REPUBLIC OF KENYA

MINISTRY OF EDUCATION

STATE DEPARTMENT FOR TECHNICAL, VOCATIONAL EDUCATION & TRAINING

TENDER FOR THE PROPOSED ERECTION AND COMPLETION OF TWIN WORKSHOP, CLASSROOMS AND OFFICES BLOCK (2-STOREY) AT KARURA KA-NYUNGU TECHNICAL AND VOCATIONAL COLLEGE – KIAMBU COUNTY (KABETE CONSTITUENCY)

TENDER DOCUMENTS

PROJECT MANAGER

DIRECTOR
Directorate of Public works, Kiambu county
P. O box 189-00900
Kiambu, Kenya

ARCHITECT

Chief Architect,
Ministry of LHUD & PW
State Department for Public Works
P.o Box 30743-00100,
NAIROBI

ELECTRICAL ENGINEER

Chief Engineer (Electrical-BS)
Ministry of LHUD & PW.
State Department for Public Works,
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NAIROBI.

STRUCTURAL ENGINEER

Regional Engineer (Structural),
Ministry for LHUD & PW
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P.O. Box 30743-00100
NAIROBI.

QUANTITY SURVEYOR

Chief Quantity Surveyor,
Ministry of LHUD & PW
State Department for Public Works,
P.O. Box 30743-00100,
NAIROBI.

MECHANICAL ENGINEER

Chief Engineer (Mechanical-BS)
Ministry of LHUD & PW,
State Department for Public Works,
P.O. Box 30743-00100,
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NOVEMBER 2023

BILL NO. 1

PRELIMINARIES

PARTICULAR PRELIMINARIES

Item	DESCRIPTION	Kshs.	Cts
A	**AMENDMENTS TO TENDERING INSTRUCTIONS** **a)** Clause 3.6 of the Instructions to Tenderers has been amended to read; "Tenders shall remain valid for a period of **One Hundred and Twenty (120) Days** from the date of tender opening", and not ninety days. All tenderers are advised to note this amendment when filling the form of tender. b) Clause 3.8 of the Instructions to Tenderers will hence be qualified and interpreted to mean; "Bid Bond/ Tender Security, **which must be from an established bank**, shall remain valid for a period of **One Hundred and Fifty (150) days** from the date of Tender Opening", i.e., it is still Thirty (30) days beyond the Tender Validity Period.		
B	**PRICING ITEMS OF PRELIMINARIES** Prices **SHALL BE INSERTED** against items of "preliminaries" in the tenderer's priced Bills of Quantities. Please note that failure to price any item of general particular preliminaries will be construed to mean that the tenderer wishes to provide for that item free of charge.		
C	**VALUE ADDED TAX & WITHHOLDING TAX** The contractor shall allow for addition of 16% Value Added Tax (V.A.T.) within the rates of these Bills of Quantities. Any omission in respect thereof shall be treated and corrected as an arithmetic error as per clause 5.7 of the instructions to Tenderers. The Contractor shall also allow for 3% Withholding Tax which should be included within the pricing rates Please note that from every Interim and Final Payment 3% Withholding Tax shall be deducted and paid directly to the K.R.A.		
D	**FIRM PRICE CONTRACT** This is a firm price contract and the Contractor must allow in his tender rates for any increase in the cost of labour and/ or materials during the currency of the contract.		
	Carried to Collection		

Item	DESCRIPTION	Kshs.	Cts
A	**SCOPE OF THE CONTRACT** The works to be carried out under this contract comprise ERECTION AND COMPLETION OF PROPOSED TWIN WORKSHOP, CLASSROOMS AND OFFICES' BLOCK (2- STOREY) FOR NEW TTIs IN SUB COUNTIES.		
B	**DESCRIPTION OF THE WORKS** SITE CLEARENCE, SETTING OUT, CONSTRUCTION AND COMPLETION OF PROPOSED TWIN WORKSHOP, CLASSROOMS AND OFFICES' BLOCK (2- STOREY).		
C	**FLOOR AREA** The total gross approximate floor area is **2132 square metres**. The total gross floor area is given without any warranty but for guidance only.		
D	**MEASUREMENTS** In the event of any discrepancies arising between the Bills of Quantities and the actual works, the site measurements shall generally take precedence. However, such discrepancies between any contract document shall immediately be referred to the Project Manager.		
E	**LOCATION OF SITE** The site for works is located within …… in ……Constituency, ...County. The tenderer shall be deemed to have visited the site and familiarized himself with all site conditions prior to submission of tenders. No claims arising from the tenderers failure to do so will be entertained.		
	Carried to Collection		

Item	DESCRIPTION	Kshs.	Cts
A	**EXISTING BUILDING SERVICES** Special precautions shall be required throughout the contract period to avoid damage to the existing cables, drains and other services. The Contractor shall allow for making good any damage arising from his actions during execution of this contract at his own expense.		
B	**GENERAL** The Contractor is referred to General Specifications for Building Works – 1976 Edition Pages B1 – B2 and must allow for all costs in complying with these clauses.		
C	**CONTRACT COMPLETION PERIOD** The contract completion period in accordance with condition 31 of the conditions of contract must be strictly adhered to. The PROJECT MANAGER shall strictly monitor the Contractors progress in relation to the progress chart and should it be found necessary, the PROJECT MANAGER shall inform the Contractor in writing that his actual performance on site is not satisfactory. In all such cases, the Contractor shall accelerate his rate of performance, production and progress by all means such as additional labour, plant, e.t.c., and working overtime all at his cost.		
D	**WORKING CONDITIONS** The Contractor shall allow in his rates for any interference that he may encounter in the course of execution of the works for the Client may in some cases ask the Contractor not to proceed with the works until some activities within the site are completed.		
	Carried to Collection		

Item	DESCRIPTION	Kshs.	Cts
A	**SIGN BOARD** Allow for providing, erecting, maintaining throughout the course of the Contract and afterwards clearing away a signboard as designed, specified and approved by the Project Manager.		
B	**LABOUR CAMPS** The Contractor shall not be allowed to house labour on site. Allow for transporting workers to and from the site during the tenure of the contract.		
C	**MATERIALS FROM DEMOLITIONS** Any materials arising from demolitions and not re-used shall become the property of the government. The Contractor shall allow in his rates for the cost of assembling and keeping them in the Ministry of Works, Western premises.		
D	**PRICING RATES** The tenderer shall include for all costs in executing the whole of the works, including transport, replacing damaged items, fixing all to comply with the said Conditions of Contract.		
	Carried to Collection		

Item	DESCRIPTION		Kshs.	Cts
	PARTICULARS OF INSERTIONS TO BE MADE IN APPENDIX TO CONTRACT AGREEMENT			
	The following are the insertions to be made in the appendix to the Contract Agreement: -			
A	**Period of Final Measurement**	3 Months From Practical completion		
B	**Defects Liability Period**	6 Months from practical completion		
C	**Date for Possession**	To be agreed with the Project Manager		
D	**Date for Completion**	**52** Weeks from date of Possession		
E	**Liquidated and Ascertained**	At the rate of Kshs 50,000.00 per week or part thereof		
F	**Prime cost sums for which the The Contractor desires to tender**	…… …… ……		
G	**Period of Interim Certificates**	Monthly		
H	**Period of Honouring Certificates**	30 days		
I	**Percentage of Certified Value Retained**	10%		
J	**Limit of Retention Fund**	10%		
K	**Bonds**	Shall be from Approved Banks and Insurance Companies		
	Carried to Collection			

Item	DESCRIPTION	Kshs.	Cts
	COLLECTION		
	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		
	PARTICULAR PRELIMINARIES CARRIED TO BILL No.1 SUMMARY		

ITEM	DESCRIPTION	KSHS	CTS
	GENERAL PRELIMINARIES		
A.	**PRICING OF ITEMS OF PRELIMINARIES AND PREAMBLES**		
	Prices will be inserted against items of Preliminaries in the Contractor's priced Bills of Quantities and Specification.		
	The Contractor shall be deemed to have included in his prices or rates for the various items in the Bills of Quantities or Specification for all costs involved in complying with all the requirements for the proper execution of the whole of the works in the Contract.		
B.	**ABBREVIATIONS**		
	Throughout these Bills, units of measurement and terms are abbreviated and shall be interpreted as follows:-		
	C.M. Shall mean cubic metre		
	S.M. Shall mean square metre		
	L.M. Shall mean linear metre		
	MM Shall mean Millimetre		
	Kg. Shall mean Kilogramme		
	No. Shall mean Number		
	Prs. Shall mean Pairs		
	B.S. Shall mean the British Standard Specification Published by the British Standards Institution, 2 Park Street, London W.I., England.		
	Ditto Shall mean the whole of the preceding description except as qualified in the description in which it occurs.		
	m.s. Shall mean measured separately.		
	a.b.d Shall mean as before described.		
	P.M. Shall mean Project Manager		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**EXCEPTION TO THE STANDARD METHOD OF MEASUREMENT** ***Attendance ;*** Clause B19(a) of the Standard Method of Measurement is deleted and the following clause is substituted:- Attendance on nominated Sub-Contractors shall be given as an item in each case shall be deemed to include: allowing use of standing scaffolding, mess rooms, sanitary accommodation and welfare facilities; provision of special scaffolding where necessary; providing space for office accommodation and for storage of plant and materials; providing light and water for their work: clearing away rubbish; unloading checking and hoisting: providing electric power and removing and replacing duct covers, pipe casings and the like necessary for the execution and testing of Sub- Contractors' work and being responsible for the accuracy of the same. ***Fix Only:-*** "Fix Only" shall mean take delivery at nearest railway station (Unless otherwise stated), pay all demurrage charges, load and transport to site where necessary, unload, store, unpack, assemble as necessary, distribute to position, hoist and fix only.		
B.	**EMPLOYER** The "Employer" is: The Principal Secretary, Ministry of Education, Science and Technology The term "Employer" and "Government" wherever used in the contract document shall be synonymous		
C.	**PROJECT MANAGER** The term "P.M." wherever used in these Bills of Quantities shall be deemed to imply the Project Manager as defined in Condition 1 of the Conditions of Contract or such person or persons as may be duly authorised to represent him on behalf of the Government.		
D.	**ARCHITECT** The term "Architect" shall be deemed to mean "The P.M." as defined above whose address unless otherwise notified is Ministry of Lands, Housing and Urban Devt, Directorate of Public Works Western l Region		
E.	**QUANTITY SURVEYOR** The term "Quantity Surveyor" shall be deemed to mean "The P.M." as defined above whose address unless otherwise notified is Ministry of Lands, Housing and Urban Devt, Directorate of Public Works Western l Region		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**ELECTRICAL ENGINEER** The term "Electrical Engineer" shall be deemed to mean "The P.M." as defined above whose address unless otherwise notified is Ministry of Lands, Housing and Urban Devt, Directorate of Public Works Western Region		
B.	**MECHANICAL ENGINEER** The term "Mechanical Engineer" shall be deemed to mean "The P.M." as defined above whose address unless otherwise notified is Ministry of Lands, Housing and Urban Devt, Directorate of Public Works Western Region		
C.	**STRUCTURAL ENGINEER** The term "Structural Engineer" shall be deemed to mean "The P.M." as defined above whose address unless otherwise notified is Ministry of Lands, Housing and Urban Devt, Directorate of Public Works Western Region		
D.	**FORM OF CONTRACT** The Form of Contract shall be as stipulated in the Republic of Kenya's Standard Tender Document for Procurement of Building Works (2021 Edition) included herein The Conditions of Contract are also included herein ***Conditions of Contract*** These are numbered from 1 to 20 as set out in pages ***73 to 128*** of these tender documents. Particulars of insertions to be made in the Appendix to the Contract Agreement will be found in the Particular Preliminaries part of these Bills of Quantities		
E.	**BOND.** The Contractor shall find and submit on the Form of Tender and **approved bank** and who will be willing to be bound the Government in and amount equal to five per cent (5%) of the Contract amount for the due performances of the Contract up to the date of completion as certified by the PROJECT MANAGER and who will when and if called upon, sign a Bond to that effect on the relevant standard form included herein. (without the addition of any limitations) on the same day as the Contract Agreement is signed, by the Government, the Contractor shall furnish within seven days another Surety to the approval of the Government.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**PLANT, TOOLS AND VEHICLES** Allow for providing all scaffolding, plant, tools and vehicles required for the works except in so far as may be stated otherwise herein and except for such items specifically and only required for the use of nominated Sub-Contractors as described herein. No timber used for scaffolding, formwork or temporary works of any kind shall be used afterwards in the permanent work.		
B.	**TRANSPORT.** Allow for transport of workmen, Ministry of works supervision personnel, materials, etc., to and from the site at such hours and by such routes as may be permitted by the competent authorities.		
C.	**MATERIALS AND WORKMANSHIP.** All materials and workmanship used in the execution of the work shall be of the best quality and description unless otherwise stated. The Contractor shall order all materials to be obtained from overseas immediately after the Contract is signed and shall also order materials to be obtained from local sources as early as necessary to ensure that they are onsite when required for use in the works. The Bills of Quantities shall not be used for the purpose of ordering materials.		
D.	**SIGN FOR MATERIALS SUPPLIED.** The Contractor will be required to sign a receipt for all articles and materials supplied by the PROJECT MANAGER at the time of taking deliver thereof, as having received them in good order and condition, and will thereafter be responsible for any loss or damage and for replacements of any such loss or damage with articles and/or materials which will be supplied by the PROJECT MANAGER at the current market prices including Customs Duty and V.A.T., all at the Contractor's own cost and expense, to the satisfaction of the PROJECT MANAGER		
E.	**STORAGE OF MATERIALS** The Contractor shall provide at his own risk and cost where directed on the site weather proof lock-up sheds and make good damaged or disturbed surfaces upon completion to the satisfaction of the PROJECT MANAGER Nominated Sub-Contractors are to be made liable for the cost of any storage accommodation provided especially for their use.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**SAMPLES** The Contractor shall furnish at his own cost any samples of materials or workmanship including concrete test cubes required for the works that may be called for by the PROJECT MANAGER for his approval until such samples are approved by the PROJECT MANAGER and the PROJECT MANAGER, may reject any materials or workmanship not in his opinion to be up to approved samples. The PROJECT MANAGER shall arrange for the testing of such materials as he may at his discretion deem desirable, but the testing shall be made at the expense of the Contractor and not at the expense of the PROJECT MANAGER. The Contractor shall pay for the testing in accordance with the current scale of testing charges laid down by the Ministry of Roads, Housing and Public Works. The procedure for submitting samples of materials for testing and the method of marking for identification shall be as laid down by the PROJECT MANAGER The Contractor shall allow in his tender for such samples and tests except those in connection with nominated sub-contractors' work.		
B.	**GOVERNMENT ACTS REGARDING WORKPEOPLE ETC.** Allow for complying with all Government Acts, Orders and Regulations in connection with the employment of Labour and other matters related to the execution of the works. In particular the Contractor's attention is drawn to the provisions of the Factory Act 1950 and his tender must include for all costs arising or resulting from compliance with any Act, Order or Regulation relating to Insurances, pensions and holidays for workpeople or so the safety, health and welfare of the workpeople. The Contractor must make himself fully acquainted with current Acts and Regulations, including Police Regulations regarding the movement, housing, security and control of labour, labour camps , passes for transport, etc. It is most important that the Contractor, before tendering, shall obtain from the relevant Authority the fullest information regarding all such regulations and/or restrictions which may affect the organisation of the works, supply and control of labour, etc., and allow accordingly in his tender. No claim in respect of want of knowledge in this connection will be entertained.		
C.	**SECURITY OF WORKS ETC.** The Contractor shall be entirely responsible for the security of all the works stores, materials, plant, personnel, etc., both his own and sub-contractors' and must provide all necessary watching, lighting and other precautions as necessary to ensure security against theft, loss or damage and the protection of the public.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**PUBLIC AND PRIVATE ROADS.** 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 local and other competent authority and the PROJECT MANAGER		
B.	**EXISTING PROPERTY.** The Contractor shall take every precaution to avoid damage to all existing property including roads, cables, drains and other services and he will be held responsible for and shall make good all such damage arising from the execution of this contract at his own expense to the satisfaction of the PROJECT MANAGER		
C.	**VISIT SITE AND EXAMINE DRAWINGS.** The Contractor is recommended to examine the drawings and visit the site the location of which is described in the Particular Preliminaries hereof. He shall be deemed to have acquainted himself therewith as to its nature, position, means of access or any other matter which, may affect his tender. No claim arising from his failure to comply with this recommendation will be considered.		
D.	**ACCESS TO SITE AND TEMPORARY ROADS.** Means of access to the Site shall be agreed with the PROJECT MANAGER prior to commencement of the work and Contractor must allow for building any necessary temporary access roads (approximately 70 metres long) for the transport of the materials, plant and workmen as may be required for the complete execution of the works including the provision of temporary culverts, crossings, bridges, or any other means of gaining access to the Site. Upon completion of the works, the Contractor shall remove such temporary access roads; temporary culverts, bridges, etc., and make good and reinstate all works and surfaces disturbed to the satisfaction of the PROJECT MANAGER		
E.	**AREA TO BE OCCUPIED BY THE CONTRACTOR** The area of the site which may be occupied by the Contractor for use of storage and for the purpose of erecting workshops, etc., shall be defined on site by the PROJECT MANAGER		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**OFFICE ETC. FOR THE PROJECT MANAGER** The Contractor shall provide, erect and maintain where directed on site and afterwards dismantle the site office of the type noted in the Particular Preliminaries, complete with Furniture. He shall also provide a strong metal trunk complete with strong hasp and staple fastening and two keys. He shall provide, erect and maintain a lock-up type water or bucket closet for the sole use of the PROJECT MANAGER including making temporary connections to the drain where applicable to the satisfaction of Government and Medical Officer of Health and shall provide services of cleaner and pay all conservancy charges and keep both office and closet in a clean and sanitary condition from commencement to the completion of the works and dismantle and make good disturbed surfaces. The office and closet shall be completed before the Contractor is permitted to commence the works. The Contractor shall make available on the Site as and when required by the "PROJECT MANAGER" a modern and accurate level together with levelling staff, ranging rods and 50 metre metallic or linen tape.		
B.	**WATER AND ELECTRICITY SUPPLY FOR THE WORKS** The Contractor shall provide at his own risk and cost all necessary water, electric light and power required for use in the works. The Contractor must make his own arrangements for connection to the nearest suitable water main and for metering the water used. He must also provide temporary tanks and meters as required at his own cost and clear away when no longer required and make good on completion to the entire satisfaction of the PROJECT MANAGER . The Contractor shall pay all charges in connection herewith. No guarantee is given or implied that sufficient water will be available from mains and the Contractor must make his own arrangements for augmenting this supply at his own cost. Nominated Sub--contractors are to be made liable for the cost of any water or electric current used and for any installation provided especially for their own use.		
C.	**SANITATION OF THE WORKS** The Sanitation of the works shall be arranged and maintained by the Contractor to the satisfaction of the Government and/or Local Authorities, Labour Department and the PROJECT MANAGER		
D.	**SUPERVISION AND WORKING HOURS** The works shall be executed under the direction and to the entire satisfaction in all respects of the PROJECT MANAGER who shall at all times during normal working hours have access to the works and to the yards and workshops of the Contractor and sub-Contractors or other places where work is being prepared for the contract.		
E.	**PROVISIONAL SUMS.** The term "Provisional Sum" wherever used in these Bills of Quantities shall have the meaning stated in Section A item A7(i) of the Standard Method of Measurement mentioned in Condition No. 16 of the conditions of Contract. Such sums are net and no addition shall be made to them for profit.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**PRIME COST (OR P.C.) SUMS.** The term "Prime Cost Sum" or "P.C. Sum" wherever used in these Bills of Quantities shall have the meaning stated in Section A item A7 (ii) of the Standard Method of Measurement mentioned in Condition No. 16 of the conditions of Contract. Persons or firms nominated by the PROJECT MANAGER to execute work or to provide and fix materials or goods as stated in Condition No. 20 of the Conditions of Contract are described herein as Nominated Sub-Contractors. Persons or firms so nominated to supply goods or materials are described herein as Nominated Suppliers.		
B.	**PROGRESS CHART.** The Contractor shall provide within two weeks of Possession of Site and in agreement with the PROJECT MANAGER a Progress Chart for the whole of the works including the works of Nominated Sub-Contractors ; one copy to be handed to the PROJECT MANAGER and a further copy to be retained on Site. Progress to be recorded and chart to be amended as necessary as the work proceeds.		
C.	**ADJUSTMENT OF P.C. SUMS.** In the final account all P.C. Sums shall be deducted and the amount properly expended upon the PROJECT MANAGER'S order in respect of each of them added to the Contract sum. The Contractor shall produce to the PROJECT MANAGER such quotations, invoices or bills, properly receipted, as may be necessary to show the actual details of the sums paid by the Contractor. Items of profit upon P.C. Sums shall be adjusted in the final account pro-rata to the amount paid. Items of "attendance" (as previously described) following P.C. Sums shall be adjusted pro-rata to the physical extent of the work executed (not pro-rata to the amount paid) and this shall apply even though the Contractor's priced Bill shows a percentage in the rate column in respect of them. Should the Contractor be permitted to tender and his tender be accepted of any work for which a P.C. Sum is included in these Bill of Quantities profit and attendance will be allowed at the same rate as it would be as if the work were executed by a Nominated Sub-Contractor.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**ADJUSTMENT OF PROVISIONAL SUMS.** In the final account all Provisional Sums shall be deducted and the value of the work properly executed in respect of them upon the PROJECT MANAGER's order added to the Contract Sum. Such work shall be valued as described for Variations in Conditions No. 13 of the Conditions of Contract, but should any part of the work be executed by a Nominated Sub-Contractor, the value of such work or articles for the work to be supplied by a Nominated Supplier, the value of such work or articles shall be treated as a P.C. Sum and profit and attendance comparable to that contained in the priced Bills of Quantities for similar items added.		
B.	**NOMINATED SUB-CONTRACTORS** When any work is ordered by the PROJECT MANAGER to be executed by nominated sub-contractors, the Contractor shall enter into sub-contracts as described in Condition No. 20 of the Conditions of Contract and shall thereafter be responsible for such sub-contractors in every respect. Unless otherwise described the Contractor is to provide for such Sub-Contractors any or all of the facilities described in these Preliminaries. The Contractor should price for these with the nominated Sub-contract Contractor's work concerned in the P.C. Sums under the description "add for Attendance".		
C.	**DIRECT CONTRACTS** Notwithstanding the foregoing conditions, the Government reserves the right to place a "Direct Contract" for any goods or services required in the works which are covered by a P.C. Sum in the Bills of Quantities and to pay for the same direct. In any such instances, profit relative to the P.C. Sum the priced Bills of Quantities will be adjusted as described for P.C. Sums and allowed.		
D.	**ATTENDANCE UPON OTHER TRADESMEN, ETC.** The Contractor shall allow for the attendance of trade upon trade and shall afford any tradesmen or other persons employed for the execution of any work not included in this Contract every facility for carrying out their work and also for use of his ordinary scaffolding. The Contractor, however, shall not be required to erect any special scaffolding for them. The Contractor shall perform such cutting away for and making good after the work of such tradesmen or persons as may be ordered by the PROJECT MANAGER and the work will be measured and paid for to the extent executed at rates provided in these Bills.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**INSURANCE** The Contractor shall insure as required in Conditions Nos. 22 and 23 of the Conditions of Contract. No payment on account of the work executed will be made to the Contractor until he has satisfied the PROJECT MANAGER either by production of an Insurance Policy or and Insurance Certificate that the provision of the foregoing Insurance Clauses have been complied with in all respects. Thereafter the PROJECT MANAGER shall from time to time ascertain that premiums are duly paid up by the Contractor who shall if called upon to do so, produce the receipted premium renewals for the PROJECT MANAGER's inspection.		
B.	**PROVISIONAL WORK** All work described as "Provisional" in these Bills of Quantities is subject to remeasurement in order to ascertain the actual quantity executed for which payment will be made. All "Provisional" and other work liable to adjustment under this Contract shall left uncovered for a reasonable time to allow all measurements needed for such adjustment to be taken by the PROJECT MANAGER Immediately the work is ready for measuring, the Contractor shall give notice to the PROJECT MANAGER. If the Contractor makes default in these respects he shall if the PROJECT MANAGER so directs uncover the work to enable all measurements to be taken and afterwards reinstate at his own expense.		
C.	**ALTERATIONS TO BILLS, PRICING, ETC.** Any unauthorised alteration or qualification made to the text of the Bills of Quantities may cause the Tender to be disqualified and will in any case be ignored. The Contractor shall be deemed to have made allowance in his prices generally to cover any items against which no price has been inserted in the priced Bills of Quantities. All items of measured work shall be priced in detail and the Tenders containing Lump Sums to cover trades or groups of work must be broken down to show the price of each item before they will be accepted.		
D.	**BLASTING OPERATIONS** Blasting will only be allowed with the express permission of the PROJECT MANAGER in writing. 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 PROJECT MANAGER governing the use and storage of explosives.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**MATERIALS ARISING FROM EXCAVATIONS** Materials of any kind obtained from the excavations shall be the property of the Government. Unless the PROJECT MANAGER directs otherwise such materials shall be dealt with as provided in the Contract. 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 PROJECT MANAGER 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.		
B.	**PROTECTION OF THE WORKS.** Provide protection of the whole of the works contained in the Bills of Quantities, including casing , casing up, covering or such other means as may be necessary to avoid damage to the satisfaction of the PROJECT MANAGER 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 Government.		
B.	**REMOVAL OF RUBBISH ETC.** Removal of rubbish and debris from the Buildings and site as it accumulates and at the completion of the works and remove all plant, scaffolding and unused materials at completion.		
C.	**WORKS TO BE DELIVERED UP CLEAN** 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 and remove all marks, blemishes, stains and defects from joinery, fittings and decorated surfaces generally, polish door furniture and bright parts of metalwork and leave the whole of the buildings watertight, clean, perfect and fit for occupation to the approval of the PROJECT MANAGER		
D.	**FIRM PRICE CONTRACT** Unless otherwise specifically stated in the Particular Preliminaries this is a firm price contract and the Contractor must allow in his tender rates for any increase in the cost of labour and/or materials during the currency of the contract.		
	Carried to collection		

