bar mark	Type and Size	Number		Length (mm)	Shape code	A (mm)	B (mm)	C (mm)	D (mm)	E/R (mm)	Rev.
Name	Num			in the elem.	total								
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		7	8	425	425	1800	51	110	760	65	65		
		8	8	22	22	94000	00	94000					
1000x850 Gutter	1	1	8	225	225	2300	51	110	1010	65	65		
		2	8	225	225	2200	51	960	110	65	65		
		3	8	225	225	1375	24	390	595	390	420		
		4	8	26	26	50000	00	50000					
Ablution Roof Slab	1	9	10	52	52	9425	00	8535	85	835			
		10	12	35	35	9475	21	1060	110	8360			
		11	10	14	14	9300	21	860	110	8360			
		12	12	35	35	1600	11	1060	560				
		13	12	35	35	2750	00	2760					
		14	12	52	52	5050	21	585	85	4435			
		15	10	18	18	4325	00	4335					
		16	10	14	14	8600	11	8060	560				
		17	10	16	16	3050	00	3060					
		21	12	2	2	12000	00	12000					
		122	16	2	2	12000	00	440	11595				
		123	16	2	2	2650	00	2250	440				
Beam on Gridline 1	1	40	16	2	2	11250	21	245	10845	220			
		41	16	2	2	8050	11	7545	545				
		42	16	2	2	4550	11	545	4045				
		43	8	31	31	1500	51	560	160	65	65		
Beam on Gridline 2	1	49	12	2	2	11150	11	395	10770				
		50	12	2	2	11850	11	11620	245				
		51	20	2	2	11950	00	11945					
		52	20	2	2	10250	00	10245					
		53	12	2	2	4375	11	3845	545				
		54	12	2	2	4075	11	255	3845				
Beam on Gridline 3	1	56	16	2	2	11950	00	11945					
		57	16	2	2	10250	00	10245					
		58	12	2	2	11100	11	395	10740				
		59	12	2	2	11850	11	11620	245				
		60	12	2	2	4375	11	3845	545				
		61	12	2	2	3975	11	245	3745				
		62	8	77	77	1500	51	560	160	65	65		
Beam on Gridline 5	1	90	8	20	20	1500	51	560	160	65	65		
		97	16	4	4	8175	21	545	7145	545			

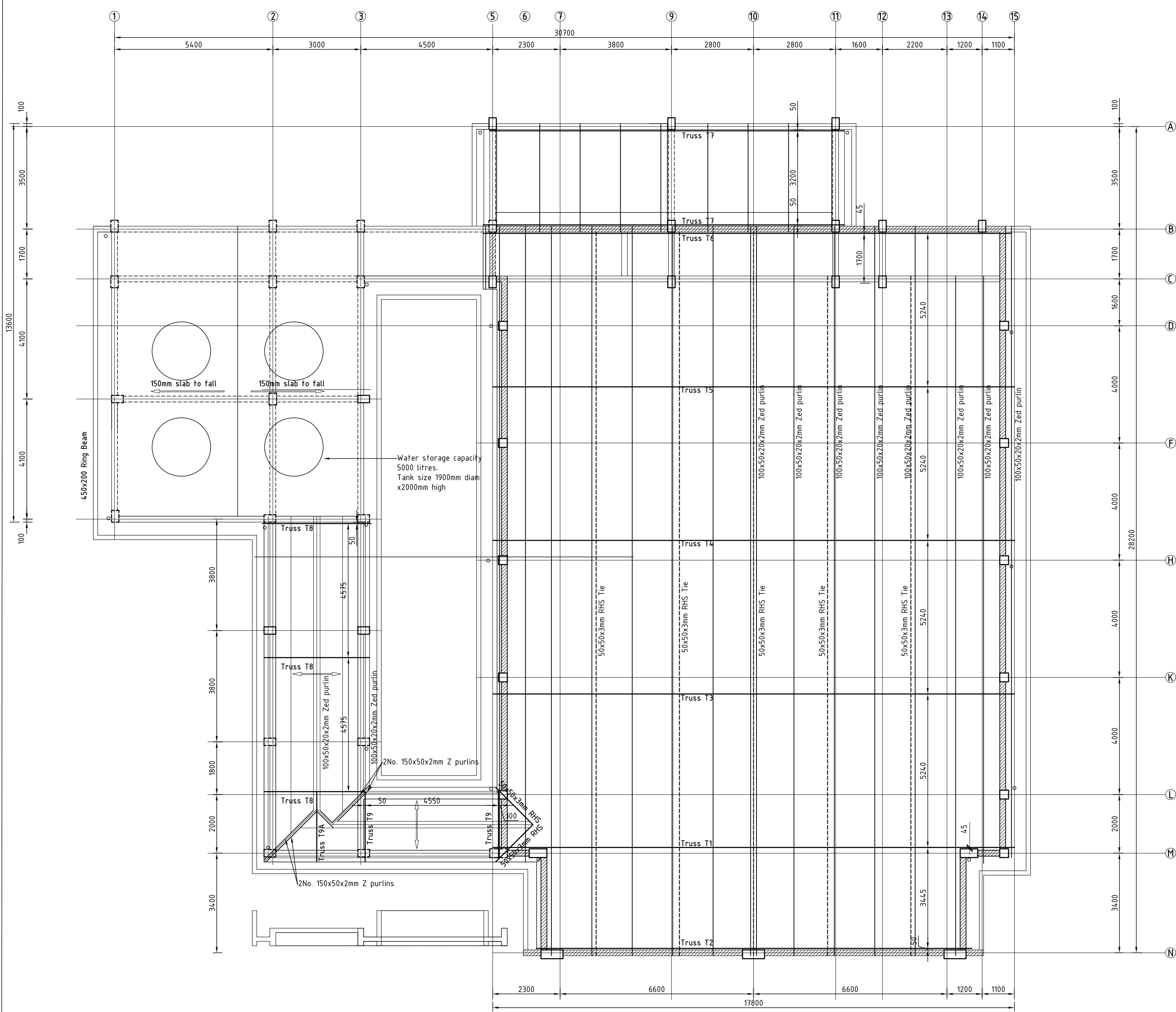
Proposed UoEm Auditorium. Roof level Bar Schedules

Member		Bar mark	Type and Size	Number		Length (mm)	Shape code	A (mm)	B (mm)	C (mm)	D (mm)	E/R (mm)	Rev.
Name	Num			in the elem.	total								
Beam on Gridline 9 & 11	2	90	8	15	30	1500	51	560	160	65	65		
		93	16	4	8	5975	21	395	5245	395			
		94	12	4	8	3375	11	245	3160				
		95	8	6	12	900	51	260	160	65	65		
Beam on Gridline A	1	18	16	2	2	12000	11	440	11595				
		19	16	2	2	2650	11	2250	440				
		20	8	48	48	2275	51	955	155	65	65		
		21	12	6	6	12000	00	12000					
		122	16	2	2	12000	11	440	11595				
		123	16	2	2	2650	11	2250	440				
Beam on Gridline B	1	63	12	2	2	11000	21	945	9170	945			
		64	20	2	2	11900	00	11895					
		65	20	2	2	7450	00	7445					
		66	12	6	6	9175	00	9170					
		67	12	2	2	9400	11	245	9170				
		68	12	2	2	4700	00	4695					
		69	20	4	4	3550	00	3545					
		70	12	4	4	3650	00	3645					
		71	16	2	2	8550	21	945	6720	945			
		72	12	8	8	6725	00	6720					
		73	8	50	50	2300	51	960	160	65	65		
		75	8	57	57	1200	51	410	160	65	65		
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		77	16	2	2	11350	25	480	720	180	715	10155	
		78	16	2	2	10825	25	1675	535	590	530	8615	
		79	16	2	2	10350	25	480	150	180	155	9720	
		80	12	2	2	2050	21	530	870	695			
Beam on Gridline C	1	82	16	2	2	11675	11	245	11470				
		83	16	2	2	10800	00	10795					
		84	16	2	2	8775	11	8570	245				
		85	16	2	2	10950	11	945	10045				
		86	16	2	2	4525	11	3770	795				
		87	16	2	2	8350	00	8345					
		88	16	2	2	11150	11	10645	545				
		89	8	42	42	2300	51	960	160	65	65		
		91	12	6	6	12000	00	12000					
		92	12	6	6	1625	00	1630					