ITEM	DESCRIPTION	KSHS	CTS
A.	**GENERAL SPECIFICATION.** For the full description of materials and workmanship, method of execution of the work and notes for pricing, the Contractor is referred to the Ministry of Roads and Public Works and Housing General Specification dated 1976 or any subsequent revision thereof which is issued as a separate document, and which shall be allowed in all respects unless it conflicts with the General Preliminaries, Trade Preambles or other items in these Bills of Quantities.		
B.	**TRAINING LEVY** The Contractor's attention is drawn to legal notice No. 237 of October, 1971, which requires payment by the Contractor of a Training Levy at the rate of 1/4 % of the Contract sum on all contracts of more than Kshs. 50,000.00 in value.		
C.	**MATERIALS ON SITE** All materials for incorporation in the works must be stored on or adjacent to the site before payment is effected unless specifically exempted by the PROJECT MANAGER. This includes the materials of the Main Contractor, Nominated Sub-Contractors and Nominated Suppliers.		
D.	**HOARDING** The Contractor shall enclose the site or part of the works under construction with a hoarding 2400 mm high consisting of iron sheets on 100 x 50 mm timber posts firmly secured at 1800 mm centres with two 75 x 50 mm timber rails. The Contractor is in addition required to take all precautions necessary for the safe custody of the works, materials, plant, public and Employer's property on the site.		
E.	**CONTRACTOR'S SUPERINTENDENCE/SITE AGENT** The Contractor shall constantly keep on the works a literate English speaking Agent or Representative, competent and experienced in the kind of work involved who shall give his whole experience in the kind of work involved and shall give his whole time to the superintendence of the works. Such Agent or Representative shall receive on behalf of the Contractor all directions and instructions from the Project Manager and such directions shall be deemed to have been given to the Contractor in accordance with the Conditions of Contract.		
F.	**COPYRIGHT** The copyright of these documents is vested in the **Chief Quantity Surveyor, Ministry of Public Works**. No part of this document may be reproduced in any form or by any means without their prior permission.		
	Carried to Collection		

ITEM	DESCRIPTION	KSHS	CTS
	COLLECTION		
	Brought Forward From Page GP/ 1		
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	TOTAL FOR GENERAL PRELIMINARIES CARRIED TO BILL No. 1 SUMMARY		

ITEM	DESCRIPTION	Kshs	Cts
	SPECIAL PRELIMINARIES		
	PROJECT DOCUMENTATION		
A	Allow a sum of Kenya Shillings Three Hundred Thousand (KShs 300,000/-) only for the Project Documentattion Expenses (Master Plan, EIA, etc) to be paid to the consultant	300,000	
B	Allow a sum of Kenya Shillings Six Hundred Thousand (KShs 600,000/-) only for Clerk of Works Expenses to be expended at the discretion of the Project Manager	600,000	
	Special Preliminaries carried forward to Bill No. 1 Preliminaries Summary	**900,000**	

ITEM	DESCRIPTION	AMOUNT
	SUMMARY:	
	PARTICULAR PRELIMINARIES (PAGE PP/ 6)	
	GENERAL PRELIMINARIES (PAGE GP/ 13)	
	SPECIAL PRELIMINARIES (PAGE SP/ 1)	900,000.00
	TOTAL FOR BILL NO.1 PRELIMINARIES CARRIED FORWARD TO GRAND SUMMARY	

SPECIFICATIONS AND PRICING NOTES

The Contractor should read carefully the following specification for workmanship prepared in accordance with standard specifications for building works 1976 Edition prepared by the Ministry of Public Works.

GENERAL ITEMS

Materials Generally

A.1 All materials used on the works shall be new and of the qualities and kinds specified herein and equal to approved samples. Deliveries shall be made sufficiently I advance to enable samples to be taken and tested if required. No materials shall be used until approved and all materials which are not approved of which are damaged, contaminated or have deteriorated in any way or do not comply in any way with the requirements of this specification shall be rejected and shall be immediately removed from the site at the contractor's expense.

A.2 Materials for which there is a Kenya Bureau of Standard specification

All materials used in the works for which a Kenya Bureau of Standards Specification has been published shall conform with the latest edition thereof in every way. The Architect reserved the right to demand that the contractor shall obtain his own expense a certificate in respect of any materials to state that is in accordance with the Kenya Bureau of Standards Specification.

A.3 Materials for which there is no Kenya Bureau of Standards specification

All materials used in the works for which no Kenya Bureau of Standard Specification has been published shall conform with the British Standards specification for such materials. If there are no published standards as specified for any materials the quality of such materials shall be generally of a standard equal to those for which there is a Kenya Bureau of Standards or British Standard specification.

EXCAVATION AND EARTHWORKS

B.1 Site Clearance

Site clearance shall include the cutting down of all trees, stumps, bushes, vegetation and rubbish, burning the debris arising in approved locations and carting remaining materials to a tip provided by the contractor.

B.2 Nature of the soil

The contractor is advised to visit the site and ascertain the nature of the ground to be excavated and he shall price accordingly and not claim will be allowed for want of knowledge in this respect.

Rates for excavation shall include for excavation in soil, earth, black cotton, sand soil, tuff, soft rock, boulders or whatever other subsoil is encountered except hard rock as defined below.

B.3 Foundation Excavations

(a) The foundation trenches and column bases shall be excavated to the widths and depths of the concrete foundations shown on the drawings or to such widths as the Engineer may instruct after examination of the excavations. Quantities of all excavations shall be measured and valued by Quantity Surveyor and any difference between such measurements and the measurements herein given shall be dealt with as a variation to the contract.

If however, the contractor excavated to any greater depths than shown in the drawings or as instructed by the Engineer, then he shall at his own expenses fill in such extra depth of excavation with concrete as specified for the foundations to the satisfaction of the Engineer. The contractor shall not be paid for the cost of any excavation executed deeper or wider than shown on the drawings or instructed by the Engineer nor the cost of back filling such excavation or disposing of surplus.

B.4 Surplus Soil Disposal

Excavated materials not required for subsequent refilling shall be removed to areas off site which shall be approved by the Architect.

B.5 Top Soil for Spreading

Where required in the Bills of Quantities, top soil required for subsequent spreading over finished works shall be especially selected and shall be dumped in special heaps as indicated by the Architect. Such top soil shall be reasonably free from vegetation to the satisfaction of the Architect and shall be compacted as little as possible in the heaps.

B.6 Filling under surface Beds in Buildings

i) Murram Filling

Murram filling as base course shall be from an approved source and the highest quality. It shall be laid in layers not less than 150mm thick and not greater than 230mm thick prior to compaction. Water will be applied to O.M.O. and each layer will be thoroughly compacted by at least 8 passes of a 10 tonne smooth wheeled roller or a 2 tonne vibrating roller until all movement ceases and 100% C.R. is obtained.

i) Hardcore filling

Hardcore filling shall be crushed rock, broken concrete or other approved hard granular materials broken to pass not greater than a 150mm ring or to be 75% of the finished thickness of the layers being compacted whichever is the less and graded so that it can be easily and thoroughly compacted by rolling. The filling is to be laid in layers each of consolidated thickness not exceeding 230mm.

B.7 Anti-termite treatment

Where described the top surface of filling shall be treated with Gladiator T.C. Pesticides to be supplied and applied by Retokil Ltd. P.O. Box 44360, Nairobi or other equal and approved firm strictly in accordance with the satisfaction of the Architect. The Contractor must destroy any termite nests found within the perimeter of the building and within 20 metres from the building externally and take out and destroy queens, impregnate holes and tunnels with approved insecticide and backfill with hard material, well rammed and consolidated. The specialist shall be required to issue a 10 year guarantee to the Employer.

B.8 Polythene sheeting

Polythene sheeting shall be produced by an approved manufacturer Joints in sheeting shall be treble folded with a 150mm fold and taped at 300mm intervals with 50mm wide back plastic adhesive tapes. The sheeting shall not stretch but shall be laid with sufficient wrinkles to permit shrinkage upto 15%.

The contractor shall ensure that the membrane is not pieced buying laying and concreting.

B.9 Existing services

Before commencing works, the contractor shall at his own expenses ascertain in writing from the relevant Local Authorities and all other Public bodies, companies and persons who may be affected, the position and depths of their respective ducts, cables, mains or pipes and appurtenance. He shall thereupon search for and locate such services.

Active existing services shall be adequately protected from damage or relocated as directed by the Architect. Inactive services shall be removed or sealed off in accordance with the direction of the Architect.

B.10 Protection

The contractor shall protect all graded and filled areas from the actions of the elements. Any settlement or washing away that occurs prior to acceptance of

the works shall be repaired and graded re-established to the required elevations and slopes.

CONCRETE WORKS

C.1 Codes of Practice

All workmanship, materials, tests and performances in connection with reinforced concrete shall be in conformity with the latest edition of the British Standard for concrete works (B.S B110 parts 1 & 2, B.S. 8004, B.S. 8007) and any other approved local and internal standards. Where inconsistence exists between these preambles and these Standards, the Contractor shall notify the Engineer in good time for his Clarification as to which of the two implications on the contract.

C.2 Supervision

A competent person approved by the Engineer shall be employed by the Contractor whose duty will be to supervise all stages in the preparation and placing of the concrete. All cubes shall be made and site tests carried out under his direct supervision on consultation with the Engineer.

C.3 Cement

Cement unless otherwise specified shall be ordinary Portland Cement of a brand and source approved by the Engineer and shall comply with the requirements of K.S.02.21. A Manufacturer's certificate of test in accordance with K.S.02-21 shall be supplied for each consignment delivered to the site.

C.4 Aggregate

Aggregate shall conform with the requirement K.S.02-95 and all the proposed sources, types and grading test results of all aggregate are to be approved in all respects by the Engineer before work commences.

If in the opinion of the Engineer the aggregates meets with the above requirements but is dirty or adulterated in any manner it shall be screed and/or washed with clean water at the contractor's expenses.

Aggregates shall be delivered to the site in their prescribed sizes or gradings and shall be stock-piled on paved areas to boarded platforms in separate units to avoid intermixing. On no account shall premixed cores aggregates be brought to the patching plant. On no account shall aggregates be stock-piled on the ground.

C.5 Water

The water used for mixing concrete shall be from an approved source, clean, fresh and free from harmful matter and comply with the requirements of B.S. 3148

C. 6 Quality Control at Works stage

Once the concrete mix is accepted from preliminary to works stage, the principal basis of control shall be analysis of the cube test results at 28 days.

C.7 Cement

The Quantity of cement shall be measured by weight. Where delivered in bags, each batch of concrete is to contain one or more bags of cement in accordance with the proportions specified.

From non-structural concrete, volume batching may be used as indicated below:

Class of concrete	15	10
Nominal mix by volume	1:3:6	1:4:8
Cubic metres of fine aggregate Per 50Kg bag of cement	0.12	0.16
Cubic metres of coarse aggregate Per 50Kg bag of cement	0.24	0.32
Max. size of coarse aggregate	40mm*	40mm*

*or 20mm for blinding concrete where described.

Where batching is by volume, approved gauge boxes of such a size as will give the correct proportions shall be used and full account shall be taken of bulking due to high moisture content.

C.8 Construction Joints

Construction joints shall be permitted only at the positions predetermined on the drawings or as instructed on the site by the Engineer. In general they shall be located at points of minimum shear, viz, vertical at, or near micspans of slabs, ribs and deems.

C.9 Faulty Concrete

Any concrete which fails to comply with these preambles or which shows signs or setting before it is placed shall be taken out of and removed from the site, where concrete is found to be defective after it has set the concrete shall be cut out and replaced in accordance with the Engineers instructions. On no account shall any faulty, honeycombed, or otherwise defective concrete be repaired or patched until the Engineer has made an inspection and issued instructions for the repair.

C.10 Steel reinforcement

The steel reinforcement shall comply with the latest requirements of the following British Standards:

Hot rolled MS for the Reinforcement of concrete	KS 02-22
Hot rolled MS for the Reinforcement of concrete	KS 4449
Cold worked H.Y steel for the Reinforcement of concrete	BS 4461
Hard drawn steel wire	BS 4482

C.11 Fabric reinforcement

Fabric reinforcement shall be electrically cross welded steel wire mesh reinforcement to B.S. 4483 and of the size and weight specified and made of wire to B.S. 4482.

C.12 Fixing steel Reinforcement

Reinforcement shall be accurately bent to the shapes and dimensions shown on the drawings and Schedules and in accordance with B.S. 4466 and B.S. 8110. Reinforcement must be cut and bent cold and no welded joints will be permitted unless to detailed or directed by the Engineer.

C.13 Formwork

The method and system of formwork which the Contractor proposed to use shall be approved by the Engineer before constriction commences. Formwork shall be substantially and rigidly constructed of timber, steel, plastic, precast concrete or other approved material.

All timber formwork shall be good, sound, clean, sawn, well-seasoned timber free from warps and loose knots and of scantlings sufficiently strong for their purpose.

WALLING

MATERIALS

D.1 Cement

Cement used for making mortar shall be as described in concrete.

D.2 Lime

The lime for making mortar shall be obtained from an approved source and shall comply with BS 8900 Class A for non-hydraulic lime. The lime to be run to putty in an approved lined put or container. The water to be first rum into the pit or container and the lime to be added until it is completely submerged, stirred vigorously until all lumps are disintegrated and shall be kept constantly covered with water and regularly stirred for at least four weeks. The resulting milk-lime then to be run through a fine sieve and rum into a pit or other container and kept clean and moist for not less than two weeks before being used in the works.

D.3 Sand

Sand used for making mortar shall be clean, well graded siliceous sand of good sharp hard quality equal to samples which shall be deposited with and approved by the Architect. It shall be free from lumps of stone, earth, loam, dust, salt, organic matter and other deleterious substances, passed through a fine sieve and washed with clean water is so directed by the Architect.

D.4 Water

Shall be as described in concrete work.

D.5 Stone

All stones shall comply with the requirements of CP 121.202 for masonry and rubble walls respectively except where amended or extended by the following clauses.

D.6 Reinforced Walls

Steel reinforcing bars in walls shall be carefully placed and spacers used to ensure that a minimum of 20mm cover is given to the reinforcement unless otherwise specified.

Horizontal reinforcement in mortar joints shall be laid such that the reinforcement is not in contact with the blocks or stone.

D.7 Wall Ties

Wall ties shall be provided to connect walls to steel or concrete columns and beams to connect two unbounded leaves of wall.

Wall ties shall be provided at 450mm centres both vertically and 900mm centres horizontally and shall be staggered when used to connect two leaves of unbounded wall. Wall ties shall be embedded into each material by a minimum of 50mm.

D.8 Fair Face

All concrete and hollow blockwork described as finished with a fair face is to be built to a true and even face with the joints finished as specified hereinafter.

D.9 Pointing

Pointing of walls shall be prepared for pointing by raking out all loose or fri9able material to a minimum of 15mm to form a square recess. The joints shall then be wetted and new mortar shall be forced into the joints and finished as directed.

GLAZING

MATERIALS

E.I General

Glass used in glazing and for mirrors shall be best quality clear glass free from visible defects so that to afford uninterrupted vision or reflection as appropriate and without obvious distortion.

E.2 Standards

Glass for glazing and mirrors shall be approved manufacture and is to comply with B.S. 952 in all respected free from flaws, bubbies, specks and other imperfections.

E.3 Clear Sheet Glass etc

The clear sheet glass shall be ordinary glazing (OG) quality.

E.5 Obscured Glass

To be of type described and as approved by the Architect.

E.6 Putty

The putty for glazing to wood sashes is to be linseed oil putty as B.S. 644.

E.7 Workmanship

Glazing of all types in all location shall be carefully executed by artisans skilled in this type of work and in conformance with the recommendations of CP 152. Glazing shall be carefully fitted so that it is not subject to pressure and stresses imposed by being an overtight fit within framing.

METAL WORK

F.1 Generally

All materials shall be the best of their respective kinds free from defects and all work is to be carried out in the most workmanlike manner and strictly as directed by the Architect. The materials in all stages of transportation, handling and stacking shall be

kept clean and prevented from injury by breaking, bending or distortion and weather action.

F.2 Mild Steel

Mild steel shall comply with B.S. 15

F.3 Hollow Section Tubing

Square and rectangular hollow section tubing shall be hot rolled mild steel in accordance with Grade 43C of B.S. 4360

F.4 Bolts, Nuts and Washers

These shall be fabricated from materials which comply with B.S. 15 and manufactured item shall comply with the appropriate B.S

F.5 Galvanized Sheet Steel

To be No. 24 S.W.G. of approved manufacture to B.S. 2989 of quality mild steel sheets cold rolled close annealed patent flattened and hot dip galvanized.

F.6 Stainless steel

Stainless steel tube be Asthenic Steel B.S. comparable to B.S. 1449 Type 36 S 16

F.7 Steel Grills

Steel Grills shall be manufactured from section conforming with B.S.990 of heavy duty sections of the metric W20 range of approved manufacture and design approved by the Architect.

After manufacture and before delivery to site steel windows are to be hot galvanized by dipping in a bath of molten zinc or painted with one coat primer.

<u>WORKMANSHIP</u>

F.8 Welding

All welding is to be in accordance with the requirements of B.S. 1856 and 938 and the electrodes shall comply with B.S. 639.

F.9 Painting

All steel is to be wire brushed and any loose scale, dirt or grease shall be removed before any painting is commenced. One coat of red oxide primer type A to B.S. 2523 SHALL BE applied at the shop.

F.10 Fixing of Steel Grilles

Fixing of metal frills shall include for assembling and fixing, including screwing to sub-frames or cutting mortices for lugs in concrete or walling and running with cement mortar 91:4, bedding frames in similar mortar, pointing in mastic, bedding sills, transoms and mullions in mastic, making good furnishings around both sides and fixing and adjusting all fittings and frames.

PLASTERWORK

G.1 Generally

Render both internal and externally shall be cement and sand in the proportions 1:4 finished to the thickness specified.

Plaster shall consist of an undercoat of a part cement to 6 parts sand by volume and a finishing coat of 1 part cement to 10 parts lime putty. Each coat shall be finished to the thickness specified.

G.2 Cement

Ordinary Portland cement and shall comply with k.s.02-21. White and coloured cements shall comply with B.S. 12 and be obtained from an approved manufacturer.

G.3 Lime

Lime shall be prepared from hydrated lime complying with B.S. 890, Part 2

G.4 Sands

Sands for cement and lime mixes shall comply with B.S. 1199, Table 1

G.5 Water

Water shall be clean and kept free from impurities

G.6 Mixing of materials

All materials shall be thoroughly mixed in the proportions described. No mixes of plasters, other than described shall be used.

G.7 Period between coats

Cement – lime undercoats shall be allowed to dry out thoroughly before a further coat is applied.

G8 **Surfaces of beds and backings**

Screeded beds for in situ finishings of floor finishings bedded in mortar shall be left rough from the screeded board.

Floated beds for inflexible floor finishings bedded in mastic, shall be left with a plain Untextured surface.

Trowelled beds for flexible finishings shall be finished smooth and free from score marks, grooves or depressions.

Floated backings for inflexible wall finishings fixed with adhesive shall be left with a plain surface.

Trowelled backings for flexible wall finishings shall be finished with smooth and free from score marks or depressions

Beds and Backings for finishings by specialist shall be to the approval of the specialist.

G.9 **Preparation of surfaces**

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

PAINTING AND DECORATING

MATERIALS

H.1 Colour Range

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

H.2 Approval of brands

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

H.3 Quality of products

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

H.4 Where it is not evident that the first or best quality of paint is being used the Architect will order the removal of such materials from the site and rectification of any works executed with those materials all at the contractor's expenses.

H.5 Same makers materials used for coating

While materials for the work may be obtained from several makers, undercoats and finishings coats for a particular surface must be obtained from the same maker (i.e. one maker's undercoat).

H.6 Remedying defects due to defective materials

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

H.7 Emulsion paint

Emulsion paint (interior and/or exterior) shall have P.V.A. base and shall be of an approved brand. The first coat shall be thinned in accordance with the manufacturer's instructions. Where described as applied externally, the paint shall incorporate an approved fungicide to prevent fungus growth.

H.8 Black bituminous paint

Black Bituminous paint shall comply with B.S. 3416, Type ii for general for drinking water.

H.9 Primer for iron and steelwork

Prime for iron and steelwork shall:-

(a) Lead based priming paint complying with B.S. 2523 Type B

b) Calcium plumbate priming paint complying with B.S. 3698 Type A.

H.9 Primer for woodwork

Primer for internal woodwork, other than the internal surfaces of external doors, windows and their frames and linings, etc in contract with masonry, concrete or plaster, shall be leadless white or light grey priming paint not darker than 9-093 of B.S. 4800 which shall be compatible with the subsequent coats and obtained from the same maker.

Oil paint

Hard gloss, semi-gloss matt and flat oil paints, and respective undercoats, shall be approved quality as appropriate.

H.27 Polyurethane lacquer

Polyurethane lacquer shall be an approved single pack or two pack lacquer as described of interior or exterior quality, as appropriate.

H.31 Plaster, rendering, concrete blockwork and brickwork

All plaster or mortar splashes, etc shall be removed from plaster rendering, concrete, block

Work and brickwork by careful scraping; all holes, cracks etc shall be stopped and the whole of the surfaces shall be brushed down to remove dust and loose materials. In addition, all traces of mould oil shall be removed from concrete surfaces by scrubbing with water and detergent and rinsing with clean water to remove all detergent.

H.35 Iron and steel

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

H.37 Hardwood

All dirt and grease shall be removed from hardwood surfaces. After priming all nail holes and other imperfections shall be stopped.

H.38 Fibreboard

All dirt shall be brushed off from fibreboard surfaces. After priming all nail holes and other imperfections shall be stopped.

H.39 Plywood

Surfaces of plywood to be painted shall be filled as required with a plaster based filler for internal work, and a filler as described in stopping here before for external work, and then rubbed down and all dust and loose materials brushed off.

H.40 Woodwork to be painted

Before fixing woodwork all surfaces which will be visible after fixing shall be rubbed down and all knots and resin pockets shall be scorched back and coated with knotting.

H.41 Woodwork to receive clear finish

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

Workmanship

H.42. Standard of workmanship

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

H.43 Stirring of materials

The contents of all cans and containers of all materials must be properly and thoroughly stirred before and during use and shall be suitably.

H.44 Manufacturer's instructions

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

H.45 Brush work

Unless otherwise described, all coatings shall be applied by Brush. Written permission must be obtained from the Architect for the application of coatings by spray or roller where not so described, and if permission is granted such application shall not result in extra cost to the Employer.

BILL NO. 2

BUILDERS' WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 01				
	SUB-STRUCTURES (ALL PROVISIONAL)				
	Excavations and earthworks				
	Site Preparations				
	Clearing site vegetation, grubbing up roots and filling up voids left with selected excavated materials				
A	Bushes, shrubs, undergrowth or the like and cart away from site	1260	SM		
	Excavation				
	Excavating vegetable soil for preseKation, average 200mm thick				
B	Load up and store on site, later level and spread as directed on site and cart away surplus excavated material	1260	SM		
	Excavating surface to reduce levels				
C	Over 300mm deep	424	CM		
	Excavating trenches: to receive foundations starting from reduced level				
D	Not exceeding 1.50m deep	445	CM		
	Breaking out existing material: extra over all kinds of excavations irrespective of depth				
E	Rock irrespective of class	120	CM		
F	Excavate pit for column bases starting from stripped level not exceeding 1.50m deep	653	CM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Disposal				
A	Excavated material; backfilling depositing and compacting in layers maximum 150mm thick	1240	CM		
B	Surplus excavated material; removing from site	282	CM		
	Disposal of water				
C	Labour and materials, keeping excavations free from general water		Item		
	Planking & Struting				
D	Labour and materials, to uphold sides of excavation generally		Item		
	Filling				
	Hardcore				
E	300mm thick depositing and compacting layers maximum 150mm thick in making up levels	1068	SM		
	Murram				
F	Blinding surfaces of fill 50mm thick	1068	SM		
	Anti-Termite and Herbicide Treatment				
	Applying "Termidor 25 EC" solution or other equal and approved sprayed evenly				
G	To surface of fill and tops of foundation walls	1068	SM		
	Concrete works				
	Insitu concrete, reinforcement				
H	Plain mix 1:4:8 in foundation strip blinding 50mm thick	221	SM		
J	Ditto in column bases	240	SM		
K	Ditto mix 1:3:6 in steps and ramps	10	CM		
Carried forward to Collection					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Reinforced concrete class 1:2:4 in:-				
A	Foundation strips irrespective of depth	45	CM		
B	Column bases	85	CM		
C	Columns generally	14	CM		
D	Floor beds 100mm thick	1215	SM		
	Reinforcement				
	Bars : high tensile steel; cold worked; B.S. 4461 including bends, hooks, tying wire, distance blocks and spacers				
E	8 mm diameter bars	708	Kgs.		
F	10mm diameter bars	946	Kgs.		
G	12mm diameter bars	4,435	Kgs.		
H	16mm diameter bars	131	Kgs.		
J	20mm diameter bars	820	Kgs.		
	Bars : round mild steel; cold worked; B.S. 4449 including bends, hooks, tying wire, distance blocks and spacers				
K	8mm diameter bars; in any location	239	Kgs.		
	Fabric B.S. 4483				
L	Reference A142; mesh 200 x 200mm weight 2.22kgs per square metre (measured net - no allowance made for laps); including bends, tying wire and distance blocks in any location	1168	SM		
	Sawn form work to in situ concrete				
M	Edges of floor bed 75 to 150mm wide	141	LM		
N	Sides of vertical columns	125	SM		
P	Ditto but circular	39	SM		
Q	Sides of foundation strips	250	SM		
R	Edges of column bases	222	SM		
	Walling				
T	225mm thick approved local stone, roughly squared; bedding and jointing in cement mortar (1:4); reinforced with hoop iron gauge 500 in every alternate course	722	SM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Damp proof membranes				
	Polythene, 500 gauge, 150mm laps - no allowance made for laps				
A	Horizontal, 1 no. of layer(s) over 300mm wide	1068	SM		
	Plinth finishes				
	Render, cement and sand (1:4), wood floated				
B	12mm thick 2 no. coatwork, to concrete or masonry base (m/s), generally external	56	SM		
C	Ditto 20mm paving in steps finished smooth	30	SM		
D	12 mm thick in two coats render (1:6) to plinth area	97	SM		
	Painting; 3 coats black bituminous paint to; -				
E	Rendered surfaces externally	97	SM		
	Paving slabs				
	Precast concrete, class 20/ 20				
F	600 x 600 x 50mm thick slabs laid on and including 50mm (consolidated) bed of sand; jointed and pointed in cement sand (1:3) mortar, V-joints	227	SM		
Carried forward to Collection					
	COLLECTION				
	Brought forward from page no. K/ 1				
	Brought forward from page no. K/ 2				
	Brought forward from page no. K/ 3				
	Brought forward from above				
Carried forward to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 02				
	GROUND FLOOR FRAME				
	Vibrated reinforced *insitu* concrete (1:2:4) in				
A	Columns	33	CM		
B	Main and intermediate beams	33	CM		
C	150mm thick suspended slab	1106	SM		
	Reinforcement, as described, (ALL PROVISIONAL)				
	Bars : round mild steel; cold worked; B.S. 4449 including bends, hooks, tying wire, distance blocks and spacers				
D	8mm diameter bars	1,990	Kgs		
	Bars : high tensile steel; cold worked; B.S. 4461 including bends, hooks, tying wire, distance blocks and spacers				
E	25 mm diameter bar	109	Kgs		
F	20 mm diameter bar	652	Kgs		
G	16 mm diameter bar	2,243	Kgs		
H	12 mm diameter bar	1,603	Kgs		
J	10 mm diameter bar	5,609	Kgs		
K	8 mm diameter bar	1,741	Kgs		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Sawn formworrk to: -				
A	Vertical sides of column	328	SM		
B	Dittto, curved on plan to 150mm radius	104	SM		
C	Horizontal soffits of suspended slab	1106	SM		
D	Sides and soffites of main and intermediate beams	458	SM		
E	Edge of slab over 75 mm but not exceeding 225mm high	166	LM		
	Expansion joint				
F	20mm thick "Flexcell" or other equal and approved expansion joint filler between concrete surfaces	65	SM		
Carried forward to Collection					
	COLLECTION:				
	Brought forward from page K/ 5				
	Brought forward from above				
Total for Ground Floor Frame Element No 2 carried forward to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 03				
	2NO. STAIRCASES				
	Insitu concrete (1:2:4), reinforcement				
	Normal; class 20/ 20mm vibrated				
A	Stairs	7	CM		
B	150 mm thick landing	15	SM		
C	Stair beam	0.5	CM		
	Bars ; high tensile steel; cold worked; B.S. 4461 including bends, hooks, tying wire, distance blocks and spacers				
D	16mm diameter bars	35	Kgs		
E	12mm diameter bars	265	Kgs		
F	10mm diameter bars	118	Kgs		
G	8mm diameter bars	11.5	Kgs		
	Sawn formwork to; -				
H	Sloping soffits of stairs	28	SM		
J	Edge of stairs 300 mm wide	17	LM		
K	Horizontal soffits of landings	14	SM		
L	Ditto edge of landing 75 - 150 mm	15	LM		
M	Ditto sides of stair beam	4.5	SM		
N	Riser girth over 75mm - 150mm high	53	LM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	12 mm thick cement sand (1:6) plaster to;				
A	Stair beam	5	SM		
B	Sloping soffits of stairs	20	SM		
C	Horizontal soffit of landing	14	SM		
	20 mm thick cement sand (1:3) screed trowelled rough to receive terrazzo on;				
D	Tread 300 mm wide	73	LM		
E	Riser 150 mm high	86	LM		
F	Landing	14	SM		
G	Edge of stair 300 mm wide	17	LM		
	20 mm polished terrazzo on;				
H	Tread 300 mm wide	86	LM		
J	Riser 150 mm high	86	LM		
K	Landing	14	SM		
L	Edge of stair 300 mm wide	17	LM		
M	20 x 100 mm polished terrazzo skirting on stair	19	LM		
	Prepare and apply one undercoat and two finishing coats of vinyl matt plastic emulsion				
N	Stair beam	5	SM		
P	Sloping soffits of stairs	20	SM		
Q	Horizontal soffit of landing	14	SM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	STAIRCASE BALUSTRADE (PROVISIONAL)				
	Concrete sundries				
A	Form pocket not exceeding 100mm deep for fish-tailed end of 25 x 25mm square hollow section, and later make good with cement and sand (1:2) grout	66	No.		
B	Ditto for fish-tailed end of 50 x 25mm rectangular hollow section, and ditto	38	No.		
	The following in mild steel balustrading, including grinding all welds smooth				
	Rectangular hollow sections				
C	25 x 25 x 3.0mm baluster 985mm high, one end capped and other end fish-tailed and fixed into mortice (m.s.)	66	No.		
D	50 x 25 x 3mm baluster 1200mm long, one end fish-tailed and cast into mortice in concrete (m.s.) and other end welded to hand-rail	38	No.		
E	50 x 25mm spacer 50mm long, one side welded to sqare hollow section baluster and other end welded to and including 100 x 50 x 3mm thick plate drilled for and including screws	10	No.		
F	50 x 25 x 3mm handrail	15	LM		
G	50 x 25 x 3mm middle rail	15	LM		
H	50 x 25 x 3mm lower rail	15	LM		
J	Welded end	310	No.		
	Wrot camphor				
K	150 x 50mm handrail, with one labour	14	LM		
L	Splayed end	9	No.		
M	Wreath	6	No.		
N	150 x 25mm middle rail, with two labours	14	LM		
P	Splayed end	9	No.		
Q	Wreath	6	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Prepare and apply three coats of prime grade gloss paint to:				
A	Intermediate balluster girth not exceeding 100 mm	63	LM		
B	Main balluster girth 100 - 200 mm	36	LM		
C	Handrail, middle and lower rails: girth 100 - 200 mm	42	LM		
	Prepare and apply three coats of polyurethane lacquer varnish to:				
D	Timber handrail, middle and lower rails	7	SM		
	Carried forward to Collection				
	COLLECTION:				
	Brought forward from page K/ 7				
	Brought forward from page K/ 8				
	Brought forward from page K/ 9				
	Brought forward from above				
	Total for Element No 03 2No Staircase carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 04				
	RAMP				
	Insitu concrete (1:2:4), reinforcement Normal; class 20/ 20mm vibrated				
A	Ramp	9	CM		
B	150 mm thick ramp landing	28	SM		
C	Ramp beam	6	CM		
	Bars : high tensile steel; cold worked; B.S. 4461 including bends, hooks, tying wire, distance blocks and spacers				
D	16mm diameter bars	105	Kg		
E	12mm diameter bars	1700	Kg		
F	10mm diameter bars	352	Kg		
G	8mm diameter bars	343	Kg		
	Sawn formwork to: -				
H	Sloping soffits of ramp	55	SM		
J	Horizontal soffits of ramp	28	SM		
K	Horizontal soffits of landings	20	SM		
L	Sides of ramp beam	90	SM		
M	Edge of ramp landing	25	LM		
	Walling				
N	200 mm thick concrete block walling laid with (1:3) cement sand mortar with hoop iron in every second course	50	SM		
P	12 mm thick (1:1:6) cement lime sand plaster to block wall	98	SM		
Q	Prepare and apply three coats of plastic emulsion paint on plastered surface	98	SM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	12 mm thick cement sand (1:6) plaster to:				
A	Ramp beam	90	SM		
B	Sloping soffits of ramp	55	SM		
C	Horizontal soffit of ramp landing	28	SM		
	20 mm thick cement sand (1:3) screed trowelled rough to receive terrazzo on:				
D	Sloping ramp	55	SM		
E	Horizontal soffit of ramp landing	28	SM		
F	Edge of ramp landing girth 150 mm high	40	LM		
	20 mm polished terrazzo on:				
G	Sloping ramp	55	SM		
H	Horizontal soffit of ramp landing	28	SM		
J	Edge of ramp landing girth 150 mm high	37	LM		
	Prepare and apply one undercoat and two finishing coats of vinyl matt plastic emulsion paint to:				
K	Ramp beam	90	SM		
L	Sloping soffit of ramp	55	SM		
M	Horizontal soffit of ramp landing	28	SM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	RAMP BALUSTRADE (PROVISIONAL)				
	Concrete sundries				
A	Form pocket not exceeding 100mm deep for fish-tailed end of 25 x 25mm square hollow section, and later make good with cement and sand (1:2) grout	330	No.		
B	Ditto for fish-tailed end of 50 x 25mm rectangular hollow section, and ditto	170	No.		
	The following in mild steel balustrading, including grinding all welds smooth				
	Rectangular hollow sections				
C	25 x 25 x 3.0mm baluster 985mm high, one end capped and other end fish-tailed and fixed into mortice (m.s.)	330	No.		
D	50 x 25 x 3mm baluster 1200mm long, one end fish-tailed and cast into mortice in concrete (m.s.) and other end welded to hand-rail	170	No.		
E	50 x 25mm spacer 50mm long, one side welded to sqare hollow section baluster and other end welded to and including 100 x 50 x 3mm thick plate drilled for and including screws	12	No.		
F	50 x 25 x 3mm handrail	75	LM		
G	50 x 25 x 3mm middle rail	75	LM		
H	50 x 25 x 3mm lower rail	75	LM		
J	Welded end	1500	No.		
	Wrot camphor				
K	150 x 50mm handrail, with one labour	75	LM		
L	Splayed end	12	No.		
M	Wreath	12	No.		
N	150 x 25mm middle rail, with two labours	75	LM		
P	Splayed end	12	No.		
Q	Wreath	12	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Painting and decorating **On metalwork** **Touch up primer, prepare and apply two undercoats and one gloss finishing coat oil paint on the following steel surfaces internally:-**				
A	Surfaces not exceeding 100 mm girth	330	LM		
B	Surfaces over 100 but not exceeding 200 mm girth	390	LM		
	On woodwork **Prepare and apply three coats of polyurethane clear lacquer varnish on the following woodwork surfaces internally:**				
C	General surfaces	60	SM		
Carried forward to Collection					
	COLLECTION: Brought forward from page K/ 11 Brought forward from page K/ 12 Brought forward from page K/ 13 Brought forward from above				
Total for Element No 04 Ramp carried to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 05				
	WALLING				
	Masonry				
A	200mm thick chisel-dressed on one side approved natural stone walling bedded and jointed in cement sand (1:3) mortar, reinforced every alternative course, with neat horizontally raked joints and flush vertical externally as work proceeds, internal left plain in readiness for plastering	272	SM		
B	Ditto (internal walling)	701	SM		
C	100 mm ditto	23	SM		
D	Form or leave 250 x 250mm opening in 200mm walling	64	No.		
E	225 x 225mm precast concrete permanent ventillation mosquito gauzed laid in cement sand (1:3) mortar	128	No.		
	Damp proof courses				
	B.S. 743, type A, bitumen hessian base 150mm laps, no allowances made for laps				
F	200mm wide, bedded in cement sand mortar (1:3)	452	LM		
	Total for Element No 05 Ground Floor Walling Carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 06				
	WINDOWS				
	Precast concrete, normal, class 20/ 20mm vibrated				
A	Sills 175 x 75mm thick, once sunk weathered, once throated, reinforced as necessary for handling, bedding, jointed and pointing in cement sand mortar (1:4)	100	LM		
	Joinery, wrot camphor				
B	150 x 25mm window-boards including rounded edges and 25 x 25mm bearers	100	LM		
C	20 mm diameter hollow section metal curtain rail complete with curtain rings, rollers, hardwood end brackets(2No) and all other accessories, length 3000 mm	5	No		
D	Ditto length 2400 mm	24	No		
E	Ditto length 3600 mm	7	No		
	Accessories				
	Metal work				
	Purpose made units				
	Casement window standard metal casement sections, permanent ventilators comprising T-bar gauze and metal hood to full width of window, one coat primer by manufacturer complete with all necessary ironmongery, steel for glazing with putty, lugs to two jamps, cutting and pinning to concrete or blockwork, fixing to head and sill with screws and plugging				
F	Overall size 2700 x 2500 mm high	5	No.		
G	Overall size 2000 x 2500 mm high	24	No.		
H	Overall size 3300 x 1900mm high	6	No.		
J	Overall size 3300 x 900mm high	1	No.		
K	Overall size 1800 x 900mm high	2	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Welded metal grill burglar proofing in 25mm SHS bars with openable lower half, one coat primer including cutting and pinning to concrete or masonry fixing head and sill with screws and plugging				
A	Overall size 2700 x 2500 mm high	5	No.		
B	Overall size 2000 x 2500 mm high	24	No.		
C	Overall size 3300 x 1900mm high	6	No.		
D	Overall size 3300 x 900mm high	1	No.		
E	Overall size 1800 x 900mm high	2	No.		
	Glazing				
F	4mm thick clear sheet glass to metal with putty 1.00 to 1.50 square metres	193	SM		
G	Ditto but obscure	32	SM		
	Painting and decorating				
	One undercoat two finishing coats oil paint full gloss finish to Crown Paints or equal and approved				
H	Wood surfaces 200 to 300mm girth external	100	LM		
J	Metal window surfaces over 300mm girth	395	SM		
K	Ditto grill surfaces	395	SM		
L	Concrete surfaces 200 to 300mm girth external	100	LM		
	One coat aluminium hardwood primer to Crown Paints or equal and approved				
M	Wood surfaces before fixing 100 to 200mm girth internal	100	LM		
Carried forward to Collection					
	COLLECTION:				
	Brought forward from page K/ 16				
	Brought forward from above				
Total for Ground Floor Windows Element No 06 Carried to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 07				
	DOORS				
	The following in wrot mahogany or other equal and approved Hardwood				
A	50 mm thick panelled door size 800 x 2400 mm	4	No.		
B	Ditto but overall size 800 x 2,400mm high	4	No.		
C	Ditto but overall size 850 x 2,400mm high	4	No.		
D	Ditto but overall size 850 x 3,350mm high	2	No.		
E	Ditto but overall size 1550 x 3,350mm high	4	No.		
	Joinery				
	Frames, wrot mahogany or equivalent hardwood				
F	150 x 50mm rebated	148	LM		
G	150 x 50 transom	44	LM		
H	20 x 25mm glazing beads	23	LM		
J	Ditto quadrant	148	LM		
K	45 x 25mm architraves	148	LM		
	Flush doors, B.S. 459, part 2				
L	Single solid core door 45mm thick, 800 x 2,055 mm high mahogany veneered facing and hardwood lipping all edges	10	No.		
M	Ditto size 850 x 2055 mm high	5	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Glazing				
A	5mm thick clear sheet glass to casement with putty 0.10 to 0.50 square metres	3	SM		
	Ironmongery				
	Supply and fix the folowing				
B	Steel brass coated butt hinges 100mm	45.5	Prs.		
C	225 x 25 x 3mm thick door fixing cramps one end bent and twice screwed to frame and the other end fanged and built in to blockwork	86	No.		
D	Door stops No. 8400	33	No.		
E	2-lever "Union" mortice lock complete with set lever handle furniture	14	No.		
F	3-lever mortice lock catalogue No. 2237 complete with set lever handle furniture	9	No.		
G	Indicator bolt No. 8094	5	No.		
H	Male/ female sign	2	No.		
J	Brass coated barrel bolt 150 mm long	8	No.		
	Painting and decorating				
	One coat aluminium hardwood primer to Crown Paints or equal and approved				
K	Wood surfaces before fixing not exceeding 100mm girth internal	148	LM		
L	Ditto 100 to 200mm girth	148	LM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<u>One undercoat two finishing coats polyurethane laquer to Crown Paints or equal and approved</u>				
A	Wood surfaces over 300mm girth external/ internal	145	SM		
B	Wood surfaces 200 to 300mm girth external	148	LM		
C	Ditto surfaces over 300mm girth (transom)	18	SM		
Carried forward to Collection					
	<u>COLLECTION:</u>				
	Brought forward from page K/ 18				
	Brought forward from page K/ 19				
	Brought forward from above				
Total for Element No 07 Ground Floor Doors Carried to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 08				
	FINISHES				
	FLOORS				
A	32 mm thick cement and sand (1:4) coloured paving screed	447	SM		
B	20 mm ditto to receive terrazzo	615	SM		
C	20mm thick terrazzo paving machine polished	615	SM		
D	20 x 100m high polished terrazzo skirting, rounded junction with wall finish and coved junction with floor	738	LM		
E	Dividing strips PVC 3 x 25mm setting in terrazzo (Provisional)	2153	LM		
F	100 x 25 mm cement sand skirting	330	LM		
	WALLS				
G	12mm thick, 2 No. coat work plaster 1:1:6 to concrete or masonry base (m/s) generally, walls internal steel trowelled	1575	SM		
H	15mm thick, 2 No. coatwork cement sand (1:4) render to concrete or masonry base externally	320	SM		
Carried forward to Collection					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	CEILINGS				
A	12mm thick cement lime sand (1:1:6) plaster on ceiling	803	SM		
	Painting and decorating				
	Three coats PCA based emulsion paint to Crown Paints or equal and approved				
B	Plastered wall surfaces over 300mm girth internal	1575	SM		
C	Ditto soffits of suspended ceiling	803	SM		
D	Rendered wall surfaces over 300mm girth external	320	SM		
E	12mm thick cement sand (1:4) backing to receive wall tiles (m/s)	100	SM		
F	250 x 300 x 8m thick coloured ceramic wall tiles on screed backing fixed with approved adhesive	100	SM		
G	Exta over ditto for rounding face	36	LM		
H	Key pointing of dressed natural stone external walling along horizontal joints	549	SM		
Carried forward to Collection					
	COLLECTION				
	Brought forward from page K/ 21				
	Brought down from above				
Total for Element No. 08 Ground Floor Finishes carried to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SUMMARY **GROUND FLOOR WORKS** SUBSTRUCTURE FROM PAGE K/ 4 GROUND FLOOR FRAME FROM PAGE K/ 6 STAIRCASE PAGE K/ 10 RAMP PAGE K/ 14 GROUND FLOOR WALLING FROM PAGE K/ 15 GROUND FLOOR WINDOWS PAGE K/ 17 GROUND FLOOR DOORS PAGE K/ 20 GROUND FLOOR FINISHES PAGE K/ 22				
TOTAL FOR GROUND FLOOR WORKS CARRIED TO MAIN SUMMARY					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	FIRST FLOOR WORKS				
	ELEMENT NO. 01				
	REINFORCED CONCRETE FRAME				
	Vibrated reinforced *insitu* concrete (1:2:4) in				
A	Columns	23	CM		
B	Main and intermediate beam	50	CM		
C	150mm thick suspended slab	50	SM		
	Reinforcement, as described, (ALL PROVISIONAL)				
	Bars : round mild steel; cold worked; B.S. 4449 including bends, hooks, tying wire, distance blocks and spacers				
D	8mm diameter bars	732	Kgs		
	Bars : high tensile steel; cold worked; B.S. 4461 including bends, hooks, tying wire, distance blocks and spacers				
E	25 mm diameter bar	109	Kgs		
F	20 mm diameter bar	652	Kgs		
G	16 mm diameter bar	2,243	Kgs		
H	12 mm diameter bar	1,603	Kgs		
J	10 mm diameter bar	255	Kgs		
K	8 mm diameter bar	80	Kgs		
Carried forward to Collection					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Sawn formwork to: -				
A	Vertical sides of column	328	SM		
B	Dittto, curved on plan to 150mm radius	75	SM		
C	Horizontal soffits of suspended slab	50	SM		
D	Sides and soffits of main and intermediate beams	458	SM		
E	Edge of slab over 75 mm but not exceeding 225mm high	166	LM		
	Expansion joint				
F	20mm thick "Flexcell" or other equal and approved expansion joint filler between concrete surfaces	65	SM		
	Carried forward to Collection				
	COLLECTION:				
	Brought forward from page K/ 24				
	Brought forward from above				
	Total for Element No 01 First Floor RC Frame carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 02 **WALLING** **Masonry**				
A	200mm thick chisel-dressed on one side approved natural stone walling bedded and jointed in cement sand (1:3) mortar, reinforced every alternative course, with neat horizontally raked joints and flush vertical externally as work proceeds, internal left plain in readiness for plastering	230	SM		
B	Ditto (internal walling)	592	SM		
C	100 mm ditto	17	SM		
D	Form or leave 250 x 250mm opening in 200mm walling	63	No.		
E	225 x 225mm precast concrete permanent ventillation mosquito gauzed laid in cement sand (1:3) mortar	126	No.		
Total for Element No. 02 First Floor Walling carried to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 03				
	WINDOWS				
	Precast concrete, normal, class 20/ 20mm vibrated				
A	Sills 175 x 75mm thick, once sunk weathered, once throated, reinforced as necessary for handling, bedding, jointed and pointing in cement sand mortar (1:4)	93	LM		
	Joinery, wrot camphor				
B	150 x 25mm window-boards including rounded edges and 25 x 25mm bearers	93	LM		
C	20 mm diameter hollow section metal curtain rail complete with curtain rings, rollers, hardwood end brackets(2No) and all other accessories, length 3000 mm	4	No		
D	Ditto length 2400 mm	21	No		
E	Ditto length 3600 mm	4	No		
F	Ditto length 1800 mm	1	No		
G	Ditto length 2100 mm	5	No		
	Accessories				
	Metal work				
	Purpose made units				
	Casement window standard metal casement sections, permanent ventilators comprising T-bar gauze and metal hood to full width of window, one coat primer by manufacturer complete with all necessary ironmongery, steel for glazing with putty, lugs to two jamps, cutting and pinning to concrete or blockwork, fixing to head and sill with screws and plugging				
H	Overall size 2700 x 1500 mm high	4	No.		
J	Overall size 2000 x 1500 mm high	21	No.		
K	Overall size 3300 x 900mm high	4	No.		
L	Overall size 1500 x 1500mm high	1	No.		
M	Overall size 1800 x 900mm high	7	No		
N	Overall size 1500 x 900mm high	1	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Glazing				
A	4mm thick clear sheet glass to metal with putty 1.00 to 1.50 square metres	103	SM		
B	Ditto but obscure	3	SM		
	Painting and decorating				
	One undercoat two finishing coats oil paint full gloss finish to Crown Paints or equal and approved				
C	Wood surfaces 200 to 300mm girth external	93	LM		
D	Metal window surfaces over 300mm girth	206	SM		
E	Concrete surfaces 200 to 300mm girth external	93	LM		
	One coat aluminium hardwood primer to Crown Paints or equal and approved				
F	Wood surfaces before fixing 100 to 200mm girth internal	93	LM		
Carried forward to Collection					
	COLLECTION:				
	Brought forward from page K/ 27				
	Brought forward from above				
Total for Element No 03 First Floor Windows Carried to Summary					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 04				
	DOORS				
	Joinery				
	Frames, wrot mahogany or equivalent hardwood				
A	150 x 50mm rebated	148	LM		
B	150 x 50 transom	24	LM		
C	20 x 25mm glazing beads	48	LM		
D	Ditto quadrant	148	LM		
E	45 x 25mm architraves	148	LM		
	Flush doors, B.S. 459, part 2				
F	Single solid core door 45mm thick, 850 x 2055 mm high mahogany veneered facing and hardwood lipping all edges	5	No.		
G	Ditto size 800 x 2055 mm high	13	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Panel doors				
A	**In wrot mahogany or equivalent hardwood** 50 mm thick door overall size 900 x 2400 mm high panels filled in with and including 50 mm thick (average) moulded panel and beading all round	7	No.		
B	Ditto size 850 x 2400 mm high	2	No.		
C	Ditto size 600 x 2400 mm high	7	No.		
	Glazing				
D	5mm thick clear sheet glass to casement with putty 0.10 to 0.50 square metres	4	SM		
	Ironmongery				
	Supply and fix the folowing				
E	Brass coated steel butt hinges 100mm	51	Prs.		
F	225 x 25 x 3mm thick door fixing cramps one end bent and twice screwed to frame and the other end fanged and built in to blockwork	133	No.		
G	Door stops No. 8400	29	No.		
H	2-lever "Union" mortice lock complete with set lever handle furniture	20	No.		
J	3-lever mortice lock catalogue No. 2237 complete with set lever handle furniture	9	No.		
K	Indicator bolt No. 8094	5	No.		
L	Male/ female sign	2	No.		
M	Brass coated barrel bolt 150 mm long	8	No.		
	Painting and decorating				
	One coat aluminium hardwood primer to Crown Paints or equal and approved				
N	Wood surfaces before fixing 100 to 200 mm girth internal	148	LM		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	One undercoat two finishing coats polyurethane laquer to Crown Paints or equal and approved				
A	Wood surfaces over 300mm girth external/ internal	115	SM		
B	Wood surfaces 200 to 300mm girth external	148	LM		
C	Ditto surfaces not exceeding 100mm girth	296	LM		
D	Ditto transom	10	SM		
	Carried forward to Collection				
	COLLECTION:				
	Brought forward from page K/ 29				
	Brought forward from page K/ 30				
	Brought forward from above				
	Total for Element No 04 First Floor Doors Carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 05				
	FINISHES				
	FLOORS				
A	32 mm thick cement and sand (1:4) coloured paving screed	885	SM		
B	25 mm ditto to receive terrazzo	45	SM		
C	20mm thick terrazzo paving machine polished on floor	45	SM		
D	20 x 100m high polished terrazzo skirting, rounded junction with wall finish and coved junction with floor	34	LM		
E	Dividing strips PVC 3 x 25mm set in terrazzo paving (Provisional)	158	LM		
F	100 x 25 mm cement sand skirting fixed	445	LM		
	WALLS				
G	12mm thick, 2 No. coat work plaster 1:1:6 to concrete or masonry base (m/s) generally, walls internal steel trowelled	1365	SM		
H	15mm thick, 2 No. coatwork cement sand (1:4) render to concrete or masonry base externally	204	SM		
Carried forward to Collection					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	CEILINGS				
A	12mm thick cement lime sand (1:1:6) plaster on suspended ceiling slab at water tanks base	60	SM		
	Painting and decorating				
	Three coats PCA based emulsion paint to Crown Paints or equal and approved				
B	Plastered wall surfaces over 300mm girth internal	1365	SM		
C	Ditto soffits of suspended ceiling	930	SM		
D	Rendered wall surfaces over 300mm girth external	204	SM		
E	12mm thick cement sand (1:4) backing to receive wall tiles (m/s)	29	SM		
F	200 x 300 x 6 mm thick coloured ceramic wall tiles on screed backing fixed with approved adhesive	29	SM		
G	Key pointing along horizontal joints in 200 mm thick external walling	230	SM		
	Total carried to Collection				
	COLLECTION				
	Brought forward from page K/ 32				
	Brought down from above				
	Total for Element No. 05 First Floor Finishes carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 06				
	WALKWAY BALUSTRADE (PROVISIONAL)				
	Concrete sundries				
A	Form pocket not exceeding 100mm deep for fish-tailed end of 25 x 25mm square hollow section, and later make good with cement and sand (1:2) grout	469	No.		
B	Ditto for fish-tailed end of 50 x 25mm rectangular hollow section, and ditto	239	No.		
	The following in mild steel balustrading, including grinding all welds smooth				
	Rectangular hollow sections				
C	25 x 25 x 3.0mm baluster 985mm high, one end capped and other end fish-tailed and fixed into mortice (m.s.)	469	No.		
D	50 x 25 x 3mm baluster 1200mm long, one end fish-tailed and cast into mortice in concrete (m.s.) and other end welded to hand-rail	239	No.		
E	50 x 25mm spacer 50mm long, one side welded to sqare hollow section baluster and other end welded to and including 100 x 50 x 3mm thick plate drilled for and including screws	24	No.		
F	50 x 25 x 3mm handrail	106	LM		
G	50 x 25 x 3mm middle rail	106	LM		
H	50 x 25 x 3mm lower rail	106	LM		
J	Welded end	2124	No.		
	Wrot camphor				
K	150 x 50mm handrail, with one labour	105	LM		
L	Splayed end	16	No.		
M	Wreath	16	No.		
	Carried forward to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Painting and decorating **On metalwork** **Touch up primer, prepare and apply two undercoats and one gloss finishing coat oil paint on the following steel surfaces internally:-**				
A	Surfaces not exceeding 100 mm girth	464	LM		
B	Surfaces over 100 but not exceeding 200 mm girth	345	LM		
	On woodwork **Prepare and apply three coats of polyurethane clear lacquer varnish on the following woodwork surfaces internally:**				
C	General surfaces	84	SM		
	Carried forward to Collection				
	COLLECTION: Brought forward from page K/ 34 Brought forward from above				
	Total for Element No 06 Walkway Balustrade carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 07				
	ROOFING				
	Roof covering				
A	28 gauge pre-painted IT4 resincot corrugated iron sheets fixed to steel purlins (m/s)	1350	SM		
B	28 gauge pre-painted ridge cap	70	LM		
C	Valley or hip cap	52	LM		
	Unframed structural steel work, factory primed before delivery to site and to be executed by an approved Sub-Contractor				
	Steel trusses				
D	100 x 50 x3mm rectangular hollow section rafter	350	LM		
E	100 x 50 x3mm rectangular hollow section joist	320	LM		
F	75 x 50 x 3mm rectangular hollow section struts/ ties	550	LM		
G	125 x 50 x 3mm "Z" purlins	1050	LM		
H	16mm diameter sag rods threaded for and including nuts and washers and drilling holes through "Z" purlins	520	LM		
J	50 x 50 x 3mm square hollow section angle braces	445	LM		
	Plates, Cleats, etc.				
K	6 mm thick plate size 325 x 100 mm six times drilled for 12 mm diameter bolt	60	No.		
L	12 mm thick plate size 250 x 150 mm, four times drilled for 16 mm diameter bolts and one face welded to joist	60	No.		
	Bolts and nuts to B. S. 4190				
M	12 mm diameter bolt 80 mm long with head, nut and two washers	350	No.		
N	16 mm ditto, 225 long with ditto	235	No.		
P	75 x 50 mm brandering	1950	LM		
Q	50 x 50 mm brandering	2350	LM		
Carried forward to Collection					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Painting and decorating **One undercoat two finishing coats oil paint full gloss finish to Crown Paints or equal and approved** **Ceilings**				
A	12 mm thick chipboard fixed on to brandering with clout nails	1267	SM		
B	Prepare and apply three coats of plastic emulsion paint on suspended ceiling	1267	SM		
C	75 x 50 mm cypress cornice on ceiling	565	LM		
	Carried forward to Collection				
	COLLECTION: Brought forward from page K/ 36 Brought forward from above				
	Total for Element No 07 Roofing carried to Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SUMMARY **FIRST FLOOR WORKS** FIRST FLOOR RC FRAME FROM PAGE K/ 25 FIRST FLOOR WALLING FROM PAGE K/ 26 FIRST FLOOR WINDOWS PAGE K/ 28 FIRST FLOOR DOORS PAGE K/ 31 FIRST FLOOR FINISHES PAGE K/ 33 WALKWAY BALUSTRADE PAGE K/ 33 ROOFING FROM PAGE K/ 37				
TOTAL FOR FIRST FLOOR WORKS CARRIED TO MAIN SUMMARY					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	MAIN SUMMARY GROUND FLOOR BUILDERS WORKS FROM PAGE K/ 23 FIRST FLOOR BUILDERS WORKS FROM PAGE K/ 38				
TOTAL FOR BILL NO. 2 BUILDERS' WORKS CARRIED TO GRAND SUMMARY					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	EXTERNAL WORKS				
	90,000 LITRE CAPACITY SEPTIC TANK FOR 400 PERSONS AND ASSOCIATED SOAKAGE AREA				
	EXCAVATION				
	Excavate in pit for septic tank starting from ground level				
A	Depth not exceeding (n.e) 1.5 m	cm	10		
B	Ditto depth not limited to (n.i.t) 5 m but n.e 2.0m	cm	10		
C	Ditto depth not limited to 2.0 m but n.e 2.5 m	cm	10		
D	Ditto depth not limited to 2.5 m but n.e 3.0 m	cm	10		
E	Ditto depth not limited to 3.0 but n.e 3.5m	cm	124		
F	Ditto but not limited to 3.5 but n.e 4.0 m	cm	259		
G	Trim bottom of excavated surface	Sm	73		
H	Extra over for excavated in rock class 11	cm	228		
	TOTAL CARRIED TO COLLECTION				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SEPTIC TANK cont'd				
A	Mix and place 50 mm concrete blinding	cm	5		
	Vibrated reinforced concrete class 20/20 (mix 1:2:4)				
B	Mix and place 200 mm concrete in base slab	cm	15		
C	Ditto but in 250 thick wall	cm	37		
D	Ditto but in 200 mm thick wall	cm	15		
E	Ditto but in 150 mm thick scum baffle wall	cm	5		
F	Ditto but in 200 mm suspended cover slab	cm	14		
	Mild steel reinforcement to B.S 4449				
G	8 mm diameter	Kg	205		
H	10 mm diameter bars	Kg	115		
I	12 mm diameter bars	Kg	3,738		
J	16 mm diameter bars	Kg	3,531		
	High yield square twisted reinforcement steel B.S 4461				
K	10 mm diameter bars	Kg	135		
L	12mm diameter bars	Kg	170		
M	16 mm diameter bars	Kg	401		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	BRC mesh reinforcement to B.S 1483 Concrete class 15 (mix 1:3:6)				
A	BRC mesh No. 65/66	Sm	90		
	Formwork Sawn formwork to :-				
B	Interior sides of vertical walls	Sm	166		
C	External sides of vertical walls	Sm	144		
D	Soffit of suspended slab	Sm	61		
E	Sides of suspended slab 150 mm 225 wide	M	44		
F	Ditto sides of entry and exit manhole	Sm	6		
G	Boxing in formwork to form opening in cover slab for 600 x 450 manhole cover and frame 150 mm - 225 wide	M	10		
H	Return fill and ram selected approved materials around external sides of septic tank	Cm	125		
	WATER PROOF CEMENT RENDERING				
I	12 mm thick sulphate resisting cement sand (mix 1:3) to base slab	Sm	70		
J	Ditto to sides of vertical walls	Sm	185		
	Total carried to Collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	FRENCH DRAINS				
	Excavate trench for agricultural pipe n.e 200 mm in diameter for french drains to detailed drawing No.(50) 5344, back fill after laying of pipes and cart away surplus excavated materials				
A	Depth to invert n.e 1.5 m	cm	200		
B	Ditto depth n.1.t.1.5 m but n.e 2.0	cm	55		
C	Provide and lay 100 mm diameter agricultural pipes in french drains include for all other materials as per drawing No. (50 0 5344	Lm	255		
D	Cultivate within soakage area , provide and spread 100 mm thick layer red soil mixed with manure (ratio manure: red soil = 1:6) plant kikuyu grass maintain till established	Sm	150		
	DISTRIBUTION MANHOLES				
	Excavate pit for rectangular distribution manhole as per detailed drawing No.(50) 5351				
E	Depth n.e 1.5 m	cm	5		
F	Ditto depth n.1t 1.5m but n.e 2.0 m	cm	5		
	Concrete class 15 (mix 1:3:6)				
G	Mix and place 50 mm thick blinding to manhole	cm	5		
	Vibrated concrete class 20/20				
H	Mix and place 150 mm thick concrete 20 as bases slab	Sm	20		
I	Ditto in 150 mm thick reinforced concrete cover slab	Sm	15		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Distribution manholes Cont.d				
	Walling				
A	200 mm thick dressed stone	Sm	15		
B	12 mm thick water proof cement rendering to vertical walls and base slab	Sm	15		
	SOAKPITS				
C	Excavate pit for circular soak pit as per detailed drawing No. (50) 5345, depth not less than 3.0 m n.e 5.0 m	cm	72		
	Concrete class 15 (mix 1:3:6)				
D	Mix and place 50 m thick concrete blinding in strip footing	cm	5		
E	Ditto but 100 mm thick strip footing	cm	5		
	Walling				
F	150 thick dressed natural stone to detailed 50 (5345)	cm	12		
G	12 mm thick water proof cement rendering to vertical walls		90		
	Vibrated reinforced concrete class 20/20 (mix 1:3:6)				
H	Mix and place concrete class 20/20 in 150 mm thick suspended slab	cm	5		
	Mild steel reinforcement bars to B.S 4449				
I	12 mm diameter round bars	Kg	192		
J	Provide 200 mm diameter stone blocks or hardcore in soak pits	cm	59		
K	Provide and fix 600 x 450 mm medium duty c.1 manhole cover and frame to B.S 497	No	16		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Collection (Septic tank)				
	Brought forward from page..... ST/1				
	Brought forward from page..... ST/2				
	Brought forward from page..... ST/3				
	Brought forward from page..... ST/4				
	Brought forward from page..... ST/5				
	SUB -TOTAL				
	Total for Bill No. 5 External Works (Septic Tank) carried to Grand Summary				