Proposed UoEm Auditorium. Roof level Bar Schedules

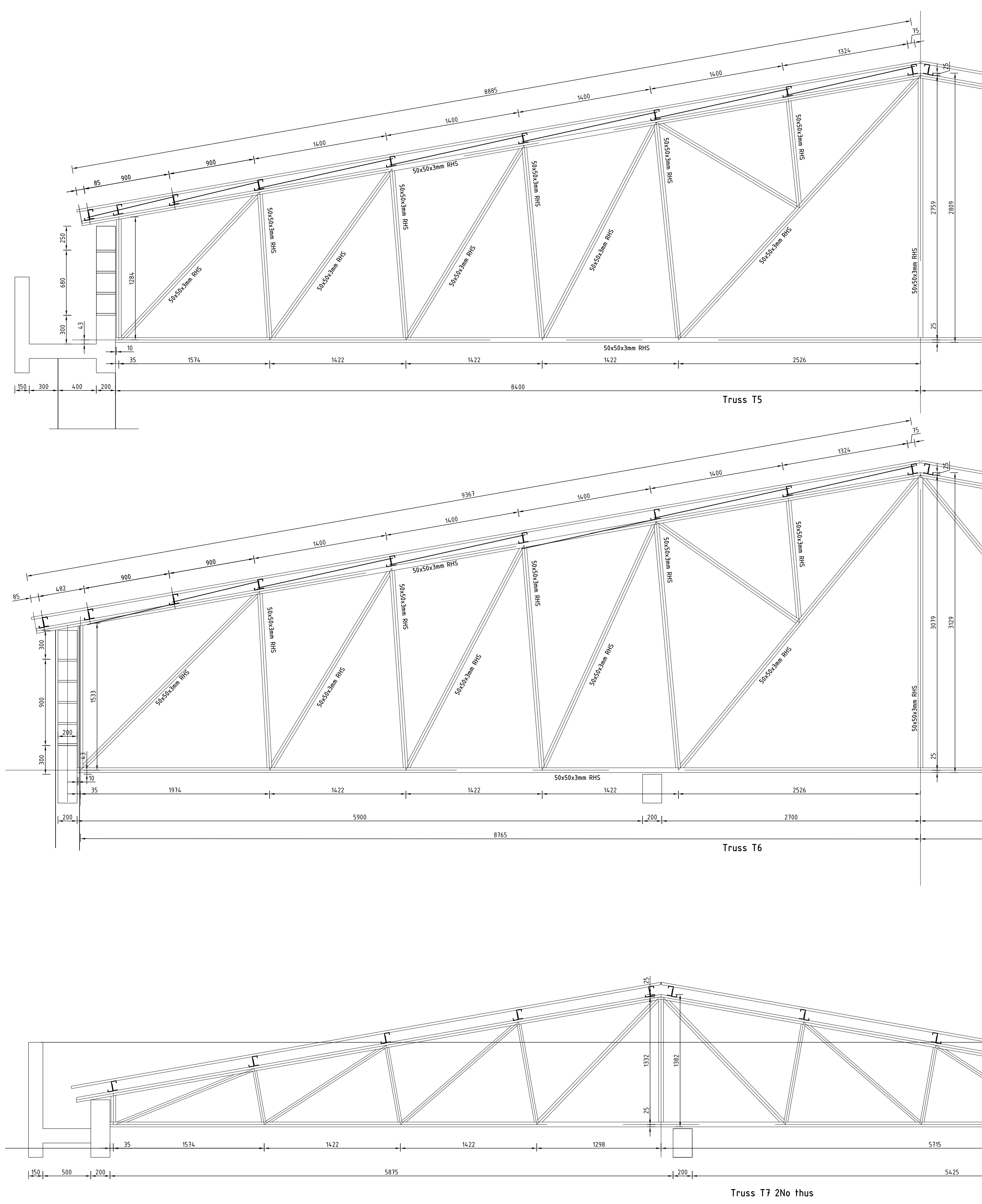
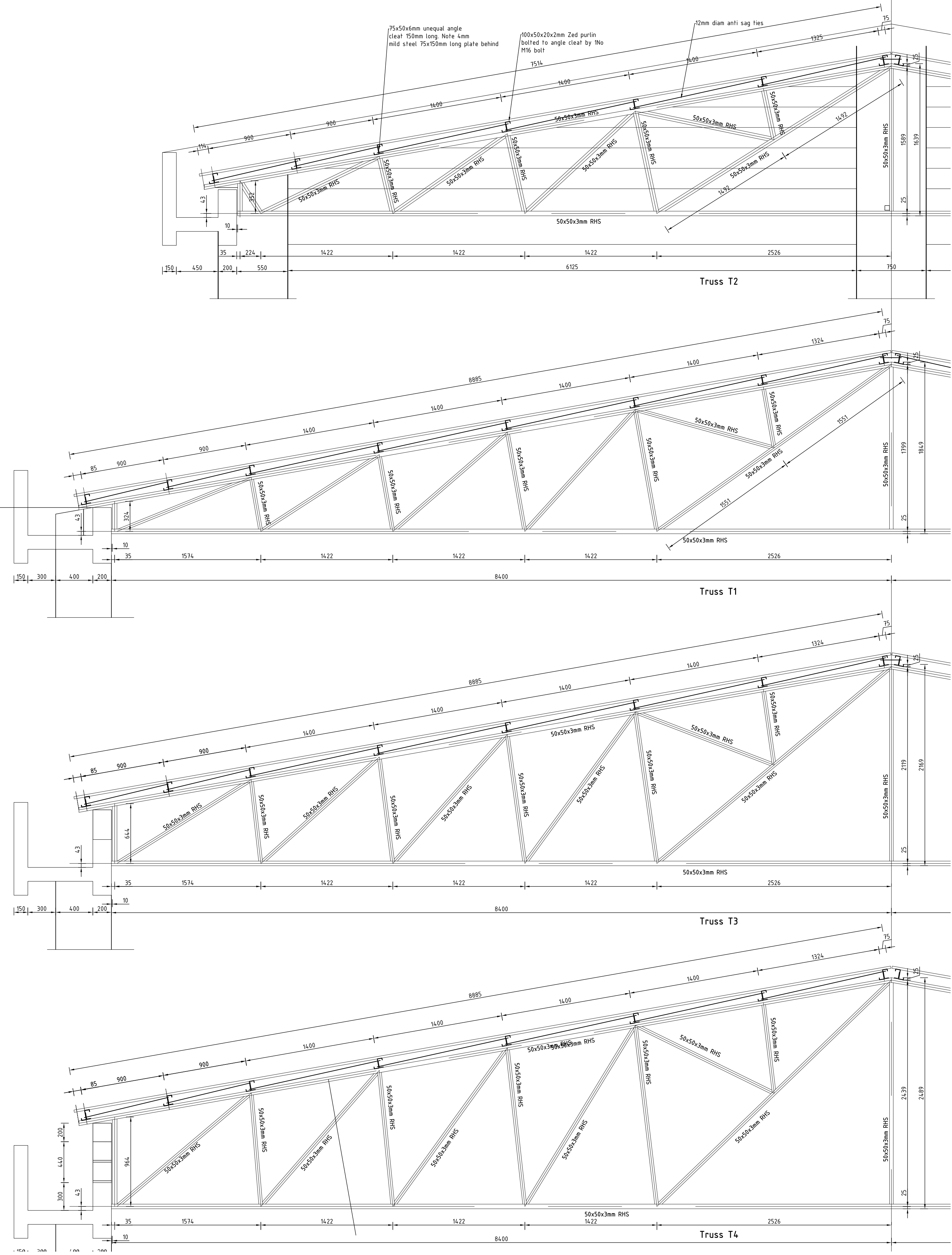
Member		Bar mark	Type and Size	Number		Length (mm)	Shape code	A (mm)	B (mm)	C (mm)	D (mm)	E/R (mm)	Rev.
Name	Num			in the elem.	total								
Beam on Gridline G	1	36	20	2	2	8925	00	8545	245				
		37	20	2	2	5025	11	4545	545				
		38	12	2	2	5075	11	545	4545				
		39	8	28	28	1500	51	560	160	65	65		
Beam on Gridline L	1	46	16	2	2	5475	21	245	5045	245			
		47	16	2	2	5475	21	245	5045	245			
		48	8	15	15	1500	51	560	160	65	65		
Beam on Gridline M/2-7	1	44	16	4	4	10025	21	245	9595	245			
		45	8	27	27	1500	51	560	160	65	65		
Beam on Gridline N	1	23	25	4	4	8850	11	440	8470				
		24	25	2	2	3950	00	3940					
		25	16	4	4	7200	34	770	300	5770	45	390	
		26	16	4	4	10825	25	645	1995	640	700	8195	
		27	16	4	4	9375	15	8770	3015	615			
		28	8	42	42	1450	51	555	155	60	60		
		29	8	3	3	2450 *	51	1055	155	60	60		
		30	8	64	64	850	51	255	155	60	60		
		31	8	3	3	2675 *	51	1055	255	65	65		
Beam on Gridlines 5' and 14'	2	98	16	2	4	11850	11	11345	545				
		99	16	2	4	10000	11	245	9795				
		100	16	2	4	10600	11	10245	395				
		101	16	2	4	11550	15	11315	11295	235			
		102	12	2	4	12000	00	12000					
		103	12	2	4	8400	00	8395					
		104	12	2	4	11775	14	455	455	11360			
		105	12	4	8	4800	11	570	4245				
		106	12	2	4	2225	11	460	1795				
		107	8	55	110	1500	51	560	160	65	65		
		108	8	13	26	1325 *	51	475	160	65	65		
		109	8	37	74	1900 *	51	760	160	65	65		
		110	12	4	8	8250	00	8245					
		111	12	2	4	5675	00	5665					
		112	16	4	8	4725	21	550	3695	550			
		114	16	4	8	4000	11	3495	545				
		115	12	1	2	3700	00	3695					
		116	12	1	2	3700	00	3695					
		117	12	2	4	2750	14	330	330	2460			
		118	12	2	4	2325	11	335	2025				
		119	8	15	30	1325 *	51	475	160	65	65		
		120	8	6	12	1325 *	51	475	160	65	65		
		121	8	6	12	1325 *	51	475	160	65	65		