BILL NO. 3

MECHANICAL WORKS

MECHANICAL WORKS

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF WATER RETICULATION, PLUMBING, DRAINAGE, SANITARY FITTINGS AND FIRE APPLIANCES

MECHANICAL BUILDING SERVICES WORKS TO THE PROPOSED TWIN WORKSHOP, CLASSROOMS AND OFFICE BLOCK FOR NEW TTIs IN CONSTITUENCIES.

TENDER REQUIREMENTS:

Eligible Mechanical Sub-contractors must meet the following requirements:

- **Proof of current registration with National Construction Authority NCA 7 and Above**
- **Certificate of incorporation.**
- **Valid Tax Compliance Certificate**
- **Proof of similar works and their value undertaken within the last three years.**
- **Proof of key Personnel proposed for execution of the works and Plant and Equipment owned by the firm.**
- **Proof on financial standing of the firm including audited accounts for the last three years; evidence of access to lines of credit and availability of other financial resources.**
- **Litigation history of the company.**

PART A

SUB-CONTRACT PRELIMINARIES

A. CONTRACT

The successful tender will be appointed as a Nominated domestic sub-contractor to the main contractor under the Directorate of public works conditions of contract.
He will be required to enter into a domestic sub- contract with the main contractor indemnifying him against the same liabilities in respect of the domestic sub-contract worksas those for which the main contractor is liable to indemnify the
Government under the contract.

The domestic sub-contract agreement shall be the latest edition of agreement and schedule of conditions of building domestic sub-contract published by the Kenya Association of Building and Civil Engineering Contractors.

The particular and general preliminaries or the Bill of Quantities for the main Contract where appropriate shall apply equally to the domestic sub-contract who is to examine these section of the Bill and allow for all costs incurred.
Copies of the domestic sub-contract agreement, conditions of contract, Bills of Quantities for the main contract can be seen at the office of the Directorate of Public Works.

B. BOND

All Domestic tenderers will submit the name of an approved surety who will be willing tobe bound to the main contractor in an amount equal to 5% of the sub-contract amount as clause 31 of the main contract.

C. PAYMENTS

Payment will be made through certification to the main contractor, unless he specificallyagrees to forgo this right in which case direct payment can be made to the domestic sub- contractor. All payments will be less retention as specified in the main contract. No payment will become due until materials are delivered to the site.

D. FIRM PRICES CONTRACT

Unless otherwise specifically stated in the preliminaries, this is affirm price contract and the domestic sub-contractor must allow in this tender for anyincrease in the cost of labour and/or materials during the currency of the domestic sub-contract. No claim for increased costs will be entertained excepting onlyduties defined in condition No.30 of the conditions of contract. No claim will be for currency fluctuations.

E. TRADE NAMES

Where trade names or manufacture's catalogue numbers are nominated in the specification, the reference is intended as a guide to the type of articlesor quality of material required. Alternate Brands of equal and approved quality will be acceptable.

F. WATER AND ELECTRICITY FOR THE WORKS.

The main contractor will make these available. The domestic sub-contractor shall be liable for the cost of any water or electricity current used for any installation providedespecially for his or her own use by the main contractor.

G. STORAGE

The main contractor will provide space for storage on the site, but the domestic sub-contractor will be responsible for provision of any lock-up sheds or stores required.

H. SAMPLES

The domestic sub-contractor shall finish at their own cost any samples of materials or Workmanship that may be called for by the project manager. For his approval, and further samples in case of rejection until suchsamples are approved by the project manager. And the project manager. May reject any materials or workmanship in his
opinion up to approved Standard.

I. PROTECTION

The domestic sub-Contract shall adequately cover and protect his own work toprevent injury and also to cover from damage all parts of the building premises where work is being performed by him under the contract.

J. HANDING OVER

The domestic sub-Contract works shall be considered complete and the defectliability period shall commence only when the domestic sub-contract works and supporting services have been tested, commissioned and operated to the satisfaction of the project Manager and officially approved and accepted by the Employer, provided always that the handing over of the domestic sub-contract works shall be coincident with the handing over of the Maincontract Works.

K. DEFECT AFTER COMPLETION

The defects liability period will be six months from the date of completion of the Main Contract as certified by the project Manager.

L. DAMAGES FOR DELAYS

Liquidated and Ascertained damaged as started in the Main ContractAgreement will be claimed against the Main Contract for anyUnauthorized delay in completion. The domestic sub- contractor will be liableFor the whole or a portion of these damage should he cause delay in completion.

M. CLEAR AWAY ON COMPLETION

The domestic sub-Contract shall, upon completion of works, at his own Expense remove and clear away all plants, equipment, rubbish and used materials, and shall leave the whole of the works in a clean and tidy state, tothe satisfaction of the Project Manager on completion, the whole of the Works shall be delivered up clean, complete and perfect in every respect
to the satisfaction of the Project Manager.

N. SITE CONDITION

The Domestic Sub-contractor shall be deemed to have visited the site to Ascertain all conditions affecting his domestic sub-contract. No claims will beallowed due to lack of Knowledge in this respect.

PART B

GENERAL MECHANICAL SPECIFICATION

INDEX

CLAUSE NO.		PAGE NO.
1.	GENERAL	B/2
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3.	REGULATIONS AND STANDARDS	B/2
4.	ELECTRICAL REGUIREMENTS	B/3
5.	TRASPORT AND STORAGE	B./3
6.	SITE SUPERVISION	B/3
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8.1	GENERAL	B/3
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PART B

GENERAL MECHANICAL SPECIFICATION

1. GENERAL

This section specifies the general requirements for plants, equipment and material forming part of the domestic sub-contract Works and shall apply except where specifically stated elsewhere in the specification or the contract Drawing.

2. QUALITY OF MATERIALS

All plants, equipment and material supplied as part of the domestic sub-contract Works shall be new and of first-class commercial quality, shall be free from Defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or material not manufactured by the domestic sub-contract shall be of the products of reputable manufacturers and so far as the provisions of the specification is concerned shall be as if they had been manufactured by the sub-contractor.

Materials and apparatus required for the complete installation as called for by the specification Contract Drawing shall be supplied by the domestic Sub-Contract unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connected by the domestic sub-contractor shall be carefully examined on receipt and stored. Should any defects be noted, the domestic sub-contractor shall immediately notify the Engineer. Defectives equipment or that damage in the course of installation or test shall be replace or required to the approval of the Engineer.

3. REGULATIONS AND STANDARDS.

The domestic sub-contract Works shall comply with the current editions of the following:-

The Kenya Government Regulations
The United Kingdom Institution

a. ELECTRICAL REQUIREMENT

Plant and equipment supplied under this domestic sub-contract shall be completewith all Necessary motor starters, control boards, and other control apparatus.
Where control Panel incorporating several starters are supplied, they shall becomplete with a main isolator.

The electrical sub-contractor will provide the supply power up to and including local isolators. He shall also provide all other wiring diagrams for the Engineer approval.

The starting current of all electrical motors and equipment shall not exceed themaximum Permissible-starting currents described in the Kenya Power and Lighting Company's By-Laws.

The Engineer may reject any equipment that is not rated for the above voltages and frequencies.

b. TRANSPORT AND STORAGE

All plant and equipment shall, during transportation be suitably packed, crated and Protected to minimize the possibility of damages and to prevent corrosion orother deterioration.

On arrival at the site plant and equipment shall be examined and any damage toparts and protective priming coats made good before storage or installation.

Adequate measures shall be taken by the domestic sub-contractor to ensure thatplant and equipment do not suffer any deterioration during storage.

Prior to installation all piping, plant and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment as deteriorated or been damaged to such an extent that it is not suitable for installation, the domestic sub-contractorshall replace this equipment at its own cost.

c. SITE SUPERVISION

The domestic sub-contractor shall ensure that there is an English speaking supervisor on the site at all times during normal working hours.

d. INSTALLATION

Installation of all special plant and equipment shall be carried out by sub- contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer is appointed agent in accordance with the standards of modern practice and the relevant regulations and standards Described under clause3 of this section regulations and standards

Described under clause3 of this section.

e. TESTING

8.1 General

The domestic sub-contractor's attention is drawn to part A sub clause 2.08 of thespecification. The following sub-clause are intended to define the domestic sub-contractorsresponsibilities with respect to testing and inspection.

8.1.1 MATERIAL TESTS

All materials for plant and equipment to be installed under the domestic sub- contract shall Be tested, unless otherwise directed, in accordance with the relevant
B.S specification concerned.

For materials where B.S specification exists tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer havingthe regard to the particular type and application of the materials concerned.

The domestic sub-contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicablestandards.

If stock material, which as not been specifically manufactured for the plant andequipment specified is used, then the domestic sub-contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated here in which case tests of materials may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemedacceptable.

8.2 Manufactured plant and Equipment – Works Tests

The right of the Engineer, relating to the inspection, examinations and testing ofplant and equipment during manufacturer shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer.

The domestic sub-contractor shall give two weeks notice to the Engineer of themanufacturers intention to carry out work tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The costs of such tests and inspections shall be borne by the domesticsub-contractor.

Six copies of all test and inspection certificates and performance graphs shall besubmitted to the Engineer for his approval as soon as possible after the completion of such tests and inspections.

Plant and equipment, which is shipped before the relevant test certificate has been approved by the Engineer, shall be shipped at the domestic sub-contractor'sown risk and should the test and inspection certificates no be approved, new testsmay be ordered by the Engineer at the sub-contractors expense.

8.3 Pressure Testing.

All pipe work installations shall be pressure tested in accordance with the requirements of the various sections of these specifications. The installation may be tested in sections to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. The Engineermust witness all tests.

Or his representative and the domestic sub-contractor shall give 48 hours notice tothe Engineer or his intention to carry out such tests.

Any pipe work that is buried or concealed before witnessed pressure tests havebeen carried out shall be exposed at the expense of the sub-contractor and the specified tests shall then be applied.

The domestic sub-contractor shall prepare test certificates for signature by the Engineer and shall give a progressive and up-to-date record of the sections of thework that have been tested.

f. COLOUR CODING

Unless stated otherwise in the particular specification all pipe work shall be colorCoded in accordance with the latest edition of B.S 1710.

10. WELDING

10.1 Method

All welding shall be carried out by the electric are processing using coveredelectrodes in accordance with the B.S 639.

Gas welding may be employed in certain circumstances providing that priorapproved is obtained from the Engineer.

10.2 Welding codes and construction

All welded joints shall be carried out in accordance with the followingspecification: -

(a) Pipe welding.

All pipes welds shall be carried out in accordance with the requirements of B.S809.

(a) General welding

All welding of mild steel components other than pipe work shall comply withgeneral requirements of B.S 1855.

10.3 Welders Qualifications

Any welder employed on this sub-contract shall have passed the trade tests as laiddown by the Government of Kenya.

The Engineer may require to see the appropriate certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the sub-contractor to replace him by aqualified welder.

PART C

GENERAL PLUMBING AND DRAINAGE SPECIFICATION

INDEX

CLAUSE NO	DESRIPTION	PAGES NO.
2.11	**General**	**C/2**
2.12	**Materials and Standard**	
2.12.1	Pipe work and fitting	C/2-C/6
2.12.2	Valves	C/6-C/8
2.12.3	Waste fitment trap	C/8
2.12.4	Pipe Supports	C/8-C/10
2.12.5	Sanitary Appliances	C/10
2.12.6	Pipe sleeves	C/10
2.13	**Installation**	
2.13.1	General	C/11
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2.13.3	under ground Installation	C/13-C/18
2.14	**Testing and Inspection**	
2.14.1	Site Tests-Pipe work system	C/18-C/20
2.14.2	Site tests-Performance	C/20-C/21
2.15	Sterilization of Hot and Cold Water Water system.	C/21

SECTION C

GENERAL PLUMBING AND DRAINAGE SPECIFICATION

2.11 GENERAL

This section specifies the general requirement for plan, equipment and materials

2.12 MATERIALS AND STANDARDS

2.12.1 PIPE WORK AND FITTINGS

(a) Black steel pipe work

All blacks steel pipe work up to 65mm nominal bore shall be manufactured in accordance with B.S 1387 Medium grade with taped pipe threads in accordancewith B.S. 143

Pipe joints shall be screwed and socketed and sufficient coupling union shall be allowed so that fitting can be disconnected without cutting the pipe. Running nipples and long screws shall not be permitted unless exceptionally approved bythe Engineer.

All black steel pipe work, 80mm normal bore up to 150mm nominal bore, shall be manufactured to comply in all respects with the specification for 65mm pipe, except that screwed and bolted flanges shall replace unions and coupling for the jointing of pipes to valves and other items of plants

All flanges shall comply with the requirements of B.S. 10 to the relevant classifications contained hereinafter under section C of the Specifications.

(b) Galvanized Steel Pipe work.

Galvanized steel pipe work shall be manufactured to comply in all respect with the standards described for black steel pipe work in paragraph (a) above.

Galvanized shall be carried out in accordance with the requirement of B.S 1387 and B.S 143 respectively.

(a) Copper Tubing

All copper tubing shall be manufactured in accordance with B.S.2871 from C.160 'Phosphorous De-oxidized Non-Arsenical Copper 'in accordance with BSD 1172.

Pipe joints shall be made with soldered capillary fittings and connections to equipment shall be with compression fitting manufacture in accordance with B.S864

Short copper connections tubes between galvanized pipe work and sanitaryfitments shall not be used because of the risk of Gallivante action

If, as may occur in certain circumstances, it is not possible to make the connectionin any other way than by use of copper tubing, then Brass straight connector shall be positioned between the galvanized pipe and the copper tube in order to prevent direct contact.

(b) Cast Iron Pipe Work

1.Internal iron pipe work and fitting for use above ground in connection with Internal building services, shall be manufacturedwith spigot and socket joints of the weight required by the Local Authority and shall fully with the requirements of B.S 416.

All joints on cast iron spigot and socket pipes shall be made with approved cold caulking compound and so installed as to allow anyexpansion or contraction that may take place.

All cast iron pipe work, branches, tees, bends and other fitting shallbe supplied complete with inspection cover for cleaning purposes. These inspection covers shall be included as part of the fitting and shall comply with the requirement of B.S 461

2. External Services

Cast iron pipe work which is used in connection with buried external services, shall be manufactured, coated and tested in accordance with the requirement of B.S 1211

All buried cast iron bends, elbows swept tees and other fitting, shallcomply with the requirement of BS 1130

Jointing on external cast iron pipes shall be carried out in accordance with one of the methods described in B.S code of practice 301, clause 505c (v), to the approval of the Engineer.

(c) Pitch Fibre Pipe work

Pitch Fibre pipe work and fitting for use in connection with external drainage services shall be manufactured in accordance with the requirement of BS 2760. Pipes shall be connected by means of pitch made tapered joints manufactured inaccordance with B.S 2760.

Until such time as the use of Pitch impregnated fibre pipes is covered by a code of practice, the jointing laying and cutting these pipes shall carried out in accordance with the requirements of notes contained under Appendix C of B.S.

(d) Concrete Pipe

Where concrete pipe and fitting are used in connection with the conveyance of surface water or sewage under atmospheric pressure, they shall be manufacturedin accordance with the requirement of BS 556, class I, except where otherwise stated.

The joints of concrete pipe and fitting may be one of the following dependingupon application and conditions.

(1) Flexible spigot and socket type
(2) Flexible rebated type (Storm water drainage only)
(3) Ordinary spigot and socket type
(4) Ordinary rebated type (Storm water drainage Only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufacture in accordance with BS 2494 except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance with B.S.

Joints (3) and (4) shall be made with approved cement mortar mix.

(b) Asbestos Cement Pressure Pipes

Where asbestos cement pressure pipe and fittings are used in connection withexternal, above ground or buried water service, they shall be manufacture in accordance with the requirements of B.S 486

The classification of these pipes falls onto four classes;

A, B, C and D respectively and the class to be used shall depend upon thepressure conditions pertaining at site.

Where cast iron detachable joints are used for connecting pipes, the materials shall comply with B. S 2494, except where they are likely to be contaminated byoil products, in which case the gaskets shall be manufactured in accordance with
B.S 3514.

(c) P.V.C. (Hard) Pressure Pipe and Fitting

All P.V.C. pipes and fitting shall be manufactured in accordance with B.S 3505:1968

Jointing

The method of Jointing to be employed shall be that of Solvent Welding, Using the pipe and manufacturers approved cement, Seal rings joints shall be introducedwhere it is necessary to accommodate expansion.

Anchoring

All bends, valves and hydrant tees etc, in the line of water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side ofthe concrete.

Pipe Bed

Pipe shall be uniformly laid on a 75mm thick bed, (sand or red soil) and must notbe allowed to rest on the joint or on stones etc.

Support to fitting.

In under ground installation care shall be taken to ensure that heavy componentssuch as valves are fully supported so that the pipeline carries no weight.

Back filling

For the protection of the pipe initial backfill shall be carried out as soon as possible after laying. The initial backfill shall grained material thoroughly compacted around the pipe and consolidated to a depth of
6 above the crown of the pipes at no time shall heavy rocks, stone or other objectsbe included in the balance of the backfill that might protrude the initial backfill layer and come into contact with the pipe.

Testing

Pipelines shall be tested in section under an internal water pressure normally oneand half times the maximum allowable working pressure for the class of pipe used.
Testing shall be carried out as soon as practicable after laying and when the pipeline is adequately anchored. Precaution shall be taken to eliminate all air fromthe test section and to fill the pipes slowly to avoid risk of damage due to surge.

(d) A.B.S. Waste System

Where indication shows on the drawing and schedules, the Sub- Contractor shallsupply and fix A.B.S. Waste pipes and fitting.

The pipes, traps and fitting shall be in accordance with the relevant BritishStandards, Including B.S 3943 and fixed generally in accordance with manufacture's instruction and B.S 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding.
The manufacturer's recommended method of joint preparation and fixing shall befollowed

Standard brackets, as supplied for use with the system, shall be used wherever possible. Where the building structure render this impracticable the domestic sub-Contractor shall provide purpose made supports, the centre of which shall not exceed one meter.

Expansion joints shall be provided as indicated. Supporting brackets and pipeclips shall be fixed on each side of these joints.

(j) P.V.C. Soil System

The domestic sub-Contractor shall supply and fix P.V.C. soil pipe and fitting asindicated on drawing and schedules.

{Pipe and fittings shall be in accordance with relevant British Standards,including B.S. 5572

The soil system shall incorporate synthetic rubber gaskets as provided by themanufacturer whose fixing instructions shall be strictly adhered to.

Connections to W.C and pass shall be affected by use of a W.C connector gasketand cover, sized to suit pan outlet.
Suitable supporting brackets and pipe clips shall be provided at maximum ofmetre centres.

The domestic Sub-Contractor shall be responsible for the joint into the cully Trapon drain as indicated on the drawings.

2.12.2 VALVES

(a) Draw-off taps and stop Valves (up to 50mm Nominal Bore

Draw off taps and Valves up to 50mm nominal bore, unless otherwise stated or specified for attachment or connection to sanitary fitments shallbe manufactured in accordance with the requirements of B.S 1010.

(b) Gate Valves

All gates valves 80mm nominal bore and above, other than those requiredfor fitting to buried water mains shall be cast iron construction in accordance with the requirements of B.S 3464. All gate valves required for fitting to buried water mains shall be cast iron construction in accordance with the requirements of B.S 1218.

All gate valves up to and including 65mm nominal bore shall be of bronzeconstruction in accordance with the requirements of B.S 1952.

The pressure classified of all gate valves shall depend upon the pressureconditions pertaining to the site of works.

(c) Globe Valve

All globe valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S 3061

The pressure classification of all globe valves shall depend upon thepressure conditions pertaining to the site of works

(d) Check or Non- Return Valves

All checks or non-return valves 80mm nominal bore and above shall be ofthe swing checks type of cast iron construction in accordance with the requirement of B.S 4090.

The pressure classification of all checks or non-return valves shall dependupon the pressure conditions pertaining to site of the works

(e) Ball valves

All ball valve for use in connection with hot and cold-water services shall be of the Portsmouth type in accordance with requirements of B.S 1212, construction from bronze or othercorrosion resistant materials. These valves fall into three pressure classification as follow: -

(i) Low Pressure _ 3.58 b maximum

(ii) Medium Pressure - 7.72 b maximum

(iii) High Pressure - 12.62 b maximum

The pressure classification required for each ball valve will be designed in the description of its associated equipment contained in section C of the specification.

(f) Manually Operated Mixing Valve

Mixing valves for showed fitting and other appliances being provided under thedomestic Sub-contractor Works shall be manufactured in
Accordance with the requirements of B.S 1415 from bronze or other corrosionresistant materials.

2.12.3 WASTE PITMENT TRAPS

(a) Standard and Deep Seal P & S Traps

Where standard or Deep Seal traps specified they shall be manufactured in suitable non-ferrous material in accordance with full requirements of B.S 1184

In certain circumstances, cast iron traps may be required for cast ironBath and in these instances bath traps shall be provided which are Manufactured in accordance with the full requirements of B.S 1291

(b) Ant- Syphon Traps

Where ant-syphon traps are specified, these shall be similar or equal to the rangetraps manufactured by Greenwood and Hughes Ltd,
Deacon Works Littellehampton, Sussex, England.The Trade Name for Traps Manufactured in Accordance with the requirements of B.S 1415 from bronze or other corrosionresistant materials.

2.12.3 PIPE SUPPORTS

General

This sub-clause deals with pipe supports securing pipes to the structure ofbuilding for above ground

application.

The variety and type of support shall be kept to a minimum and theirdesign shall be such to facilitate quick and secure fixing to metal, concrete, masonry or wood.
Consideration shall be given, when designing support, to the maintenanceof desired pipe falls and the restraining of pipe movements to a longitudinal axial direction only.
The domestic Sub-contractor shall supply and install all steelwork formingpart of the pipe support assemblies and shall be responsible for making good any damage to builders work associated with pipe support installation.

The domestic sub-Contract shall submit his entire proposal for pipesupports to the Engineer for approval before any erection work commences.

(b) Steel , Copper pipes and Tubes

Pipe runs shall be secured by pipe clips connected to pipe hangers, wallbrackets, or trapeze type supports. 'U' bolts shall not be used as a substitute for pipe clips without the prior approval of the Engineer.

An approximately guide to the maximum permissible supports spacing inmetres for steel and copper pipe and tube is given in the following table for horizontal runs.

Size Nominal Bores	Copper Tube To B.S 659	steel tube To B.S 1387
15mm	1.25m	2.0m
20mm	2.0m	2.5m
25mm	2.0m	2.5m
32mm	2.5m	3.0m
40mm	2.5m	3.0m
50mm	2.5m	3.0m
65mm	3.0m	3.5m
80mm	3.0m	3.5m
100mm	3.0m	4.0m
125mm	3.0m	4.5m
150mm	3.5m	

The support sizing for vertical runs shall not exceed one and half times thedistances given horizontal runs.

(c) Cast Iron and Asbestos Cement Spigot and socket jointed Pipes

Cast iron and asbestos cement socketed pipes shall generally be supported atevery socket joint by means of either holder bats secured rigidly to the structure, or purpose made straps for attachment to rigid steel support brackets.

When holder bats are used, they shall conform to the requirements of B.S.416.
Suitable anchors shall be provided at all changes of pipe directions, Junctionand tees, to counter the effect of end thrust loads.

(d) Asbestos Cement Pressure Pipes

Asbestos Cement Pressure pipes with either cast iron detachable joints or asbestos cementscrew joints shall be supported and anchored on either side of the joint. The joints shall remain free.

Pipe hangers and trapeze type supports shall not be suitable for the suspension of asbestospressure pipes unless they are designed with suitable restrictions to prevent swinging while at the same time providing the necessary support requirements.

Within building, asbestos pressure pipe shall be carried either on concrete supports or onrigidly fixed wall brackets.

Suitable anchors shall be provided at all changes of pipe directions, junctions and tees tocounterpart the effect of end trust loads.

(e) Concrete and Pitch Pipes

These pipes shall not be used for above ground application.

(f) Expansion Joint and Anchors

Where practicable, cold pipe work systems shall be arranged with sufficient bends and changes of direction to absorb pipe expansion providing hat the pipe stresses are contained within the working limitsprescribed in the relevant B.S. specification.

The domestic sub-Contractor shall pay particular care when supporting cast Iron and asbestos cement pipes in order to ensure that settlement and buildingmovement do not brake the pipe joints.

Where piping anchors are supplied, they shall be fixed to the main structure only. Detail of all anchors design proposals shall be submittedto the Engineer for approval before erection commences.

The sub-Contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flangeson pumps or other items of plant.

The domestic Sub-Contractor shall supply flexible joints to prevent vibrationsAnd other movements being transmitted from pumps to piping systems or Vice Versa.

2.12.5 SANITARY APPLICANCES

All sanitary appliances supplied and installed as part of the domestic sub-contract works shall comply with the general requirements of B.S.specification.

2.12.6 PIPE SLEEVES

Main runs of pipework are to be fitted with sleeves where they pass through wallsand floors. Generally the sleeves shall be of P.V.C. except where they pass through the structure, where they shall be mild steel. The sleeves shall have 6mm
–12mm clearance all around the pipes or for insulated pipe work all around theinstallation. The sleeve will then be packed with slag wool or similar.

2.13 INSTALLATION

2.13.1 GENERAL

Installation of pipes work, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The domestic sub-contractor shall be responsible to the main contractor for ensuring that allbuilders work associate with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

2.13.2 ABOVE GROUND INSTALLATION

(a) Water Service

Before any joints is made, the pipes shall be hung in their supports and adjusted to ensure that the jointing faces are parallel and any falls whichshall be required are achieved without springing the pipes.

Where falls are shown on the contract Drawing or stated elsewhere in thespecification, pipe work shall be installed parallel to the lines of the building and as close to the walls, ceilings, columns etc. as is practicable.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and otheruser equipment shall be installed with adequate access for operation and maintenance. Where valves and other operation equipment are unavoidably installed beyond normal reach or in such position as to be difficult to reach from a short stepladder, extension spindles with floor orwall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions to facilitate easy removals of fittings, and to enable alterations of pipe workto be carried out without the need to cut the pipe.

Full allowance shall be made for the expansions and contraction of pipe work, precautions being taken to ensure that any force produced by pipe movements are not transmitted to valves, equipment or plant.

All screwed joist to piping and fitting shall be made with P.T.F.E. Tape. The pump shall maintain the test pressure for about one hour and if there is any leakage, it shall be measured by the quality of water pumped into the main in that time. A general leakage of one gallon per 25mm of diameter, per 1.6 Kilometer per 24 hour 30 metre head, may be consideredreasonable but any visible individual leak shall be repaired.

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(a) Sanitary Services

Soil, waste, and vent pipe systems shall be installed in accordance with the best standards of modern practice as described in B.S. 5572to the approval of the Engineer.

The domestic sub-Contractor shall provide all necessary roding and inspection facilities within the draining system in position where easy accessibility is available.

Where a branch requires roding facilities in a position to which normal access is unobtainable, then that branch shall be extended soas to provide a suitable purpose made roding eye in the interest adjacent wall or floor to which easy access is available.

The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The sub- Contract shall be responsible for sealing the roof after installation ofthe stacks

The open end of each stack shall be fitted with a plastic coated, orgalvanized steel, wire guard.

Access for roding and testing shall be provided at the foot of eachstack

(b) Sanitary Appliances

All sanitary appliances associated with the domestic sub-Contract Work shall be Installed in accordance with the best standard of modern practiceas described in B.S. 5572 to the approval of the Engineer.

2.11.2 3 UNDERGROUND INSTALLATION

(a) General

All underground water and drainage services installation shall be carried out in accordance with the best Standard of modern practice as described in C.P 301 and C.P. 310 respectively and the following clause.

(b) Sequence of Operation for Underground Services Installation

(1) Setting Out

As described in B.S. Codes of practice 301 Clause 502

(2) Breaking Up Surface (If In Roads)

As described in B.S. Code of practice 301 Clause 503

(3) Excavation and Timbering

As described in B.S. Code of practice 301 Clause 503 and thefollowing: -

Excavation shall be made to such depths and dimensions as may berequired by the Engineer to obtain prior falls and firm foundations. No permanent construction shall be commenced on any bottom until the excavation has been examined and approved by the Engineer.

Should the domestic Sub-contractor in error or without the instruction of the Engineer make any excavation below the requirement level of the pipe or bed, as the case may be, then shallbe required to refill such excavation to the correct levels with concrete 1:4:8: to 38mm maximum aggregate size.

The domestic sub-contractor' prices shall have included for excavating in all material met with, for trimming bottoms to the necessary falls and for any extra excavation required for planking,strutting and working space.

The domestic sub-contractor shall keep the whole of the trenches or other excavations free from water and shall execute such pumpsas may be necessary to keep the excavation dry at all times.

No sub-soil water shall be discharged into the sewage systemwritten permission of the Engineer.

(4) Laying of Concrete Beds or other Support for Pipes (IfRequired)

As described in B.S. Code of practice 301 Clause 504 and thefollowing: -

All drains below buildings and roads shall be encased inconcrete 150mm thick.

Concrete beds and support shall be concrete 1:3:6 to20mm maximum aggregated size.

(5) Pipe Laying and Jointing

Drain pipes shall be laid and jointed as described under
B.S Code of practice 301 Clause 505.

Pitch fibre drain pipe shall be laid, jointed and cut in accordance with the requirements on the Node containedunder Appendix C of B.S 2760.

Water pipes shall be laid and jointed as described under
B.S. code of practice 310. Clause 401,403 and 404.

(6) Manholes

(i) General

All manholes provided under the domestic sub-Contract works shall be constructed or approved materials and in an approved manner.

All manholes shall be water-tight and if constructed of brickwork, solid block work or stonework, they shall be rendered internally with a cement mortar of at least 12mm thickness and finished with a smooth surface.

The sides of all channels in every manholes shall be brought up vertically to a height of not less than the diameter of the drain and shall be benched in a good concrete from the top of the channels at an angle of 30 to the horizontal and floated to a smooth hard surface with acoat of 1:1 cement mortar.

In all other respects, manholes shall be constructed inaccordance with B.S code of practice 301.

(i) Rectangular and Square Manholes

Rectangular and Square straight through manholes shall be constructed from brickwork, solid block work, stonework orconcrete to comply with the following minimum internal dimensions (millimeters).

Depth Below Ground of Outgoing Invert	Internal Access Shift Dimensions LXW	Size of Main Shaft Diameter	Internal Chamber Dimensions LXW	Height of Chamber Above Benching	Wall Thickness
Up to 740	-	100 to 150	610 x460	-	150
Up to 740	-	230 to 460	760x760	-	150
Up to1200	-	100 to 150	760x760	-	150
160 to 1200	-	230 to 460	910x910	-	150
1220 to 1800	-	100 to 150	910x910	-	150
1220 to 1800	-	230 to 460	1070x910	-	150
1830 to 4550	100 x150	100 to 150	1370x910	1370	230
1830 to 4550	760 x 760	230 to 460	1370x1070	1370	230
4570 & above	760 x760	100 to 150	1370x1140	1680	230
4570 & above	760 x 760	230 to 460	1370x1140	1680	230

When branches are connected into the manhole, the length and width dimension of the chamber shall be increased as follows: -

Length
Branch Diameter 100mm 300mm/branch on side with most branches. 150mm 380mm/branch on the side with most branches. 230 and 300mm/branch on the side with most branches.

7. Width

Branch Diameter

100mm to 300mm for each side with branches plug 160mm 460mmor the diameter of the main drain whichever is the greater.

(ii) Precast Concrete Circular Manhole

Where specified straight through precast manholes shall be manufactured and constructed to comply with B.S. 556 and the following dimensional requirements,(Dimensions in Millimeters).

Depth Ground of Outgoing Invert	Internal Access Shaft Diameter	Size Main Channel Diameter	Chamber Diameter	Height Chamber Above Benching
Up to 740	-	100 to 460	910	-
760 to 2410	-	100 to 460	1070	-
2440 to 4550	760	100 to 460	1220	1370
4570 & over	760	100 to 460	1370	2680

When branches are connected into manholes the internal Diameter of the chamber shall be increased, as necessary, up to a maximum chamber 1830mm

(iii) Step Iron and cover

Access shaft manholes of depth greater than 760mm shall be provided withapproved step irons at suitable intervals.