* Varies. Average length given for quantities only

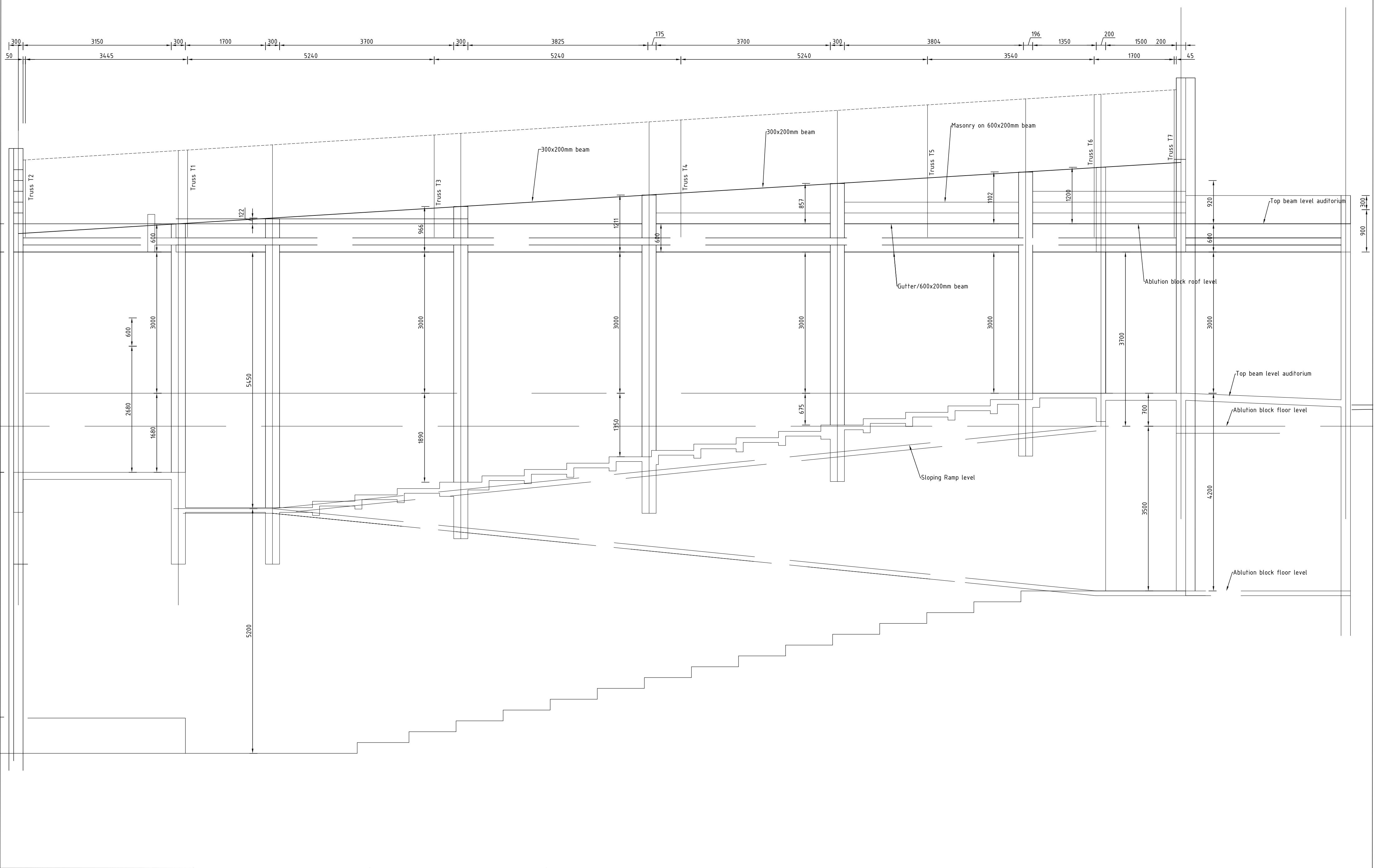


ROOF LAYOUT 1:100

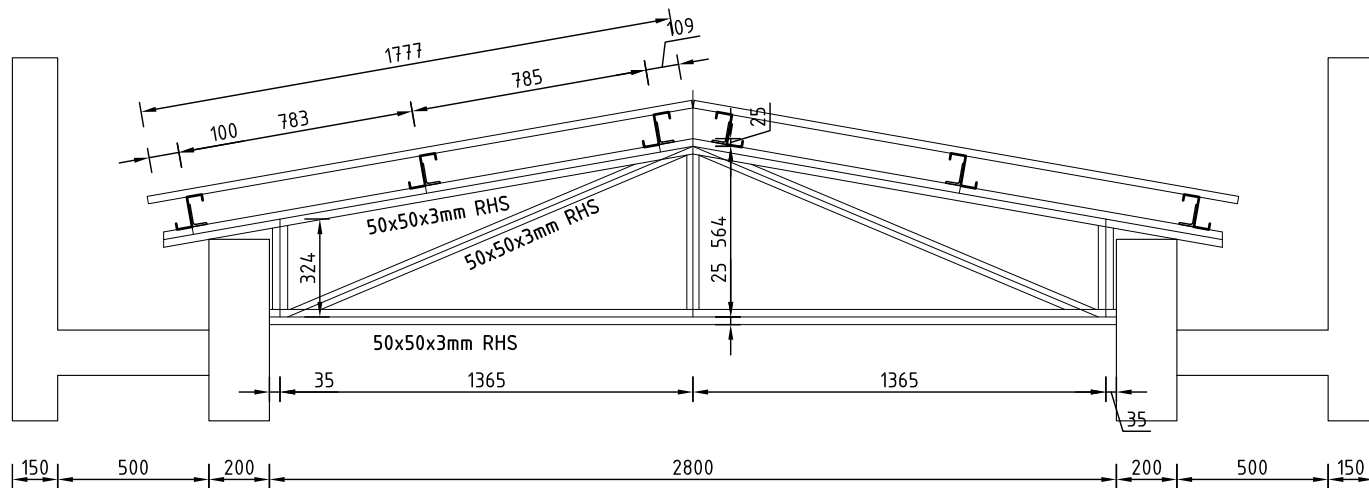
Client.	Project..	Architects.	Drawing's title	Design: N.K.W Drawn: N.K.W Checked: Eng. Miring'u Date:OCTOBER 2018	scale: 1:100 1:25	All dimensions in millimetres, Figured figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.
UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDIRORIUM AND LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	ROOF AND GUTTER LAYOUT	Drawing No. S18.71.03		