Every manhole or manholes access shaft shall be fitted with a removable airtightcast iron cover to adequate size and strength, fixed in a manner, which prevents surface water gaining access into the drainage system.

Cast manhole covers and frames shall be manufactured in accordance with the requirements of B.S. 497 and shall generally fall into the following categories:-

Heavy Duty	:	:	For carriageways
Medium Duty :	:	:	for footpaths
Light duty	:	:	For domestic remises or Other places where they Do not have to carryWheeled traffic

(iv) Back Drop Connections

Where the level of the branch drain entering the manhole is higher than can be suitably accommodated by the normal type benching, then the branch drain shall be connected to the manhole by means of a back drop connection.

Back drop connections shall be made in accordance with thedetails shown on the relevant sub-contract Drawing and the requirements of B.S. code or practice 301.

(v) Channels

Where the branch channel connects to the main channels in the manhole, the invert of the branch channel shall be a minimum of 38mm higher thanthe main channel.

(7) Testing of Pipelines

After pipelines are connected up and joints have been sealed, the pipelinesshall be tested before pipe are, if required hunched or surrounded in concrete.

Methods of testing and inspection shall be in accordance with clause 4 of thespecifications.

(8) Concrete Beddings, Haunching and Surround

Concrete bedding, hauching and surrounding shall be provided as necessary or where called for by the Engineer in accordance with the requirements laiddown in B.S. code of Practice 301, Clause 310.

(9) Backfilling

Backfilling of trenches, headings and around manholes shall be carried out in accordancewith the methods described in B.S. Codes**.**

(10) Reinstatement of surface

Following the final backfilling of all trenches, headings, and manhole surrounds, the surface of the excavated areas shall be fully reinstated to theapproval of the Engineer.

Where excavation have been carried out in public or other areas are not forming part of the site, the domestic Sub-Contract shall be deemed to have allowed in his price for all charge associated with the temporary and final reinstatements of the local of highway Authority, Whether this is carried outby the domestic sub-Contractor or by the Authority concerned.

No claim for extra in this respect will be accepted.

(11) Sewer Connection

The domestic Sub-Contract shall pay all charges associated with the connection by the Local Authority of the drainage to the Main sewer, including necessary reinstatement.

2.12 TESTING AND INSPECTION

2.12.1 SITE TESTS-PIPEWORK SYSTEMS

(a) Underground Water Mains

After laying, jointing and anchoring, the main shall be slowly and carefully charged with water, so that all air is expelled and allowed tostand full for three days before testing under pressure.

Along main shall be tested in sections, as the work of laying proceeds andall joints shall be exposed for inspection during the testing.

The open end of the main may be temporarily closed for testing under moderate pressure by fitting water, pipe-expanding plug, of which several types are available. The end of the main and the plug, of which secured bystruts or otherwise, to resist the end thrust of the water pressure in the main.

If the section of the main terminates with a slice valve, the wedge of the valve shall not be used to retain the water, instead the valve shall be fittedtemporarily with a blank flange, or socket valve with a plug and wedge shall be placed in the open position while testing. The domestic Sub- contractor shall provide suitable end supports withstand the end thrust of the water pressure in the main.

(b) Above Ground Internal Water Services Installation.

All water service pipe system installed above ground shall be tested hydraulically for a period of one hour to not less than one and half timesthe design working pressure.

If preferred, the domestic Sub-contractor may test the pipelines in sections. Any such section found to be satisfactory need not to be thesubject of a further test when system has been completed, unless specifically requested by the Engineer.

During the test, each branch and joint shall be examined carefully for the leaks and any defects revealed shall be made good by the sub-contractor and the section re-tested.

The domestic sub-contractor shall take all necessary precautions to prevent damage occurring to special valves and fittings during the tests.Any item damaged shall be repaired or replaced at the sub-contractor's expense.

(c) Underground Drainage System

A site test shall be carried out on all drainage pipes before concrete Haunching or surrounds are applied. These tests shall be carried out preferably from manhole to manhole.

Short brand drains connected to main drain between manholes shall be tested as one system with the main drain. In long branches a testing junction shall be inserted next to the junction with the main drain and thebranch tested separately. After the test has been passed, the testing junction shall be effectively sealed.

All tests on underground drains shall be permitted on cast iron drains atthe discretion and the approval of the Engineer.

Water tests shall be carried out in accordance with the methods described under B.S code of practice

301,clause 601 (b) and (c) and the test pressureshall not be less than 1,520mm head at the highest point in the pipe sectionand do not more 10.360mm head at any point in the section.

The test pressure shall be maintained for a period of one hour during which time the pipe and joints shall be inspected for sweating and leakage.Any leakage discovered during the tests shall be made good by the domestic sub-contractor and the section re-tested.

In addition to pressure tests, drain pipe runs shall also be tested for straightness where applicable. This test shall be carried out in accordance with one of the two methods described in B.S code of practice 301, clause601 (e).
Testing of manholes shall be carried out in accordance with the methodsdescribed under B.S code of practice 301, clause 601 (f).

(d) <u>Above Ground Soil Waste and Ventilation System</u>

All soil, waste and ventilation pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in B.S. 5572:1972.

Smoke tests on above ground soil waste and ventilating pipe system shall not be permitted.

Pressure tests shall not be carried out before any work that is to be concealed is finally enclosed.

Any defects revealed by the tests shall be made good by the sub-contractor and the test repeated to the approval of the Engineer.

In all respects, tests shall comply with the requirements of B. S. 5572

2.12.2 <u>SITE TEST - PERFORMANCE</u>

Following satisfactory pressure test on the pipework systems. Operationaltests shall be carried out in accordance with the relevant B.S. code of practice on the system as a whole to establish that special valves, gauges, controls, fittings, equipment and plant are functioning correctly to the satisfaction of the Engineer.

All hot water pipework shall be installed with performed fibre glass lagging to a thickness of 25mm where the pipe runs above a false ceiling or in areas where the ambient temperature is higher than normal with the result that pipe “seating” due to condensation will cause nuisance.

All lagged pipes which run in a visible position after erection shall begiven a canvas cover and prepared for a painting as follows: -

(i) Apply a coating of a suitable filler until the canvas weavedisappear and allow to dry.
(ii) Apply two undercoats of an approved paint and finish in suitablegloss enamel to colours approved by the Engineer.

All lagging for cold or hot water pipes erected in crawlways,ducts, and above false ceiling which, after erection are not visible from the corridors of rooms, shall be covered with a reinforce aluminum foil finish and banded in colours to be approved by the Engineer

In all respects, unless otherwise stated, the hot and cold water installation shall be carried out in accordance with the standards of modern practice as described in C.P. 342 and C.P.310 respectively to the approval of the Engineer.

The test pressure shall be applied by means of manually operated test pump or, in the case of long main or mains or large diameter, by power driven test pump which shall not be left unattended. In either case precautions shall be taken to ensure that the requirement under this clauseof specification.

The domestic Sub-contractor shall be deemed to have included inhis price for all test pumps, and other equipment required under this clause of specification.

2.11 The test pressure shall be one and half times the maximum working pressure except where a pipe is manufactured from a material for which the relevant B.S Specification designates a maximum test pressure as in the case of cast or spun iron pipe where the test pressure should not exceed 120,180, and 240.

2.12 STERILIZATION OF HOT AND COLD WATER SYSTEMS

All underground water mains and above ground water distribution systems, cistern, tanks, calorifiers, pumps etc shall be thoroughly sterilizedand flushed out after the completion of all tests and before being fully commissioned for Handing over.

The sterilization procedures shall be carried out by the sub-contractor inaccordance with the requirements of B.S. codes of practice 310, Clause 409, to the approval of the Engineer.
metre/ head of clause B, C and D pipes, respectively.

PART D

PARTICULAR SPECIFICATION FOR SUPPLY AND INSTALLATION OF PORTABLE FIRE EXTINGUISHERS.

1.0 GENERAL

The particular specification details requirements for the supply and installation and commissioning of Fire Extinguishers that shall conform to B.S.5423: 1977. The domesticsub-contractor shall include for all appurtenances and appliances not necessary called for in this specification or shown on the contract Drawings but which are necessary for the completion and satisfactory of the works.

It is in the opinion of the domestic Sub-contractor there is a difference between the requirements of the specification and the Contract Drawings; he shall clarify these differences with the Engineer before tendering.

1.01 SCOPE OF WORKS

The domestic sub-contractor shall supply, deliver, erect, test and commission allfire extinguishers which are called for to this specification and shown on the Contract Drawings and listed in these Bills of Quantities.

1.02 WATER /CO_2 FIRE EXTINGUSHERS.

The portable 9 Liter water filled CO_2 cartridge operated fire extinguishers shall comply with B.S. 1382: 1948 and to the requirement of B.S. 5423: 1977. unless manufactured with stainless steel, bodies shall have all internal surfaces completely coated with either a lead tin alloy to nine applied by hotdipping. There shall be no visibly uncoated areas.

The extinguisher shall be clearly be marked with the following:-

(a) Method of operation

(b) The works “WATER TYPE” (GAS PRESSURE) in prominent letter

(c) Name and address of the manufacturer or responsible vendor

(d) The nominal charges of the Liquid in imperial gallons and Litres

(e) The liquid level to which the extinguisher is to be charged

(f) The year of manufacturer

(g) A declaration to the effect that the extinguisher has been tested to a pressure of350: 15/sq. in (24: 1 bar)

(h) The number of the British standards BS 1883 or Bs 5423:1977

1.03 CARBON DIOXIDE FIRE EXTINGUISHER

The portable carbon dioxide fire extinguisher shall comply with BS 3326: 1960 and BS5423:1977

The extinguisher shall be a seamless steel cylinder manufacture to one of the followingBritish Standards, Bs 401, Bs 1287 or BS 1288.

The filling ratio shall comply with BS 5355 with valves fittings for compressed gas cylinders to BS 314. Where a hose is fitted, it shall be flexible and have a minimumworking pressure of 3000 Ib/sq. in (206.85 bar, the hose is not to be under internal pressure until the extinguisher is operated.

The nozzle shall be manufactured of brass gunmetal, aluminum or stainless steel and maybe fitted with w suitable valve for temporally stopping the discharge if such means are not incorporated in the operating head.

The discharge horn shall be designed and constructed so as direct the discharge and limitthe entrainment of air. It shall be constructed of electrically non-conductive material.

The following markings shall be applied to the extinguishers:-

(a) The word 4.5 KG Carbon dioxide fire extinguisher and to include the appropriatenominal gas content

(b) Method of operation

(c) The word "Re-Charge immediately after use"

(d) Instruction for periodical checking

(e) The number of the British Standard BS 3326: 1960 or BS 5423

(f) The manufacture name or identifications markings

1.04 DRY POWDER CHEMICAL PORTABLE FIRE EXITINGUISHER

The portable dry powder chemical fire extinguisher shall comply with BS 3465:1962 andBS 5423. The body shall be constructed of steel not less than the requirements of BS 1449 or aluminum to BS 1470:1972 and shall be suitably protected against corrosion The dry powder chemical fire extinguisher shall be non-toxic and retain its free flowing properties under normal storage conditions. Any pressurizing agent used as an expellant shall be in dry state, in particular compressed air.

The discharge tube is either fitted shall be made of steel, brass, copper or other not less suitable materials. Where a hose is provided, it shall not exceed 1,060 MM and shall be acid and alkaline resistant. Provision shall be made for securing the nozzle when not in use.

The following shall be clearly marked with the following information:-

(a) The word "Dry Powder Chemical Fire Extinguisher"
(b) Method of operation in prominent letters.
(c) The working pressure and the weight of the powder charge in Kilogram
(d) Manufacturer's name of identification

(e) The word "Recharge after Use" if rechargeable
(f) Instruction to regularly check the weight of the pressure container (gas cartridge) or inspect the pressure indicator on stored pressure type when fitted, and remedy any loss indicated either

(g) The year of manufacture
(h) The pressure to which the extinguisher was tested

(i) The number of the British Standard BS 3465 or Bs 5423:1977

(j) Where appropriate complete instructions for charging the extinguisher shall beclearly marked on the extinguisher or otherwise be supplied with the refill.

1.05 SIGNAGE-FIRE INSTRUCTION/FIRE EXIT.

1.05.1 FIRE INSTRUCTION NOTICE

Print fire instruction on the Perspex plates with white colour back groundmeasuring 510mm length x 380mm width x 4mm thick as follows;

FIRE INSTRUCTION NOTICE

In the event of fire;

1.Raise the alarm by actuating the nearest alarm system point, sound Siren/gong or shout fire!

2. Attack fire using the nearest available equipment.

3. Call nearest fire Brigade or police 999 and inform your Switchboard (PABX) operator.

4. Ensure that all personnel not involved in fire fighting evacuate to safety outside the building.

5. Close but DO NOT LOCK doors behind as you leave.

6. Evacuate the building using stairs or fire escapes. Do not use Lifts/escalators.
Do not stop or return for personal belongings.

7. Assemble outside the building for roll call.

1.05.2 FIRE EXIT SIGN.

Print fire exit signs on the Perspex plate, 4mm thick, with white colourbackground as follows;

1. Lettering IN RED COLOUR of not less than 50mm in height.
2. A Pendant sign bearing words, FIRE EXIT and with a directional arrow.

The sign must be capable of being read from both approaches to exit and so isdouble sided .

1.07 WATER STORAGE TANKS.

1.07.1 Cold water storage tanks.

Where specified as galvanized mild steel, water storage tanks shall comply with BS 417.Galvanizing shall take place after manufacture.

Pressed steel sectional water storage tanks shall comply with BS 1564,and shall be similar in manufacture to "BRAITH-WAITE"

Water storage tanks shall be mosquito proofed by means of well fitting bolted cover bedded on a thick gasket of felt or bitumen.

Overflow pipes from tanks shall discharge into air or floor gullies where nearby positioned, with splay cut ends mosquito proofed by means of wire gauze tightly bound on with stout galvanized wire or soldered on.

BILL OF QUANTITIES FOR MECHANICAL SERVICES NOTES TO THE TENDERER

The domestic tenderer shall insert prices and rates in the following schedules of prices.

1. The unit rates shall be used to assess the value of additions or omissions arising from authorized variations to the contract works.

2. The unit rates shall be deemed to be used by the contractor in the preparation of his tender, and shall include for everything that is necessary to install the section of works referred, complete with testing and commissioning.

3. The unit rates shall include the supply, delivery, insurance, unpacking, assembling, clearing, installation, connecting, profit, all government taxes and any other obligation under the contract.

4. The tender must satisfy himself that he has enough information to submit his tender that will lead to completion and satisfactory operation of the works

5. In the event of discrepancies between the quantities given and the drawings the tenderer shall draw the attention of the Consulting Engineers before any adjustments.

6. In the event of omissions that would lead to unsatisfactory completion of the works the Tender shall immediately inform the Consulting Engineer for correction.

GENERIC WORKSHOP MODEL FOR NEW T.T.I IN CONSTITUENCIES.

ITEM	DESCRIPTI0N	UNIT	QTY	DESCRIPTION	AMOUNT
	ELEMENT N0.1 INTERNAL PLUMBING. Supply, deliver, install, test and commission galvanized mild steel tubing to BS1387 medium grade with screwed and socketed joints to BS 21 and galvanized cast iron fittings to BS 143 and 1256. Tenderers **MUST** allow in their pipe work prices for all the couplings, connectors, unions, jointings, etc as required in the normal running lengths of pipe work and also where necessary for pipe fixing clips, holderbats plugs screws and pipe sleeves through structural members.				
A	15mm diameter GMS class B pipe.	LM	24		
B	20mm diameter GMS class B pipe.	LM	24		
C	25mm diameter GMS class B pipe.	LM	36		
D	32mm diameter GMS class B pipe	LM	18		
E	40mm Ditto	LM	6		
	EXTRA OVER GMS PIPING FOR THE FOLLOWING:				
	G.I. Elbows				
F	15mm diameter G.I.elbow	N0	18		
G	20mm Ditto	N0	12		
	G.I. Equal Tee				
H	15mm diameter G.I equal tee	N0	8		
I	20mm diameter G.I. equal tee	N0	6		
J	25mm diameter G.I. equal tee	N0	4		
K	32mm ditto	N0	2		
L	40mm ditto	N0	2		
	Carried to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	EXTRA OVER GMS PIPING CONT.FOR THE FOLLOWING:				
	G.I.Bends				
A	15mm diameter G.I. bend	N0	8		
B	20mm diameter G.I bend	N0	8		
C	25mm diameter G.I. bend	N0	4		
	G.I. pipe Reducer				
D	20X20x15mm diameter G.I. tee reducer	N0	8		
E	25x25x20mm diameter G.I.tee reducer	N0	12		
F	32x32 x 25mm diameter G.I.tee reducer	N0	4		
G	40 x 32mm diameter G.I. reducer bush	N0	2		
H	32 x 25mm diameter G.I. reducer bush	N0	2		
I	25 x 20mm diameter G.I. reducer bush	N0	12		
J	20 x 15mm diameter G.I. reducer bush	N0	8		
	G.I. Unions				
K	15mm diameter G.I. union	N0	2		
L	20mm diameter G.I. union	N0	2		
M	25mm diameter G.I. union	N0	4		
N	32 mm Ditto	N0	2		
O	40mm Ditto	N0	1		
	G.I. Hexagonal Nipple				
P	15mm diameter G.I hexagonal nipple	N0	26		
Q	20mm diameter G.I.hexagonal nipple	N0	4		
R	25mm diameter G.I.hexagonal nipple	N0	6		
S	32mm ditto	N0	4		
T	40mm ditto	N0	2		
	Carried to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	GATE VALVE				
A	15mm diameter approved high pressure cast brass, full-way gate valve to BS 1212 class 125, with bonnet-type head, non-rising spindle, guided wedge and tapered stub treads as "PEGLER" or equal to be approved.	N0	2		
B	20mm diameter ditto	N0	3		
C	25mm diameter ditto	N0	3		
D	32mm diameter ditto	N0	4		
E	40mm diameter ditto	N0	1		
	STOP CORKS				
F	15mm diameter approved good quality cast brass stop cork to BS 125, with hand wheel head as "PEGLER" or equal to be approved.	N0	2		
	COPPER TUBING				
G	15mm diameter good quality copper tubing to BS 659,about 300mm long, bent as required, including brass back nuts to BS 854 and jointing to tube.	N0	26		
	BALL VALVE				
H	Portsmouth High pressure ball valve with delayed action to MOH pattern, with 32mm shank, G.I.socket and back nuts, complete with silencer rod 400mm long or equal to be approved.	N0	2		
	BALL FLOAT				
I	Ball float as "PEGLER" diameter 150mm, high pressure type, polypropylene plastic material float.	N0	2		
	WATER TANK				
J	Plastic water storage tank as made by "KENTANK" capacity 2300 litres, size 1542mm x1442 mm diameter model CV92,complete with 20mm inlet connection,1N0 -32mm outlet connections,25mm washout connection and all necessary accessories or equal approved.	N0	3		
K	Allow for Tank support base and builders works related to Tank installation.	Item	1		
	Carried to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT KSH
	ELEMENT N0.2 SANITARY FITTINGS. **S**upply,deliver, install, test and commission the following sanitary fittings, including their support brackets, fixing screws, etc and connection to water supply and waste/drainage.				
A	WC ensuit as Twyfords classic to BS 1213,Western type with S-Trap outlet in white vitreous china clay material to BS 3402,9.0litres capacity flushing cistern to BS 1125,with internal overflow system,pvc flush pipe 32mm diameter, fixing screws, seat & cover plus all accessories or equal to be approved.	N0	3		
B	Ditto but eastern type with p-trap.	N0	3		
C	Twyfords white vitreous china clay wash hand basin size 510 x 420mm to BS 1188, complete with chrome plated basin waste 32mm diameter, chain stay & chain, PVC waste plug, single chrome plated pillar tap to BS 1010 as "BRICON" size 15mm diameter, chrome plated bottle trap size 32mm diameter, flexible pipe, fixing screws & brackets or equal to be approved.	N0	10		
D	Twyfords Urinal bowl model VC7004WH in white vitreous china clay size 560 x360 x330mm, complete with dome shaped PVC urinal grating, heavy duty PVC bottle trap size 40mm diameter, Concealed Stainless steel Flush pipe for two people, fixing screws, etc and connection to drainage or equal.	N0	4		
F	Automatic Urinal flush Cistern in white vitreous china clay as Twyfords model CX8612WH capacity 9 Litres or equal approved	N0	2		
G	Twyfords mirror Re: N0.58364SSO of plain beveled glass plate size 420mm x 600mm x 6mm thick, supplied with dome headed chrome plated fixing screws/stainless steel fixing brackets or equal to be approved.	N0	10		
	Carried to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSH)
	SANITARY FITTINGS CONT.				
A	Twyfords toilet roll holder in white vitreous china clay material Ref: N0.16336 and fixing to wall including forming recess to size 150mmx150mm or equal to be approved.	N0	6		
B	**HAND DRIER** Automatic hand drier in white colour, operating on an infra-red automatic sensing system with heating element safety cut-out complete with a 30 seconds safety timer, plastic rawl plugs and fixing screws. The hand drier to have a heating capacity of 2.1Kw and performance flow rate of135 cfm (3.82metres cubed/min) and to be of size 270x264x143mm deep. It shall have a noise level of below 72.5 dBA at 1.5m. as HEATRAE SADIA or equal to be approved.	N0	4		
C	**KITCHEN SINK** Single bowl, single drain (SBSD) stainless steel kitchen sink as "CARADON SAPPHIRE" heavy duty to BS 1244, size 1000 x 500mm, with bowl size 420mm x 345mm, complete with single chrome plated Bib tap as "BRICON" size 12mm diameter, chrome plated sink waste size 32mm diameter, cast brass P-trap size 40mm diameter with "Roding eye", over flow facility, support brackets and all accessories or equal approved.	N0	1		
		N0	2		
D	Weathering roof slate for 100mm diameter pipe				
E	**SANITARY FOR PEOPLE ON WHEEL CHAIRS** W.C ensuit in white vitreous china clay with S-trap as Twyfords classic for physically challenged persons complete with flush acessories, seat cover, hand support rails, wash hand basin, and other necessary accessories, all suitable for the needs of people on wheel chairs	N0	4		
	Total carried to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSH)
A	**SOAP DISPENSER** Wall mounted soap dispenser with a capacity of approx.1.5 litres, having a press action soap release mechanism c/w fixing screws. Allow for initial soap supply. As STARMIX or equal approved	N0	4		
	ELEMENT N0:3 INTERNAL DRAINAGE Supply, deliver, install, test and commission the following drainage fittings, complete with fixing screws, couplers, jointing, branches, etc, as required in the running lengths of Pvc pipes including holder bats and clipping to wall where necessary. Solvent welded joints shall be as per the systems written instructions. The pipes are to be Pvc soil systems to BS 4515 and 4660 class D with socketed joints to BS 21 and mild steel tubing to BS 1389 class B with screwed and socketed joints to BS 21 and galvanized cast iron fittings to BS 143 and 1256. Tenderers MUST allow in their prices for all couplings, joints, connectors, etc.The entire installation to with BS 5572. **UPVC SOIL SYSTEM CONFORMING TO BS 4515 AND BS 4660.**				
B	PVC Soil waste pipe size 100mm diameter.	LM	36		
C	PVC Access pipe bend size 100mm diameter	N0	6		
D	PVC pipe sweep bend size 100mm diameter .	N0	7		
E	P.V.C vent cowl 100mm diameter	N0	2		
F	WC connector	N0	10		
G	PVC pipe sweep tee size 100mm diameter	N0	6		
	GULLEY TRAPS				
H	PVC gulley trap size 100mm diameter, complete with excavation and masonry walling size 450 mm x 300 mm x 300 mm with pre-cast reinforced concrete cover in rebate, cut to pipe profile or equal approved.	N0	2		
	Total to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSH)
	EXCAVATIONS				
A	Allow for the excavation of trench to lay drainage pipes. The trench will average 600mm but will not exceed 1000mm deep, including part return, fill in, raw and reminder cart away.	LM	12		
B	Allow for keeping the entire excavated area free from water, mud and sand by pumping, bailing or otherwise.	ITEM	1		
	MUPVC WASTE SYSTEM CONFORMING TO BS 5255				
C	PVC waste pipe size 32mm diameter	LM	12		
D	Ditto but 40mm diameter	LM	18		
E	Ditto but 50mm diameter	LM	24		
	EXTRA OVER MuPVC				
F	32mm diameter sweep tee	N0	8		
G	Ditto but 40mm diameter	N0	6		
H	Ditto but 50mm diameter	N0	2		
I J	32mm diameter bend	N0	14		
K	Ditto but 40mm	N0	8		
L	Ditto but 50mm	N0	12		
M	32mm access plug	N0	6		
N	Ditto but 50mm	N0	2		
O	PVC 50x40mm bush reducer	N0	4		
P	Ditto 40x32mm	N0	4		
Q	Ditto but 32 x100mm	N0	4		
R	Ditto 50 x 100 mm	N0	4		
	PVC FLOOR TRAPS				
	PVC floor trap as METRO, complete with cover grating to match floor finish or equal approved.	N0	4		
	Total carried to summary page MBS-51				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	ELEMENT NO. 3				
	FIRE FIGHTING INSTALLATION				
	Supply,deliver,install,test and commission the following including all materials and jointing to supply pipes, ,supports ,etc				
A	Hobby booster pump for hose reel, comprising of 2N0.pumps,duty and standby, capable of a flow rate of 2.3 l/s against pressure head of 2.3 Bar, complete with flow control switch of a sensitivity of 0.11/s,control panel, pressure switch, pressure tank, ant-vibration hose, etc as necessary for automatic operation or equal approved.	Set	1		
	HOSE REEL				
B	Standard manual swinging type recessed fire hose reel, comprising 35M length of non-kinking reinforced rubber,19mm bore diameter hose wound on a metal reel with a hollow rotating shaft to BS 3169:1981.The shaft shall be permanently connected to the water supply by special pipework. One end of the rubber hose shall be connected to the rotating shaft and the other to the shut-off adjustable type nozzle of 4.8mm or 6.3mm diameter, capable of producing a minimum flow rate of 23 l/min, controlled through a plastic jet nozzle spray to produce a spray of atleast 7M long. The hose shall be complete with control brass gate valve as PEGLER 20mm diameter of rising stem type with a hand wheel head indicating direction of open and close or equal approved	NO	0		
	HOSE REEL PIPEWORK *Supply, deliver, install, test and commission galvanized mild steel tubing to BS1387 medium grade with screwed and socketed joints to BS 21 and galvanized cast iron fittings to BS 143 and 1256. Tenderers MUST allow in their pipe work prices for all the couplings, connectors, unions, jointing, etc as required in the normal running lengths of pipe work and also where necessary for pipe fixing clips, holderbats plugs screws and pipe sleeves through structural members.*				
C	20mm diameter GMS pipes class B	LM	0		
D	Ditto 25mm	LM	0		
E	Ditto 50mm	LM	6		
F	Ditto but 40mm	LM	6		
G	Ditto 32mm	LM	6		
	Carried forward to Summary				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSH)
	EXTRA OVER GMS PIPES				
A	20mm diameter bends	NO	0		
B	Ditto 25mm	NO	0		
C	Ditto 50mm	NO	4		
D	50x40mm reducer	NO	1		
E	40x32mm reducer	NO	2		
F	50mm diameter equal tee	NO	2		
G	25x20mm reducing bush	NO	0		
H	Union 20mm diameter	NO	0		
I	Union 25mm diameter	NO	0		
J	Union 50mm diameter	NO	2		
K	Nipple 50mm diameter	NO	4		
L	Nipples 20mm diameter	NO	0		
M	BRASS GATE VALVE 20mm diameter approved cast high pressure screw down full-way non-rising stem solid wedge disc gate valve to BS 5154 PN16 for series B rating with hand wheel head and jointing to steel tubing as CRANE model N0 156 or equal to be approved.	NO	0		
N	Ditto but 50mm.	NO	2		
O	NON-RETURN 50mm diameter screwed in cap lift type metal disc bronze non-return valve to BS 5154 PN 32 for series B rating as CRANE model N0.D105 or equal to be approved.	NO	2		
	Carried forward to Summary				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSH)
A	Allow for the sheltering of booster pump set from adverse weather.	Item			
	PORTABLE FIRE APPLIANCES.				
	Supply, deliver, install, connect and set to work, the following, complete with charge and all accessories.				
B	9.0 litres water /Co2 fire extinguishers to BS 5423 as manufactured by Mather & Platt, complete with charge, fixing brackets, pictorial instructions,colour code, discharge horn & hose and operating valve or equal.	NO	9		
C	9.0Kg dry chemical powder fire extinguishers to BS 5424 as manufactured by Mather & Platt, complete with charge, fixing brackets, pictorial instructions,colour code,dischare horn & hose and operating valve or equal.	NO	9		
D	4.5 kg portable fire extinguisher as manufactured by Mather & Platt to BS 5045,complete with charge, fixing brackets, pictorial instructions, lour coding, discharge horn & hose plus operating valve.	NO	9		
	PROTECTION PAINTING.				
E	Allow for painting the pipes with two coats of appropriate shade of FIRE RED after cleaning and smoothing.	ITEM	0		
	Carried forward to Summary				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSH)
	COLLECTION PAGE				
1	BALANCE B/F 8|MBS				
2	BALANCE B/F 9|MBS				
3	BALANCE B/F 10|MBS				
	SUB TOTAL				
	Allow 10% contingency				
	TOTAL FOR ELEMENT NO. 4 FIRE FIGHTING INSTALLATION (MECHANICAL WORKS) CARRIED TO GRAND SUMMARY				