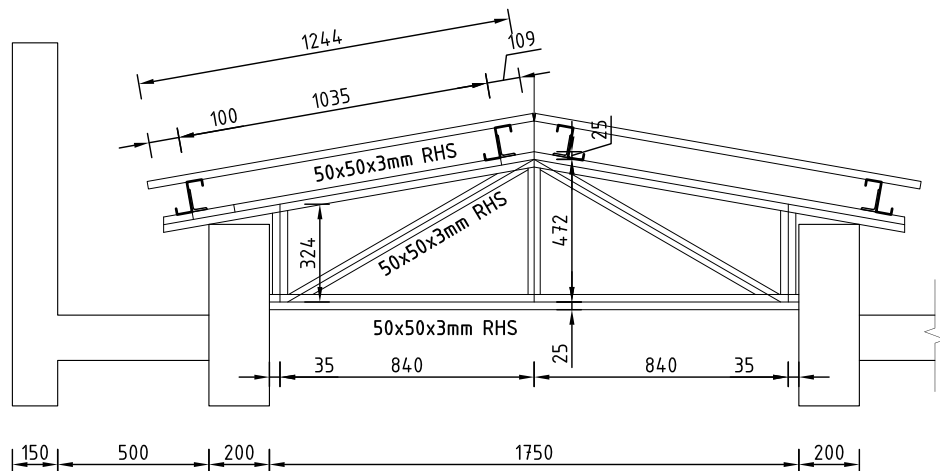
Client.	Project..	Architects.	Drawing Title	Design: N.K.W	scale: 1:100 1:25	All dimensions in millimetres. Figured figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.
UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDIRORIUM AND LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	ROOF TRUSS DETAILS	Drawn: N.K.W		
				Checked: Eng. Miring'u		
				Date:OCTOBER 2018	Drawing No. S18.71.03	



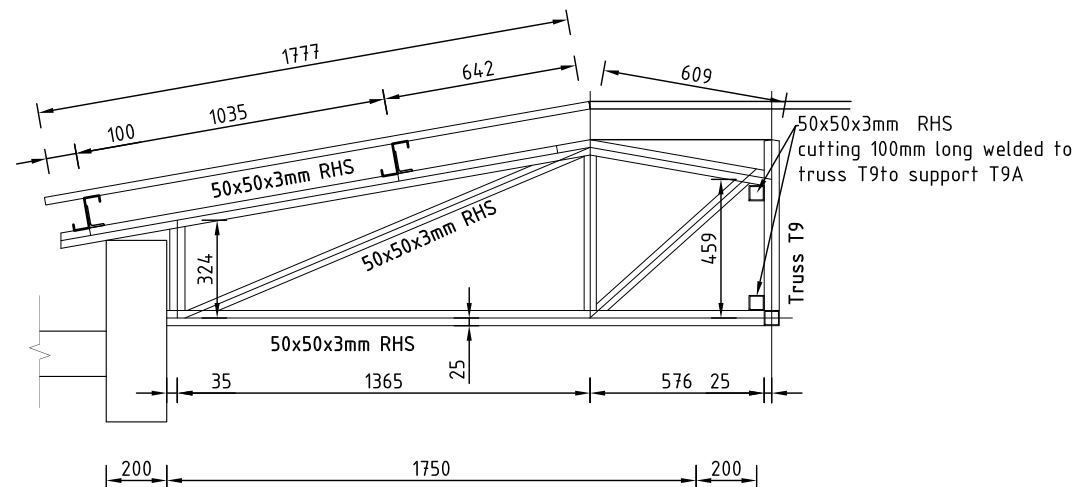
Client.	Project..	Architects.	Drawing's title	Design: N.K.W Drawn: N.K.W Checked: Eng. Miring'u Date:OCTOBER 2018	scale: 1:100 1;25	All dimensions in millimetres, Figured figured dimensions should be used preference This drawing should be read in conjunction with the relevant architectural, structural, mechanical & electrical services drawings. Reinforced concrete to be grade 25/20 to BS 8110. Cover to main reinforcement to as below (a) foundation = 50mm (b) Columns = 40mm. (c) Beams = 30mm. (d) Slabs = 25mm.
UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	PROPOSED AUDIRORIUM AND LECTURE HALL	UNIVERSITY OF EMBU P.O BOX 6-60100 EMBU, KENYA	SECTION THROUGH AUDITORIUM	Drawing No. S18.71.04		



Truss T8 3No thus



Truss T9 2No thus



Truss T9A 1No thus

Structural/Civil Engineers

**MIRSA AND ASSOCIATES
CONSULTING ENGINEERS**

P.O Box 54904-00200, Nairobi
Tel 2728511

Design	Muthoni/Nyagah	
Drawn	Muthoni	
Checked	S.M	
Scales	1:50/1:25	
Drawing no.	18.71.05	Date: November 2019