COLLECTION PAGE

ITEM	DESCRIPTION	PAGE	AMOUNT (KSH)
1	BALANCE B/F	MBS-40	
2	BALANCE B/F	MBS-41	
3	BALANCE B/F	MBS-42	
4	BALANCE B/F	MBS-43	
5	BALANCE B/F	MBS-44	
6	BALANCE B/F	MBS-45	
7	BALANCE B/F	MBS-46	
8	BALANCE B/F	MBS-47	
9	BALANCE B/F	MBS-48	
10	BALANCE B/F	MBS-49	
	Total carried to Grand Summary page		

SCHEDULE OF ON-GOING PROJECTS.

Details of on-going or committed projects, including expected completion date.

PROJECT NAME	NAME OF CLIENT	CONTRACT SUM	% COMPLETE	COMPLETION DATE

CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS

Work performed on works of a similar nature and volume over the last five years.

PROJECT NAME	NAME OF CLIENT	TYPE OF WORK AND YEAR OF COMPLETION	VALUE OF CONTRACT (KSH)

NB: Attach separate lists if space here is not enough.
I certify that the above works were successfully carried out and completed by us.

---------- ---------- -----------

Title Signature Date

KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the contract.

POSITION	NAME	YEARS OF EXPERIENCE (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION

I certify that the above information is correct.

---------- ---------- ----------

Title Signature Date

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED.

SECTION – F

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

CONTENTS.

CLAUSE N0.		PAGE N0.
1.0	GENERAL NOTES TO TENDERERS	MBS-65
2.0	TECHNICAL SCHEDULE	MBS-66

TECHNICAL SCHEDULE

GENERAL NOTES.

1. General Notes to the Tenderers.

1.1 The Tenderer shall submit technical schedules for all materials and equipment, upon which he has based his tender sum.

The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturers' literature shall be accepted. Failure to comply with this may have his tender disqualified.

Completion of the technical schedule shall not relieve the Contractor from Complying with the requirements of the specifications except as may be approved by the Engineer.

TECHNICAL SCHEDULE

ITEM	DESCRIPTION	MANUFACTURERS'	COUNTRY OF ORIGIN	REMARKS, CATALOGUE N0.,ETC
1	WC pans			
2	WC flush cisterns			
3	Urinal bowls			
4	Wash hand basins			
5	Mirrors			
6	Hand driers			
7	Tissue holders			
8	Urinal flush cistern			
9	S.S. Kitchen sinks			
10	Hose reel booster pumps			
11	Hose reel			
12	Fire hydrant valve			
13	Fire Extinguishers			
14	Water tanks			
15	PVC pipes			
16	GMS pipes			
17	Taps			
18	Bottle traps			
19	Gate valves			
20	Stop corks			
21	Non return valves			
22	Urinal flush valve			
23	Soap dispenser			
24	Instantaneous Hot water heaters			

BILL NO. 4

ELECTRICAL INSTALLATION WORKS

Eligible Electrical Sub-contractors **MUST** meet the following conditions:-

1. Be Registered by Energy Regulatory Commission (ERC) as Electrical Contractors Class 'B' or above.
2. Be Registered by National Construction Authority category 'NCA7' or above.
3. Proof of the above to be provided
4. Contacts of the prospective sub-contractor to be provided.

SECTION D

PARTICULAR SPECIFICATION

OF

MATERIALS AND WORKS

GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

2.1 General

2.2 Standard of Materials

2.3 Workmanship

2.4 Procurement of Materials

2.5 Shop Drawings

2.6 Record Drawings

2.7 Regulations and Standards

2.8 Setting out Works

2.9 Position of Electrical Plant and Apparatus

2.10 M.C.B Distribution Panels and Consumer Units

2.11 Fused Switchgear and Isolators

2.12 Conduits and Conduit Runs

2.13 Conduit Boxes and Accessories

2.14 Labels

2.15 Earthing

2.16 Cables and Flexible Cords

2.17 Armoured PVC Insulated and Sheathed Cables

2.18 Cable Supports; Markers and Tiles

2.19 PVC Insulated Cables

2.20 Heat Resisting Cables

2.21 Flexible Cords

2.22 Cable Ends and phase Colours

2.23 Cable Insulation Colours

2.24 Sub-circuit Wiring

2.25 Space Factor

2.26 Insulation

2.27 Lighting Switches

2.28 Sockets and Switched sockets

2.29 Fused Spur Boxes

2.30 Cooker Outlets

2.31 Connectors

2.32 Lampholders

2.33 Lamps

2.34 lighting Fittings Street lighting Lanterns

2.35 Position of Points and Switches

2.36 Street/Security Lighting Columns

2.37 Timing Control Switch

2.38 Wiring System for Street Lighting

2.39 Metal control Pillar

2.40 Current Operated Earth leakage circuit breaker

2.41 MV Switchboard

2.42 Steel Conduits and Steel Trunking

2.43 Testing on Site

2.1 SHOP DRAWINGS

Before manufacture or Fabrication is commenced the sub-contractor shall submit Two copies of detailed drawings of all control pillars, meter cubicles, medium voltage switchboards including their components showing all pertinent information including sizes, capacities, construction details, etc, as may be required to determine the suitability of the equipment for the approval of the Engineer. Approval of the detailed drawings shall not relieve the sub-contractor of the full responsibility of errors or the necessity of checking the drawings himself or of furnishing the materials and equipment and performing the work required by the plans and specifications.

2.2 RECORD DRAWINGS

These diagrams and drawings shall show the completed installation including sizes, runs and arrangements of the installation. The drawings shall be to scale not less than 1 :50 and shall include plan views and section.

The drawings shall include all the details which may be useful in the operation, maintenance or subsequent modifications or extensions to the installation.

Three sets of diagrams and drawings shall be provided, all to the approval of the Engineer.

One coloured set of line diagrams relating to operating and maintenance instructions shall be framed and, mounted in a suitable location.

2.3 REGULATIONS AND STANDARDS

All work executed by the Sub-contractor shall comply with the current edition of the “Regulations” for the Electrical Equipment of Buildings, issued by the Institution of Electrical Engineers, and with the Regulations of the Local Electricity Authority.

Where the two sets of regulations appear to conflict, they shall be clarified with the Engineers. All materials used shall comply with relevant Kenya Bureau of Standards Specification.

2.4 SETTING OUT WORK

The sub-contractor at his own expenses; is to set out works and take all measurements and dimensions required for the erection of his materials on site; making any modifications in details as may be found necessary during theprogress of the works, submitting any such modifications or alterations in detailto the Engineer before proceeding and must allow in his Tender for all such modifications and for the provision of any such sketches or drawings related thereto.

2.5 POSITIONS OF ELECTRICAL PLANT AND APPARATUS

The routes of cables and approximate positions of switchboards etc, as shown on the drawings shall be assumed to be correct for purpose of Tendering, but exact positions of all electrical Equipment and routes of cables must be agreedon site with the Engineer before any work is carried out.

2.6 MCB DISTRIBUTION PANELS AND CONSUMER UNITS

All cases of MCB Panels and consumer units shall be constructed in heavy gauge sheet with hinged covers.

Removable undrilled gland plates shall be provided on the top and bottom of the cases. Miniature circuit breakers shall be enclosed in moulded plastic with the tripping mechanism and arc chambers separated and sealed from the cable terminals.

The operating dolly shall be tripfree with a positive movement in both make and break position. Clear indication of the position of the handle shall be incorporated.

The tripping mechanism shall be on inverse characteristic to prevent tripping in temporary overloads and shall not be affected by normal variation in ambient temperature.

A locking plate shall be provided for each size of breaker; A complete list of circuit details on typed cartridge paper glued to stiff cardboards and covered with a sheet of perspex, and held in position with four suitable fixings, shall be fitted to the inner face of the lids of each distribution panel. The appropriateMCB ratings shall be stated on the circuit chart against each circuit in use: Ivorine labels shall be secured to the insulation barriers in such a manner as to indicate the number of the circuits shown on the circuit chart.
Insulated barriers shall be fitted between phases, and neutrals in all boards, and to shroud live parts.

Neutral cables shall be connected to the neutral bar in the same sequence as the phase cables are connected to the MCB's . This shall also apply to earth bars when installed.

2.7 FUSED SWITCHGEAR AND ISOLATORS

All fused switchgear and isolators whether mounted on machinery, walls or industrial panels shall conform to the requirements of KS 04 – 226 PART: 1: 1985.

All contacts are to be fully shrouded and are to have a breaking capacity on manual operations as required by KS 04 – 182 : 1980.

Fuse links for fused switches are to be of high rupturing capacity cartridge type, conforming to KS 04 – 183 : 1978.

Isolators shall be load breaking/fault making isolators.

Fused switches and isolators are to have separate metal enclosures. Mechanical interlocks are to be provided between the door and main switch operating mechanism so arranged that the door may not be opened with the switch in the 'ON' position. Similarly; it shall not be possible to close the switch with the door open except that provision to defeat the mechanical interlock and close the switch with the door in the open position for test purposes. The 'ON' and 'OFF' positions of all switches and isolators shall be clearly indicated by a mechanical flag indicator or similar device. In T.P & N fused switch units, bolted neutral links are to be fitted.

2.8 CONDUITS AND CONDUIT RUNS

Conduit systems are to be installed so as to allow the loop-in system of wiring:

All conduit shall be black rigid super high impact heavy gauge class 'A' PVC in accordance with KS 04 – 179: 1988 and IEE Regulations. No conduit less than 20mm in diameter shall be used anywhere in this installation.

Conduit shall be installed buried in plaster work and floor screed except when run on wooden or metal surface when they will be installed surface supported with saddles every 600mm. Conduit run in chases shall be firmly held in position by means of substantial pipe hooks driven into wooden plugs.

The Sub-contractors attention is drawn to the necessity of keeping all conduits entirely separate from other piping services such as water and no circuit connections will be permitted between conduits and such pipes.
All conduits systems shall be arranged wherever possible to be self-draining to switch boxes and conduit outlet points for fittings:

The systems, when installed and before wiring shall be kept plugged with well fitting plugs and when short conduit pieces are used as plugs, they shall be doubled over and tied firmly together with steel wire; Before wiring all conduit systems shall be carried out until the particular section of the conduit installation is complete in every respect.

The sets and bends in conduit runs are to be formed on site using appropriate size bending springs and all radii of bends must not be less than 2.5 times the outside diameter of the conduit. No solid or inspection bends, tees or elbows will be used.

Conduit connections shall either be by a demountable (screwed up) assembly or adhesive fixed and water tight by solution. The tube and fittings must be clean and free of all grease before applying the adhesive. When connections are made between the conduit and switch boxes, circular or non-screwed boxes, care shall be taken that no rough edges of conduit stick out into the boxes.

Runs between draw in boxes are not to have more than two right angle bends or their equivalent . The sub-contractor may be required to demonstrate to the Engineers that wiring in any particular run is easily withdrawable and the sub-contractor may, at no extra cost to the contract; be required to install additional draw-in boxes required. If conduit is installed in straight runs in excess of 6000mm, expansion couplings as manufactured by Egatube shall be used at intervals of 6000mm.

Where conduit runs are to be concealed in pillars and beams, the approval of the Structural Engineer, shall be obtained. The sub-contractor shall be responsible for marking the accurate position of all holes, chases etc, on site, or if the Engineer so directs, shall provide the Main Contractor with dimensional drawings to enable him t o mark out and form all holes and chases. Should the sub-contractor fail to inform the main contractor of any inaccuracies in this respect they shall be rectified at the sub-contractors expense.

It will be the Sub-contractors responsibility to ascertain from site, the details of reinforced concrete or structural steelwork and check from the builder's drawings the positions of walls, structural concrete and finishes. No reinforced concrete or steelwork may be drilled without first obtaining the written permission of the Structural Engineer.

The drawings provided with these specifications indicate the appropriate positions only of points and switches, and it shall be the Sub-Contractors responsibility to mark out and centre on site the accurate positions where necessary in consultation with the Architect and the Engineer. The sub-contractor alone shall be responsible for the accuracy of the final position.

2.13 CONDUIT BOXES AND ACCESSORIES

All conduit outlets and junction boxes are to be either malleable iron and of standard circular pattern of the appropriate type to suit saddles being used or super high impact PVC manufactured to KS 04 – 179 : 1983.

Small circular pattern boxes are to be used with conduits up to and including 25mm outside diameter. Rectangular pattern adaptable boxes are to be used for conduits of 32mm outside diameter and larger. For drawing in of cables in exposed runs of conduit, standard pattern through boxes are to be used:

Boxes are to be not less than 50mm deep and of such dimensions as will enable the largest appropriate number of cables for the conduit sizes to be drawn in without excessive bending.

Outlet boxes for lighting fittings are to be of the loop-in type where conduit installation is concealed and the sub-contractor shall allow one such box per fitting, except where fluorescent fittings are specified when two such boxes per fitting shall be fitted flush with ceiling and if necessary fitted with break joint rings. Pattresses shall be fitted where required to outlets on surface conduit runs.

Adaptable boxes are to of PVC or mild steel (of not less than 12swg) and black enamelled or galvanised finish according to location. They shall be of square or oblong shape location. They shall be of square or oblong shape complete with lids secured by four 2 BA brass roundhead screws; No adaptable box shall be less than 75mm x 75mm x 50mm or larger than 300mm x 300mm x 75mm and shall be adequate in depth in relation to the size of conduit entering it. Conduits shall only enter boxes by means of conduit bushes.

2.14 LABELS

Labels fitted to switches and fuseboards;-

(i) Shall be Ivorine engraved black on white.

(ii) Shall be secured by R.H brass screws of same manufacturing throughout.

(iii) Shall be indicated on switches:-
- a) Reference number of switch
- b) Special current rating
- c) Item of equipment controlled

(iv) Shall indicate on MCB panels
- a) Reference number
- b) Type of board, i.e;, lighting, sockets, etc,.
- c) Size of cable supplying panel
- d) where to isolate feeder cable

(v) Shall be generally not less than 75mm x 50mm.

2.15 EARTHING

The earthing of the installation shall comply with the following requirements;-

(i) It shall be carried out in accordance with the appropriate sections of the current edition of the Regulations, for the Electrical Equipment of Buildings issued by Institute of Electrical Engineers of Great Britain.

(ii) At all main distribution panels and main service positions a 25mm x 3mm minimum cross sectional area Copper tape shall be provided and all equipment including the lead sheath and armouring of cables, distribution boards and metal frames shall be bonded thereto.

(iii) The earth tape in Sub-clause (ii) shall be connected by means of a copper tape or cable of suitable cross sectional area to an earth electrode which shall be a copper earth rod (see later sub-clause).

(iv) All tapes to be soft high conductivity copper, untinned except where otherwise specified and where run underground on or through walls, floors, etc., it shall be served with corrosion resisting tape or coated with corrosion compound and braided

(v) Where the earth electrode is located outside the building a removable test link shall be provided inside the building as near as possible to the point of entry to the tape, for isolating the earth electrode for testing purposes.

(vi) Earthing of sub-main equipment shall be deemed to be satisfactory where the sub-main cables are M.I.C.S. or conduit with separate earth wire, and installation is carried out in accordance with the figures stated in the current edition of the I.E.E Regulations.

(vii) Where an earth rod is specified (see Sub-clause (iii) it shall be proprietary manufacture, solid hand drawn copper of 15mm diameter driven into the ground to a minimum depth of 3.6m . It shall be made up to 1.2m sections with internal screw and socket joints and fitted with hardened steel tip and driving cap.

(viii) Earth plates will not be permitted

(ix) Where an earth rod is used the earth resistance shall be tested in the manner described in the current edition of the IEE Regulations, by the Sub-Contractor in the presence of the Engineer and the Sub-Contractor shall be responsible for the supply of all test equipment.

(x) Where copper tape is fixed to the building structure it structure it shall be by means of purpose made non-ferrous saddles which space the conductor away from the structure a minimum distance of 20mm. Fixings, shall be made using purpose made plugs; No fixings requiring holes to be drilled through the tape will be accepted.

(xi) Joints in copper tape shall be tinned before assembly riveted with a minimum of two copper rivets and seated solid.

(xii) Where holes are drilled in the earth tape for connection to items of equipment the effective cross sectional area must not be less than required to comply with the IEE regulations.

(xiii) Bolts, nuts and washers for any fixing to the earth tape must be of non-ferrous material.

(xiv) Attention is drawn to the need for the earthing metal parts of lighting fittings and for bonding ball joint suspension in lighting fittings.

2.16 CABLES AND FLEXIBLE CORDS

All cables used in this Sub-Contract shall be manufactured in accordance with the current appropriate Kenya standard Specification which are as follows:-

P.V.C. Insulated Cables and Flexible Cords - Ks 04-192:1988

P.V.C. Insulated Armoured Cables - Ks 04-194:1990

Armouring of Electric cables - Ks 04-290:1987

The successful Sub-Contractor will, at the Engineers discretion be required to submit samples of cables for the Engineers approval; the Engineer reserves the right to call for the cables of an alternative manufacture without any extra cost being incurred.
P.V.C. insulated cables shall be 500/1000 volt grade. No cables smaller than 1.5mm² shall be used unless otherwise specified. The installation and the finish of cables shall be as detailed in later clauses. The colour of cables shall conform with the details stated in the “Cable Braid and insulation Colours” Clause.

2.17 ARMOURED P.V.C. INSULATED AND SHEATHED CABLES:

Shall be 600/1000 volt grade manufactured to Ks 04-194:1988 and Ks 04-187/188 with copper stranded conductors.

The wire armour of the cable shall be used wholly as an earth continuity conductor and the resistance of the wire armour shall have a resistance not more than twice of the largest current carrying conductor of the cable.

P.V.C./S.W.A./P.V.C. cables shall be terminated using “Telecom” “B” type or approved equal or approved equal glands and a P.V.C. tapered sleeve shall be provided to shroud each gland.

Where cables rise from floor level to switchgear etc., they shall be protected by P.V.C. conduit, to a height of 600mm from finished floor level, whether the cable is run on the surface or recessed into the wall.

2.18 CABLE SUPPORTS, MARKERS AND TILES

All PVC/SWA/PVC cables run inside the building shall be fixed in rising ducts or on ceilings by means of die cost cables hooks or clamps, or appropriate size to suit cables, fixed by studs and back nuts to their channel sections.

Alternatively, fixing shall be by BICC claw type cleating system with die-cast cleats and galvanised mild steel back straps or similar approved equal method. For one or two cables run together the cleats shall be fixed a special channel section supports or backstraps described above which shall in turn be secured to walls or ceilings of ducts by rawbolts.

In excessively damp or corrosive atmospheric conditions special finishes may be required and the Sub-contractor shall apply to the Engineer for further instructions before ordering cleats and channels for such areas.

The above type of hooks and clamps and channels or cleats and blackstraps shall also be used for securing cables in vertical ducts.

Cables supports shall be fixed at 600mm maximum intervals, the supports being supplied and erected under this Sub-contract. Saddles shall not be used for supporting cables nor any other type of fixing other than one of the two methods described above or other system which has received prior approval of the Engineer;

Cables are to be kept clear of all pipe work and the Sub-contractor shall work in close liaison with other services Sub-contractors.