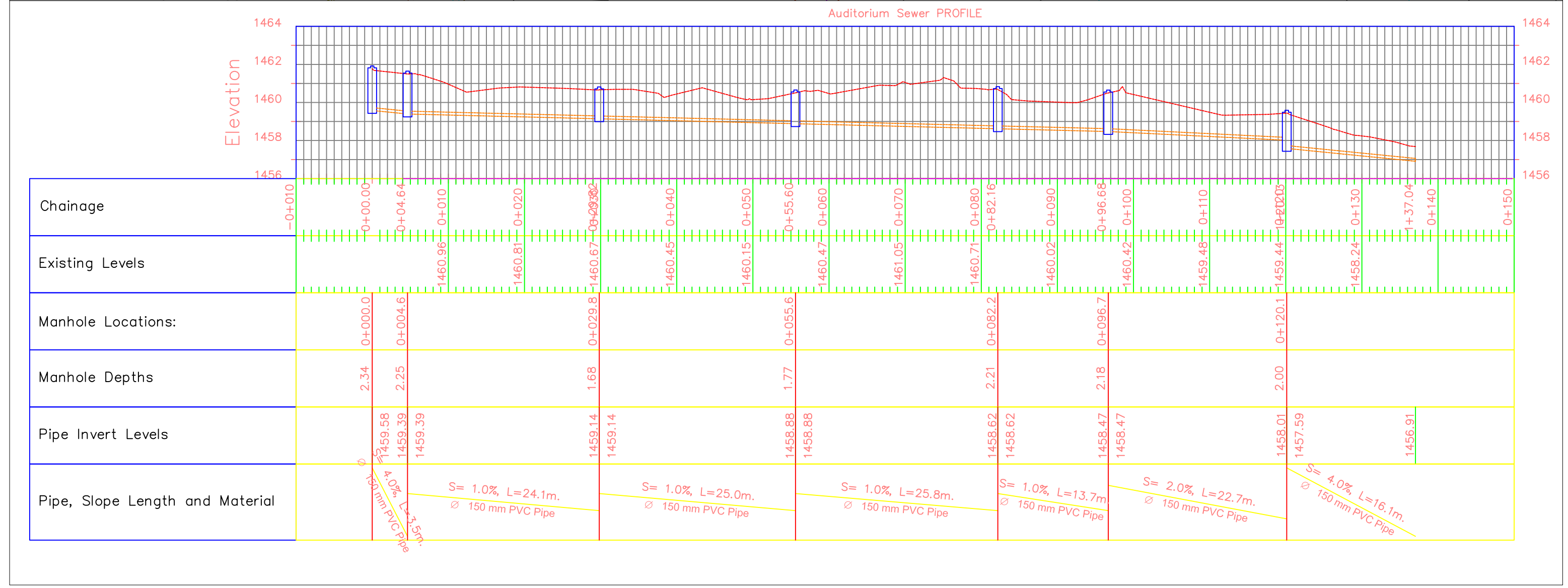
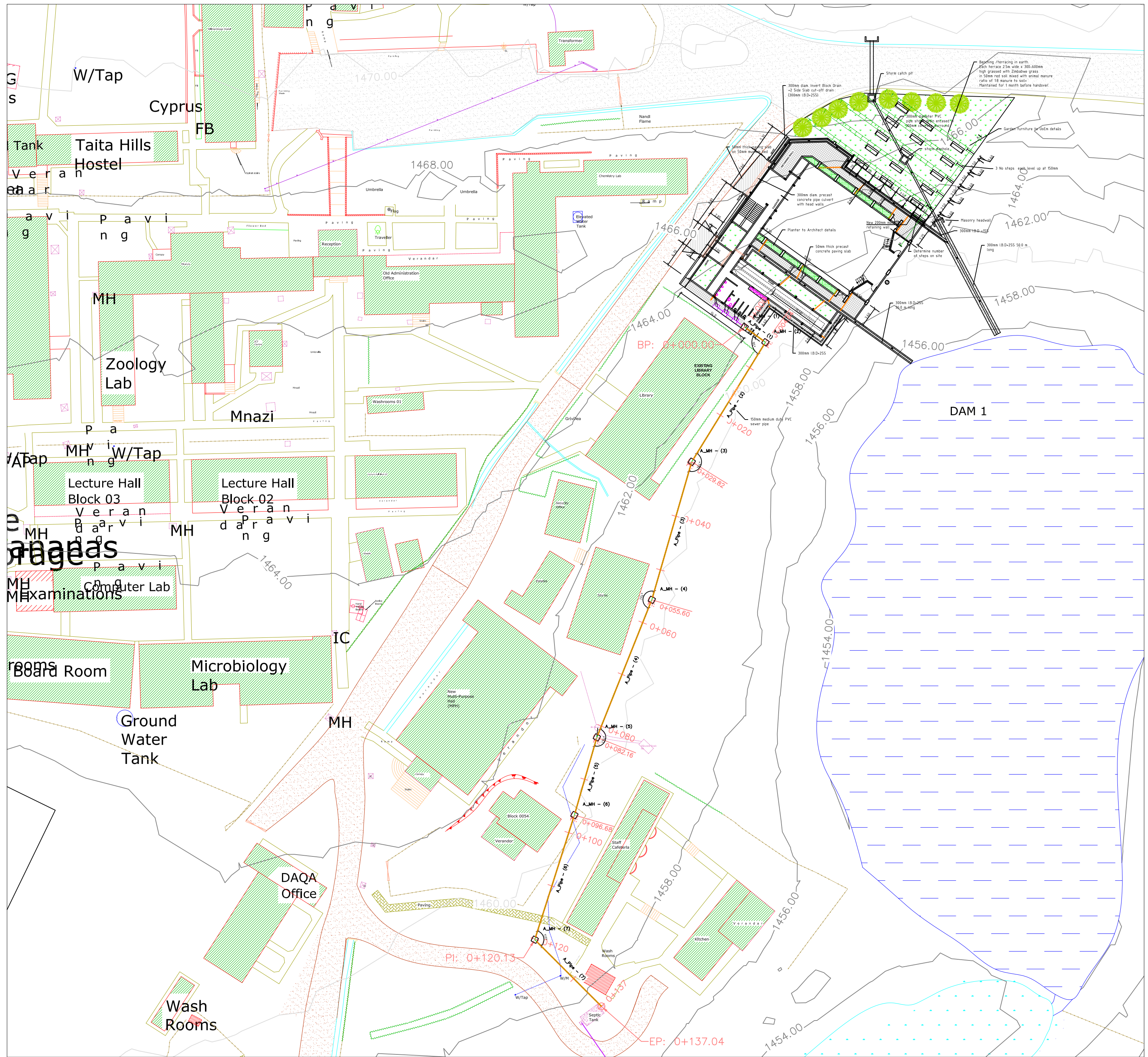
Use figured dimensions only. No scaling allowed.

Client

**PROPOSED AUDITORIUM BLOCK ON
L.R.NO. 30567 EMBU.**

Drawing

TRUSS T8 and T9 DETAILS



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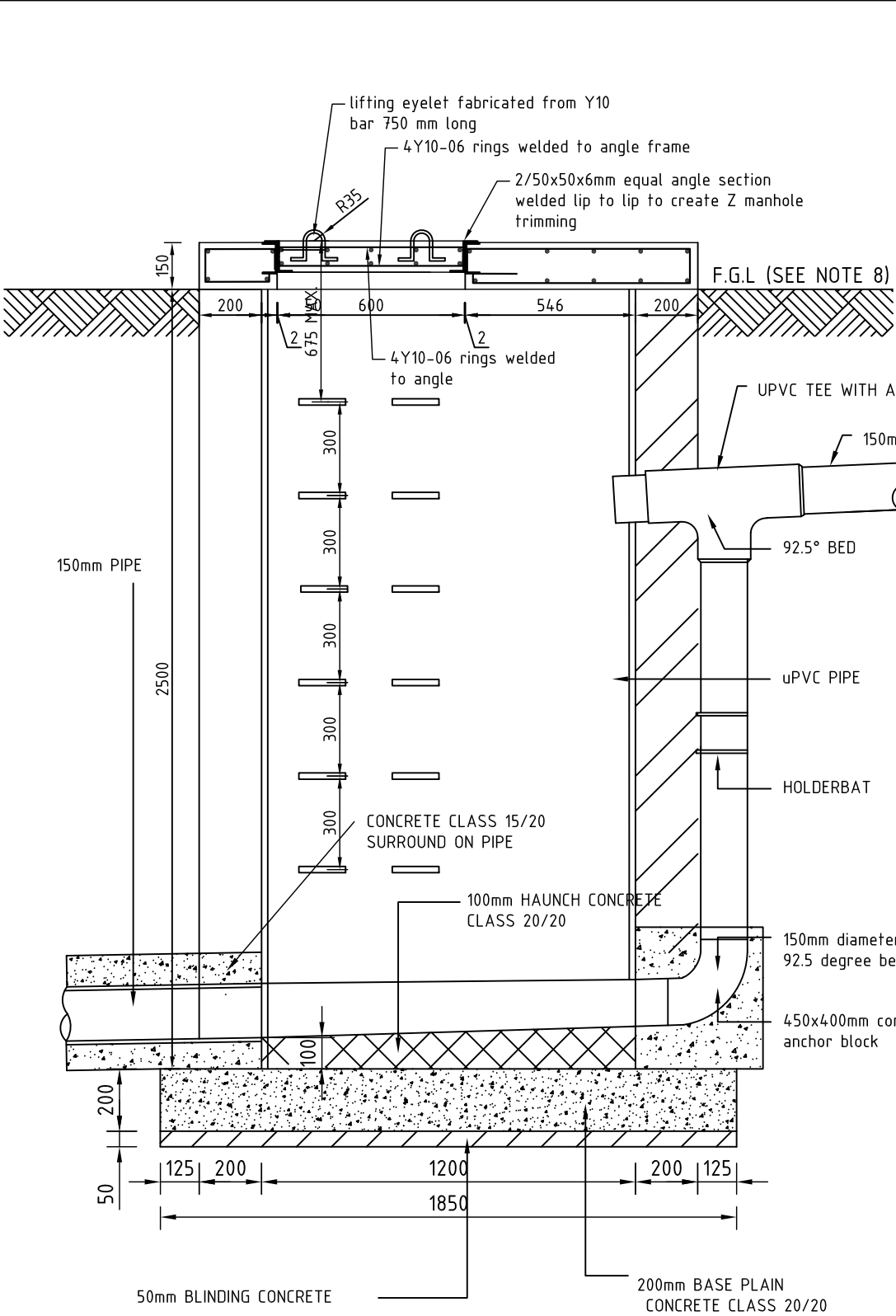
DESIGN	Miringu
DRAWN	Muthoni / Nyaga
CHECKED	S.M
SCALES	1:500
DRAWING No	MA/EUCS/CIV-AUD_01
USE ONLY SCALED DIMENSIONS	

PROJECT

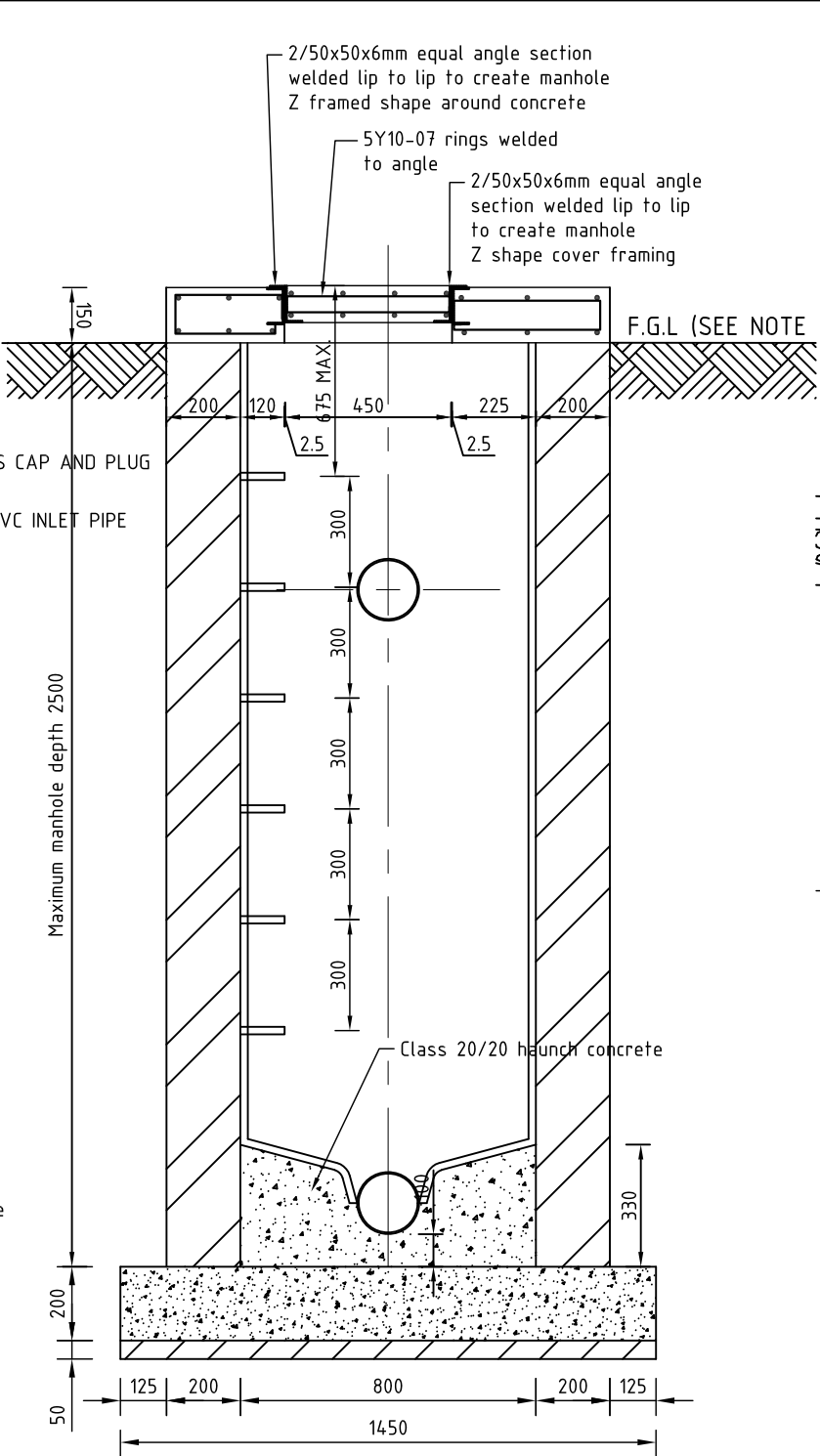
PROPOSED AUDITORIUM BLOCK UNIVERSITY OF EMBU

DRAWING

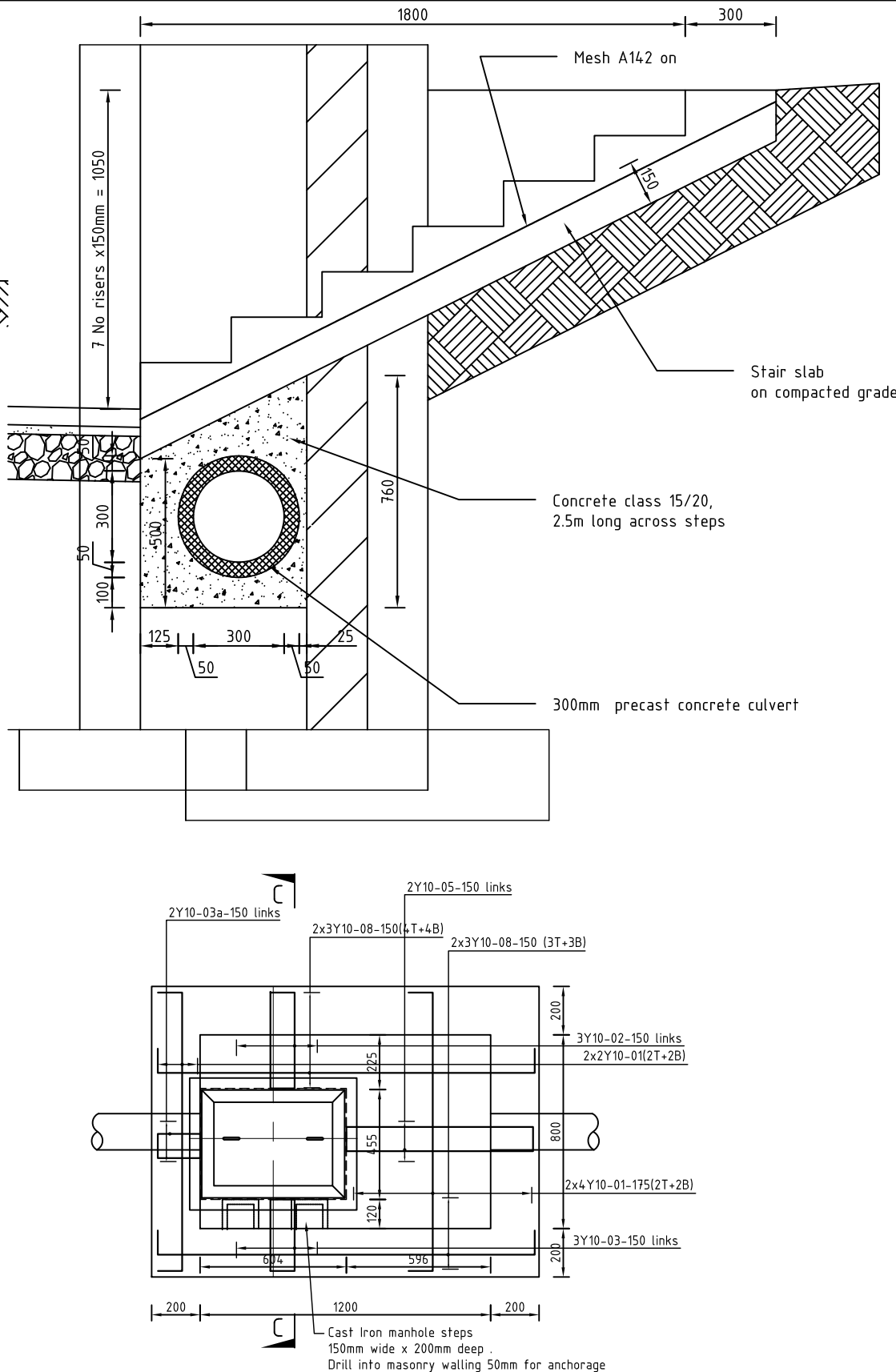
SITE PLAN AND EXTERNAL WORKS LAYOUT AND SEWER PROFILE



SECTION B-B THROUGH SEWER MANHOLE SCALE 1:20



SECTION C-C THROUGH SEWER MANHOLE SCALE 1:20



SEWER MANHOLE SCALE 1:20

MIRSA AND ASSOCIATES LTD Consulting Civil and Structural Engineers P.O BOX 54904-00200 NAIROBI Tel +254-737983263	DESIGN	Miringu	PROJECT PROPOSED AUDITORIUM BLOCK UNIVERSITY OF EMBU DRAWING SEWER MANHOLE DETAILS
	DRAWN	Muthoni / Nyaga	
	CHECKED	S.M	
	SCALES	1:500	
	DRAWING No	MA/EUCS/CIV-AUD_02	
USE ONLY SCALED DIMENSIONS			

SECTION B-B 1:25

MASONRY RETAINING WALL COLUMNS
9No. thus

ELEVATION SCALE 1:20

PLAN MASONRY HEADWALL 2No. thus

SCALE 1:20

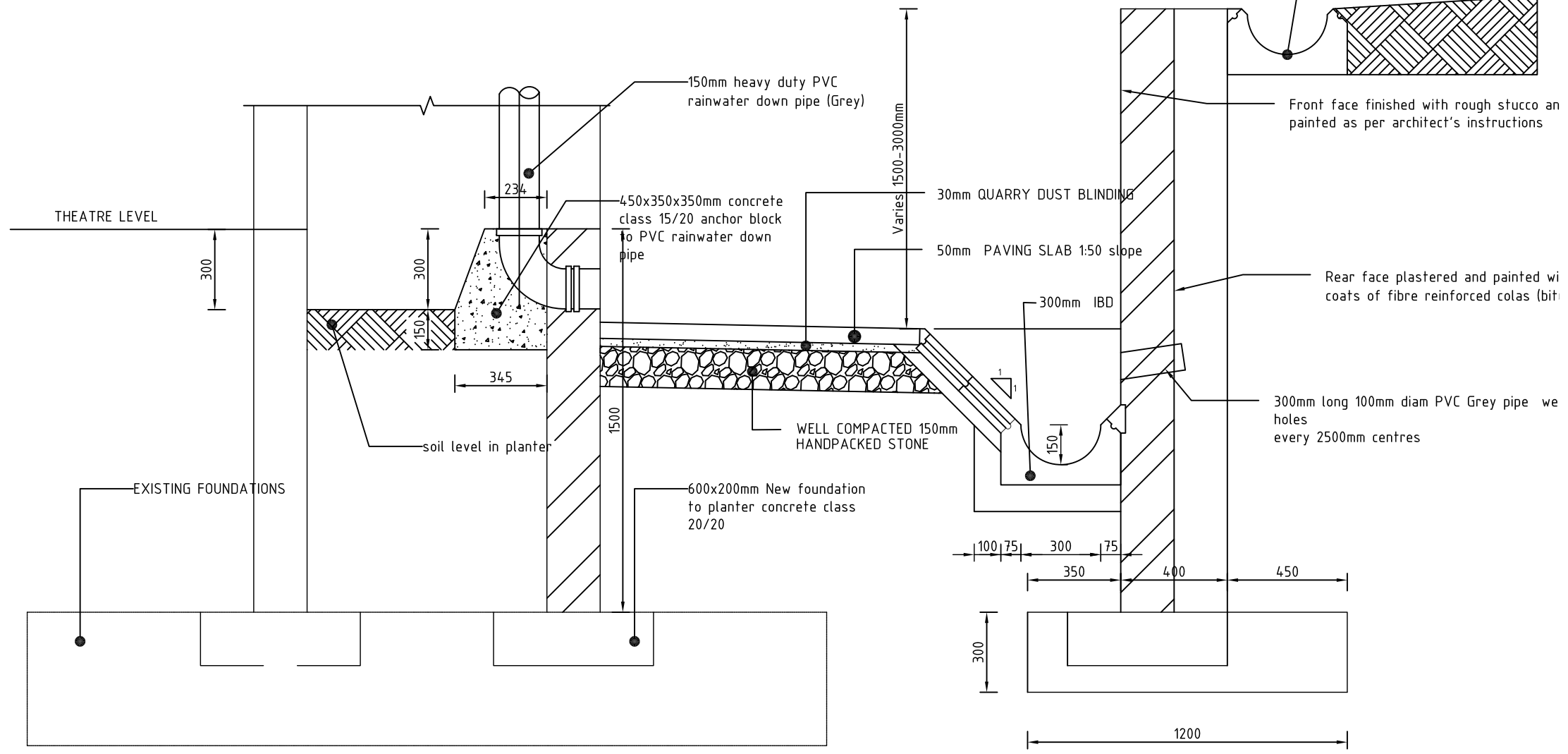
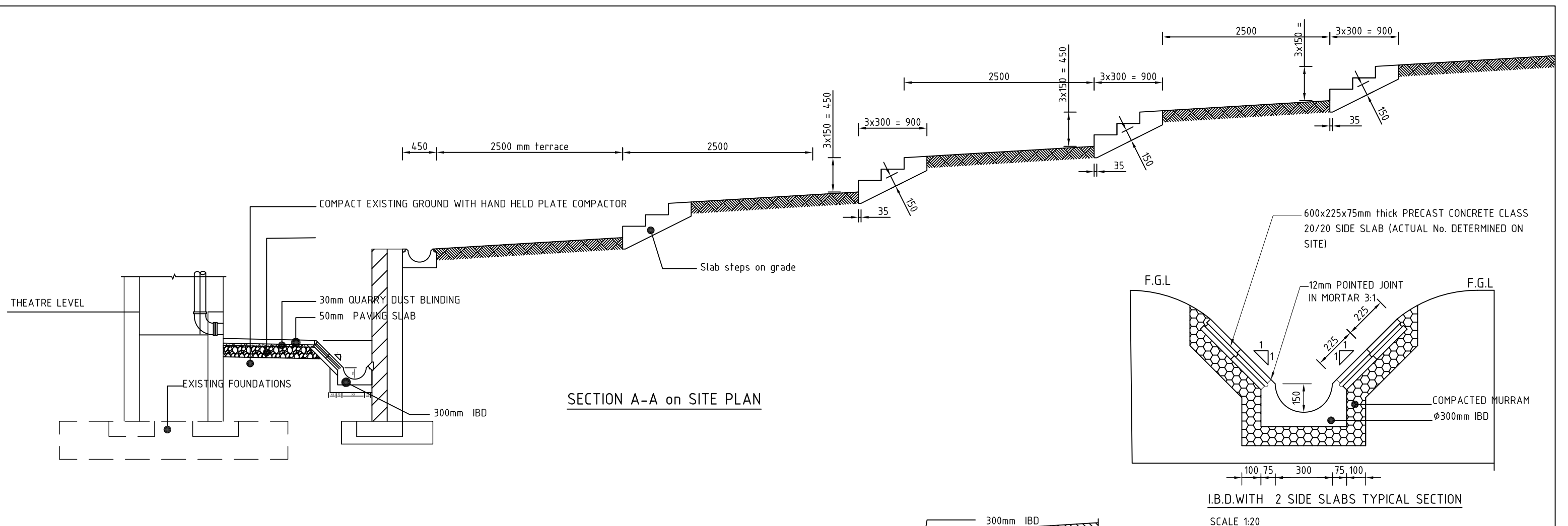
EXCAVATION BACKFILL TYPE
"A"

PAVEMENT OVER DRAIN ACROSS
FOOTPATHS DETAIL "B"
ASSUME 1.5 m. LONG each at 4No.
LOCATIONS

SECTION B-B

SCALE 1:20

PROJECT PROPOSED AUDITORIUM BLOCK UNIVERSITY OF EMBU	
DRAWING MISCELLANEOUS DETAILS SHEET 1 of 3	
DESIGN	Miringu
DRAWN	Muthoni / Nyaga
CHECKED	S.M
SCALES	1:500
DRAWING No	MA/EUCS/CIV-AUD_03
USE ONLY SCALED DIMENSIONS	
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PROJECT

PROPOSED AUDITORIUM BLOCK
UNIVERSITY OF EMBU

DRAWING

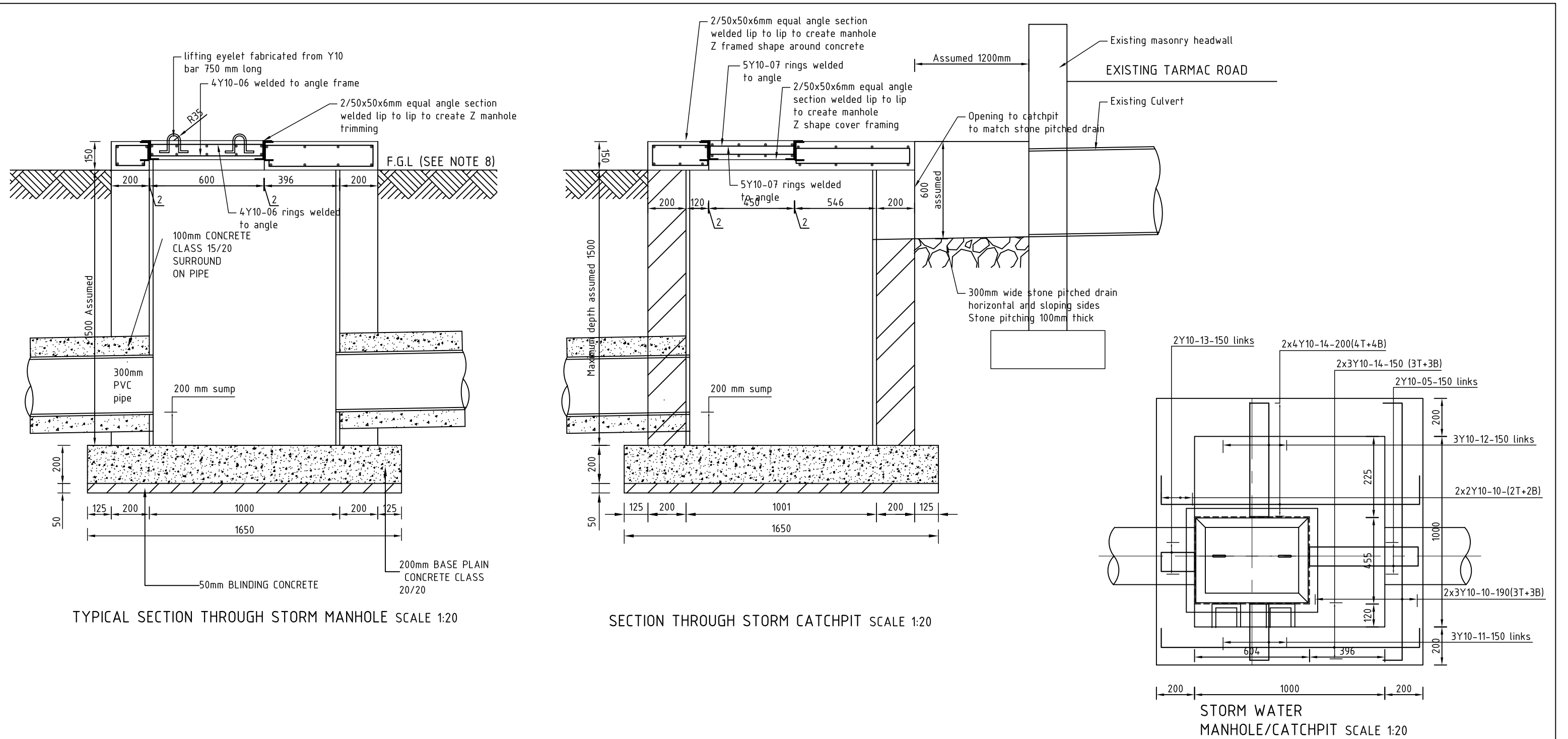
MISCELLANEOUS DETAILS SHEET 2 of 3

DESIGN	Miringu
DRAWN	Muthoni / Nyaga
CHECKED	S.M
SCALES	1:500

DRAWING No **MA/EUCS/CIV-AUD_04**

USE ONLY SCALED DIMENSIONS

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MIRSA AND ASSOCIATES LTD Consulting Civil and Structural Engineers P.O BOX 54904-00200 NAIROBI Tel +254-737983263	DESIGN	Miringu	PROJECT PROPOSED AUDITORIUM BLOCK UNIVERSITY OF EMBU DRAWING MISCELLANEOUS DETAILS SHEET 3 of 3 DETAILS
	DRAWN	Muthoni / Nyaga	
	CHECKED	S.M	
	SCALES	1:500	
	DRAWING No	MA/EUCS/CIV-AUD_05	
USE ONLY SCALED DIMENSIONS			

BAR SCHEDULE								
Element	No off Elements	Mark	Type & Size	No in each	Total Number	Length of each (mm)	Total Length (m)	Shape. Dimensions in (mm)
1200x800mm Trunk Sewer Manholes Cover	7	01	Y10	70	80	1350		100 1150 100
		02	Y10	3	21	1150		100 395
		03	Y10	3	21	940		100 290
		03a	Y10	4	28	700		100 170
		04	Y10	2	14	1150		100 390
		05	Y10	6	42	1900		100 765
		06	Y10	4	28	1050		40 440
		07	Y10	5	35	1450		60 590
		08	Y10	6	42	1650		1550 50
1000x1000 mm Storm Manhole / Catchpit	2	10	Y10	10	20	1550		100 1350 100
		11	Y10	3	6	1150		100 395
		12	Y10	3	6	1550		100 590
		13	Y10	2	6	700		100 170
		14	Y10	14	28	1550		100 1350
		15	Y10	14	28	1550		100 1350
		06	Y10	4	8	1050		40 440
		07	Y10	5	10	1450		60 590
400x200 mm Retaining wall columns	9	20	Y12	10	90	1500		200 1100 200
		21	Y8	15	135	1150		140 340
		22	Y20	4	36	2400		400 2000
		23	Y20	4	36	2600		Varies average 2400 150
Mesh A142 to steps and stair on grade			15m square metres					150mm side and end laps

<div>MIRSA AND ASSOCIATES LTD</div> <div>Consulting Civil and Structural Engineers</div> <div>P.O BOX 54904-00200 NAIROBI</div> <div>Tel +254-737983263</div>	DESIGN	Miringu	<div>PROJECT</div> <div>PROPOSED AUDITORIUM BLOCK UNIVERSITY OF EMBU</div> <div>DRAWING</div> <div>REBAR SCHEDULES</div>
	DRAWN	Muthoni / Nyaga	
	CHECKED	S.M	
	SCALES	1:500	
	DRAWING No	MA/EUCS/CIV-AUD_06	
USE ONLY SCALED DIMENSIONS			