The Sub-Contractor shall include for the provision of fixing of approved type coloured slip on cables end markers to indicate permanently the correct phase and neutral colours on all ends.

Provision shall be made for supplying and fixing approved non-corrosive metal cable markers to be attached to the outside of all PVC/SWA/PVC cables at 15mm intervals indicating cable size and distinction.

Where PVC/SWA/PVC cables are outside the building they shall be laid underground 750mm deep with protecting concrete interlocking cover tiles laid over which shall be provided and laid under this Sub-contract.

All necessary excavations and reinstatement of ground including sanding or trenches will be carried out by the Sub-Contractor, unless otherwise stated.

2.19 PVC INSULATED CABLES

Shall be of non-braided type as CMA reference 6491 x 600/1000/1000 volt grade cables, or equal approved.

PVC cables shall conform to the details of the " Cables and Flexible cords" and "Cable Braid and Insulation Colours" clauses.

2.20 HEAT RESISTING CABLES

Final connections to cookers, water heaters, etc., shall be made using butyl rubber insulated cable as CMA reference 610 butyl (Single core 600/1000 Volt).

This type of cable shall be used in all instances where a temperature exceeding 100°F, but not exceeding 150°F is likely to be experienced. Final connections to all lighting fittings (and other equipment where a temperature in excess of 150°c likely to be experienced) shall be made using silicon rubber insulated cable or equal and approved.

2.21 FLEXIBLE CORDS

Shall be in accordance with the "Cable and Flexible Cords" clause. No cord shall be less than 24/0.2mm in size unless otherwise specified.

Circular white twin TRS flex shall be used for plain pendant fittings up to 100 watts. For all other types of lighting fittings the flexible cable shall be silicone rubber insulated.

No polythene insulated flexible cable shall be used in any lighting fitting or other appliance (see "Heat Resisting Cables" Clause 30).

2.22 CABLE ENDS AND PHASE COLOURS

All cable ends connected up in switchgear, MCB panels etc;, shall have the insulation carefully cut back and the ends sealed with Hellerman rubber slip on cable end markers.

The markers shall be of appropriate phase colour for switch and all other live feeds to the details of the "Cable Insulation Colours" clause. Black cable with black end markers shall only be used for neutral cables.

2.23 CABLE INSULATION COLOURS

Unless otherwise stated in later clauses the insulation colours shall be in accordance with the following table.

Where other systems are installed the cable colours shall be in accordance with the details stated in the appropriate clause.

SYSTEM	INSULATION COLOUR	CABLE END MARKER
Main and Sub-Main		
a) Phase	Red	Red
b) Neutral	Black	Black
1) Sub-Circuits Single Phase		
a) Phase	Red	Red
b) Neutral	Black	Black

2.24 SUB-CIRCUIT WIRING

For all lighting and sockets wiring shall be carried out in the "looping in" system and there shall be no joints whatsoever. No lighting circuits shall comprise more than 20 points when protected by 10A MCB. Cables with different cross-section area of copper shall not be used in combination.

Lighting circuits P. V.C. cable 1.5mm² for all lighting circuits indicated on the drawing.
Power circuits P.V.C cable (minimum sizes).

(i) 2.5mm² for one, two or three 5Amp sockets wired in parallel.

(ii) 2.5mm² for one 15Amp socket.

(iii) 2.5mm² for maximum of ten switched 13 Amp sockets wired from 30 Amp MCB.

The wiring sizes for lighting circuits and sockets are shown on the drawings. In such cases, the sizes shown on the drawings shall prevail over the sizes specified.

Wiring sizes for other appliances shall be shown on the drawing or specified in later clauses of this specification.

2.25 SPACE FACTOR

The maximum number of cables that may be accommodated in a given size of conduit or trunking or duct is not to exceed the number in Tables B.5 and B.6 or as stated in Regulation B.91, B.117 and B.118 of the I.E.E Regulations whichever is appropriate.

2.26 INSULATION

The insulation resistance to earth and between poles of the whole wiring system, fittings and lumps, shall not be less than the requirements of the latest edition of the I.E.E Regulations. Complete tests shall be made on all circuits by the Sub-contractor before the installations are handed over.

A report of all tests shall be furnished by the Sub-Contractor to the Engineer. The Engineer will then check test with his own instruments if necessary.

2.27 LIGHTING SWITCHES

These shall be mounted flush with the walls, shall be contained in steel or alloy boxes and shall be of the gangs ratings and type shown in the drawings. They shall be as manufactured by M.K. Electrical Ltd., or other equal and approved to KS 04 – 247: 1988

2.28 SOCKETS AND SWITCHED SOCKETS

These shall be flush pattern in steel/pvc box and shall be of the gangs and type specified in the drawings.

They shall be 13- Amp, 3-pin, shuttered, switched and as manufactured by “M.K. Electrical Co. Ltd.”, or other approved equal to KS 04 – 246: 1987

2.29 FUSED SPUR BOXES

These shall be flush, D.P switched as in steel/pvc box and of type and make specified in the drawings complete with pilot light and as manufactured by “M. K. Electrical Company Ltd”, or other approved equal. KS 04 – 247: 1988

2.30 COOKER OUTLETS

These shall be flush mounted with 13-A switched socket outlet and neon indicator Lamps.
The cooker control units shall be as manufactured by “M.K. Electrical Company Ltd”, or other approved equal KS 04 – 247: 1988

2.31 CONNECTORS

Shall be specified in the drawings and appropriate rating. These shall be fitted at all conduit box lighting point outlets for jointing of looped P.V.C cables with flexible cables of specified quality.

2.32 LAMPHOLDERS

Shall be of extra heavy H.O skirted and shall be provided for every specified lighting fitting and shall be B.C;, E.S;, or G.E.S as required. All E.S. and G.E.S. holders shall be heavy brass type (except for plain pendants where the reinforced bakelite type shall be used). The screwed cap of the E.S and G.E.S. holders shall be connected to the neutral.

Where lampholders are supported by flexible cable, the holders shall have “cord grip” arrangements and in the case of metal shades earthing screws shall be provided on each of the holders.

The Sub-Contractor must order the appropriate type of holder when ordering lighting fittings, to ensure that the correct types of holders are provided irrespective of the type normally supplied by the manufacturers.

2.33 LAMPS

All lamps shall be suitable for normal stated supply voltage and the number and sizes of lamps detailed on the drawings shall be supplied and fixed. The Sub-Contractor must verify the actual supply voltage with the supply authority before ordering the lamps.

Tungsten filament lamps shall be manufactured in accordance with KS 04 – 112:1978 for general service lamps and KS 04 – 307:1985 for lamps other than general services. Tubular fluorescent lamps shall comply with KS 04 – 464:1982

Pearl lamps shall be used in all fittings unless otherwise specified.

2.34 LIGHTING FITTINGS AND STREET LIGHTING LANTERNS

This Sub-Contract shall include for the provision, handling charges, taking the delivery, safe storage, wiring (including internal wiring) assembling and erecting of all lighting fittings shown on the drawings.

All fittings and pendants shall be fixed to the conduit boxes with brass R/H screws. These to be in line with metal finish of fittings. The lighting fittings are detailed for the purpose of establishing a high standard of finish and under no circumstances will substitute fittings be permitted.
In case of rectangular shaped ceiling fittings, the extreme ends of the fittings shall be secured to suitable support in addition to the central conduit box fittings. Supports shall be provided and fixed by the Sub-Contractor.

The whole of the metal work of each lighting fittings shall be effectively bonded to earth. In the case of ball and/or knuckle joints short lengths of flexible cable shall be provided, bonded to the metal work on either side of the joints. If the above provisions are not made by the manufacturers -, the Sub-contractor shall include cost of additional work necessary in his tender. See “Flexible Cords” clause for details of internal wiring of lighting fittings. Minimum size of internal wiring shall be 20/0.20mm (23/0067). Each lighting fitting shall be provided with number type and size of lamps as detailed on the drawings. It is to be noted that some fittings are suspended as shown on the drawings.

Where two or more points are shown adjacent to each other on the drawings, e.g socket outlet and telephone outlet, they shall be lined up vertically or horizontally on the centre lines of the units concerned.

Normally, the units shall be lined up on vertical centre lines, but where it is necessary to mount units at low level they shall be lined up horizontally.

2.35 POSITIONS OF POINTS AND SWITCHES

Although the approximate positions of all points are shown on the drawings, enquiry shall be made as to the exact positions of all M.C.B panels, lighting points, socket outlets etc, before work is actually commenced. The Sub- contractor must approach the Architect with regard to the final layout of all lights on the ceiling and walls.

The Sub-contractor must consult with the Engineer in liaison with the Clerk of Works, or the General Foreman on site regarding the positions of all points before fixing any conduit etc. The Sub-Contractor shall be responsible for all alterations made necessary by the non-compliance with the clause.

2.36 STREET/SECURITY OUTDOOR LIGHTING COLUMNS:

The column shall be at a minimum of 225mm in the ground on 75mm thick concrete foundations and the pole upto 150mm shall be surrounded with concrete. The top bracket and plain section of the columns shall be common to and interchangeable with all brackets with maximum mismatching tolerance of 3mm between any pole and bracket. After manufacture and before erection the columns shall be treated with an approved mordant solution which shall be washed off and the whole allowed to dry. Thereafter, the columns shall be painted with one undercoat and two coats of gloss paint to an approved colour. All columns shall be complete with fused cut-outs.

2.37 TIMING CONTROL SWITCH

These shall be installed where shown on the drawings. Photocell timing control circuits which will operate ‘on’ with a specified level of darkness and ‘off’ with a given level of light. The initial adjustment will be done with approval of the Electrical Engineer.

2.38 WIRING SYSTEM FOR STREETLIGHTING

Cables shall be as indicated on the drawings, and shall be laid in a cable trench 450mm deep along the road sides and 600mm deep across the roads and 900mm away from the road kerb or 1500mm away from the edges of the road. 'Loop-in' and 'Loop-out' arrangement shall be used at every pole. Wiring to the lanterns on each pole shall be with 1.5mm² PVC twin insulated and sheathed cable with earth wire shall be laid at least 600mm below the finished road level on a compact bed of murram at least 50mm thick and covered with a concrete surrounded 150mm thick.

2.39 METAL CONTROL PILLAR

These shall be metal clad and fabricated as per contract drawings and specification. The Sub-Contractor shall supply, install, test and commission control pillars including supplying, fixing connecting switchgears as detailed on the appropriate drawings.

2.40 CURRENT OPERATED EARTH LEAKAGE CIRCUIT BREAKER

Current operated earth leakage circuit breaker shall conform to B.S.S. 4293:68 rated at 240 volts D.P. 50 cycles A.C. Mains.

The breaker shall be provided with test switch and fitted in weather proof enclosure for surface mounting. The rated load current and earth fault operating current shall be as specified in the drawings. These shall be as manufactured by Crabtree, Siemens or other equal and approved.

2.41 M.V. SWITCHBOARD AND SWITCHGEAR

The switchboard shall be manufactured in accordance with KS04-226 which co-ordinates the requirements for electrical power switchgear and associated apparatus. It is not intended that this K.S. should cover the requirements for specified apparatus for which separate Kenyan Standard exist. All equipment and material used in the switchboard shall be in accordance with the appropriate Kenya Standard.

The switchboard shall comprise the equipment shown on the drawings together with all current transformers, auxiliary fuses, labels, small wiring and interconnections necessary for the satisfactory operation of the switchboard

Switchboard shall be of the flush fronted, enclosed, metal clad type with full front or rear access as called for in the particular specifications, suitable for indoor use, sectionalized as necessary to facilitate transport and erection. The maximum height of the switchboard is to be approximately 2.0 meters. A suitable connection chamber containing all field terminals shall be provided at the top or bottom of the switchboard as appropriate.

Before manufacture, the Sub-Contractor shall submit to the consulting Engineer for approval of detailed drawings showing the layout, construction and connection of the switchboard.

All bus-bars and bus-bar connections shall consist of high conductivity copper and be provided in accordance with KS 04-226: 1985. The bus-bars shall be clearly marked with the appropriate phase and neutral colours which should be red, yellow, blue for the phases and black for neutral. The bus-bars shall be so arranged in the switchboard that the extensions to the left and right may be made in the future with ease should the need arise.

Small wiring, which will be neatly arranged and cleated, shall be executed in accordance with B.S. 158 and the insulation of the wiring shall be colored according to the phase or neutral connection.

Switches and fuse switches, shall be in strict accordance with KS04-183:1978 Class 2 switches. Means of locking the switch in the “OFF” position shall be provided.

All fuse switches shall comply with KS04-183:1978, PARTS 2 and 3 a fault rating at least equal to the fault rating of the switchboard in which they are installed. Cartridge fuse links to KS 04-183:1978 category A.C. 46, class Q1 and fusing factor not exceeding 1.5 shall be supplied with each Fused switch.

Mounting arrangements shall be such that individual complete fuse switches may be disconnected and withdrawn when necessary without extensive dismantling work. When switches are arranged in their formation all necessary horizontal and vertical barriers shall be provided to ensure segregation from adjacent units. Means of locking the switch in the “OFF” position shall be provided.

2.42 STEEL CONDUITS AND STEEL TRUNKING

Conduits shall be of heavy gauge class “B” welded to Standard specification KS 04-180:1985. In no case will conduit smaller than 20mm diameter be used on the works. Conduits installed within buildings shall be black enameled finish except where specified otherwise. Where installed externally or in damp conditions they shall be galvanised. Conduit fittings, accessories or equipment used in conjunction with galvanised conduits shall also be galvanised or otherwise as approved by the service engineer.

Metal trunking shall be fabricated from mild steel of not less than 18 swg. All sections of trunking shall be rigidly fixed together and attached to the framework or fabric or the building at intervals of not less than 1.2m. Joint trunking shall not overhang fixing points by more than 0.5m.

All trunking shall be made electrically continuous by means of 25 x 3mm copper links across each joint and where the trunking is galvanised, the links shall be made by galvanised flat iron strips.

All trunking fittings (i.e. Bends, tees, etc) shall leave the main through completely clear of obstructions and continuously open except through walls and floors at which points suitable fire resisting barriers shall be provided as may be necessary. The inner edge of bends and tees shall be chamfered where cables larger than 35mm^2 are employed.

Where trunking passes through ceilings and walls the cover shall be solidly fixed to 150mm either side of ceilings and floors and 50mm either side of walls.

Screws and bolts securing covers to trunking or sections of covers together shall be arranged so that damage to cables cannot occur either when fixing covers or when installing cables in the trough.

Where trunking is used to connect switchgear of fuseboards, such connections shall be made by trunking fittings manufactured for this purpose and not by multiple conduit couplings.

Where vertical sections of trunking are used which exceed 4.5m in length, staggered tie off points shall be provided at 4.5m intervals to support the weight of cables.

Unless otherwise stated, all trunking systems shall be painted as for conduit.

Where a wiring system incorporates galvanized conduit and trunking, the trunking shall be deemed to be galvanized unless specified otherwise.

The number of cables to be installed in trunking shall be such as to permit easy drawing in without damage to the cables, and shall in no circumstances be such that a space factor of 45% is exceeded.

Conduit and trunking shall be mechanically and electrically continuous. Conduit shall be tightly screwed between the various lengths so that they butt at the socketed joints. The internal edges of conduit and all fittings shall be smooth, free from burrs and other defects. Oil and any other insulating substance shall be removed from the screw threads; where conduits terminate in fuse-gear, distribution boards, adaptable boxes, non-spouted switchboxes, etc., they shall, unless otherwise stated, be connected thereto by means of smooth bore male brass bushes, compression washers and sockets. All exposed threads and abrasions shall be painted using an oil paint for black enamelled tubing and galvanising paint for galvanised tubing immediately after the conduits are erected. All bends and sets shall be made cold without altering the section ofthe conduit. The inner radius of the bed shall not be less than four (4) times the outside diameter of the conduit. Not more than two right angle bends will be permitted without the inter-position of a draw-in-box. Where straight runs of conduit are installed, draw-in-boxes shall be provided at distances notexceeding 15mm. No tees, elbows, sleeves, either of inspection or solid type, will be permitted.

Conduit shall be swabbed out prior to drawing in cables, and they shall be laid so as to drain of all condensed moisture without injury to end connections.

Conduits and trunking shall be run at least 150mm clear of hot water and steam pipes, and at least 75mm clear of cold water and other services unless otherwise approved by the services engineer.

All boxes shall conform to KS 04 – 668: 1986, to be of malleable iron, and black enamelled or galvanised according to the type of conduit specified. All accessory boxes shall have threaded brass inserts.

Box lids where required shall be heavy gauge metal, secured by means of zinc plated or cadmium plated steel screws.

All adaptable boxes and lids of the same size shall be interchangeable.
Boxes used on surface work are to be tapped or drilled to line up with the conduit fixed in distance type saddles allowing clearance between the conduit and wall without the need for setting the conduit.

Where used in conjunction with mineral insulated copper sheathed cable, galvanised boxes shall be used and painted after erection.

Draw-in boxes in the floors are generally to be avoided but where they are essential they must be grouped in positions approved by the services engineer and covered and by the suitable floor traps, with non-ferrous trays and covers.

The floor trap covers are to be recessed and filled in with a material to match the floor surface.

The Sub-contractor must take full responsibility for the filling in of all covers, but the filling in material will be supplied and the filling carried out by the main building contractor.

Where buried in the ground outside the building the whole of the buried conduit is to be painted with two coats of approved bitumastic composition before covering up.

Where run on the surface, unpainted fittings and joints shall be painted with two coats of oil bound enamel applied to rust and grease free metalwork.

2.43 TESTING ON SITE

The Sub-contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the Regulations for the electrical equipment of buildings issued by the I.E.E of Great Britain, the Government Electrical Specification and the Electric Supply Company's By- Laws.

(a) Tests shall be carried out to prove that all single pole switches are installed in the 'live' conductor.

(b) Tests shall be carried out to prove that all socket outlets and switched socket outlets are connected to the 'live' conductor in the terminal marked as such, and that each earth pin is effectively bonded to the earth continuity system. Tests shall be carried out to verify the continuity of all conductors of each 'ring' circuit.

(c) Phase tests shall be carried out on completion of the installation to ensurethat correct phase sequence is maintained throughout the installation. Triplicate copies of the results of the above tests shall be provided within 14 days of the witnessed tests and the Sub-contractor will be required to issueto the service engineer the requisite certificate upon completion as required by the regulations referred to above.

(d) Any faults, defects or omissions or faulty workmanship, incorrectly positioned or installed parts of the installation made apparently by such inspections or tests shall be rectified by the Sub-contractor at his own expense.

(e) The Sub-contractor shall provide accurate instruments and apparatus and all labour required to carry out the above tests. The instruments and apparatus shall be made available to the services engineer to enable him to carry out such tests as he may require.

The Sub-contractor shall generally attend on other contractors employed on the project and carry out such electrical tests as may be necessary.

The Sub-contractor shall test to the services engineer's approval and as specified elsewhere in this specification or in standards and regulations already referred to, all equipment, plant and apparatus forming part of the works and before connecting to any power or other supply and setting to work.

Where such equipment, etc., forms part of or is connected to a system whether primarily or of an electrical nature or otherwise (e.g. air conditioning system) the Sub-contractor shall attend on and assist in balancing, regulating testing and commissioning, or if primarily an electrical or other system forming part of works, shall balance, regulate, test and commission the system to the service engineer's approval.

APPENDIX TO GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

The electrical sub-contractor shall comply with the following:-

1. Government Electrical Specifications No. 1 and No. 2.

2. All requirements of Kenya Power Company Limited, and Communications Commission of Kenya (CCK).
3. Institute of Electrical Engineer's Rules and Regulations for elctrical Installation in Buildings (Current Edition)

SECTION E

SCHEDULE OF CONTRACT DRAWINGS

SCHEDULE OF CONTRACT DRAWINGS

Drawing No.	Description
TVET/E-01	GROUND FLOOR-LIGHTING LAYOUT
TVET/E-02	GROUNG FLOOR-POWER LAYOUT
TVET/E-03	UPPER FLOOR-LIGHTING LAYOUT
TVET/E-04	UPPER FLOOR –PWER LAYOUT
TVET/E-05	GENERAL POWER DISTRIBUTION-SCHEMATIC

SECTION F

PARTICULAR SPECIFICATIONS

OF

MATERIALS AND WORKS

PARTICULAR SPECIFICATIONS

1.0 SITE LOCATION

The site of the proposed works is at…….

2.0 SCOPE OF WORKS

The works to be carried out under this sub-contract comprise supply, installation, testing and commissioning of the following:-

Electrical Works

This shall include: -

a. Electrical Installation
b. Trunking
c. Lightning Protection System

3.0 MATERIALS FOR THE WORKS

Materials shall be as specified in Section D and in the Bills of Quantities of this document which shall be read in conjunction with contract drawings. Alternative materials shall be accepted only after approval by the Project Manager.

SECTION G

SCHEDULE OF UNIT RATES

SCHEDULE OF UNIT RATES

1. The tenderer shall insert unit rates against the items in the following schedules and may add such other items as he considers appropriate.

2. 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.

3. The unit rates will be used to assess the value of additions or omissions arising from authorised variations to the contract works.

4. 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.

SCHEDULE OF UNIT RATES

NO	DESCRIPTION	QTY	UNIT	UNIT RATE	
				KSHS	CTS
	1) **Cables :** Four core armoured Cables:-				
	a) 16mm2	1	M		
	b) 25 mm2	1	M		
	c) 35mm2	1	M		
	d) 50mm2	1	M		
	e) 70 mm2	1	M		
	2) 4.0mmx2core armoured cales	1	M		
	3) 6.0mmx2core armoured cable	1	M		
	4)10.0mm x2Core armoured cable	1	M		
			M		
	5) 25mm single core pvc cable	1	M		
	6)10.0mm single core pvc cable				
	7) 2 Zone fire control panel c/w 72hr battery back-up.	1	NO		
	8) Bell sounders as: -				
	a) 24V DC4''(100mm)	1	NO		
	b) 24V DC 6''(150mm)	1	No		
	c) Weatherproof 24V DC 6''(150mm)	1	NO		
	9) 20A Tp contactor -Telemecanique				
	10) Photocell.	1	NO		
	11) Trenching(200mm widex450mm deep) ,tiling with hatari tiles,cable laying and Backfilling……	1	M		
	12) 6.8metres galvanized metal street lighting column for side entry(6M above ground & 800mm below)-lower part 100mm diameter-2.2m,followed by 75mm-1.8 and 50mm-2.0mm complete with internal wiring and fused excluding lantern	1	No		
	13)Beta 79 Lantern for side entry	1	No		
	14)Post top street light column 5M	1	No		
	15)Gamma 6 Lantern for post top mounting	1	No		

SECTION H

BILLS OF QUANTITIES

BILLS OF QUANTITIES

A) PRICING OF PRELIMINARIES ITEMS.

Prices will be inserted against item of preliminaries in the sub-contractor's Bills of Quantities and specification. These Bills are designated as Bill 1 in this Section. Where the sub-contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections:-

a) Preliminaries – Bill 1

Sub-contractors preliminaries are as per those described in section C – sub-contractor preliminaries and conditions of contract. The sub-contractor shall study the conditions and make provision to cover their cost in this Bill. The number of preliminary items to be priced by the Tenderer have been limited to tangible items such as site office, temporary works and others. However the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

b) Installation

The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
The unit of measurements and observations are as per those described in clause 1.05 of the section C.

c) Summary

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The sub-contractor shall insert his totals and enter his grand total tender sum in the space provided below the summary.
This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document

B) NOTES FOR BILLS OF QUANTITIES

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.

2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (including **16% V.A.T and 3 % Withholding tax**).

3 All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part.

4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere to. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

   Should the sub-contractor install any material not specified here in before receiving approval from the Project Manager, the sub-contractor shall remove the material in question and, at his own cost, install the proper material.

5. The grand total of prices in the price summary page must be carried forward to the **Form of Tender**.

6. Tenderers must enclose, together with their submitted tenders, **detailed coloured manufacturer's Brochure**s detailing Technical Literature and specifications of fittings they intend to offer. **This shall be used in the tender evaluation to determine the first line aesthetics and quality of fittings offered.**

7. No preliminaries are provided in this bills of quantities

1. Statement of Compliance

a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.

b) I confirm I have not made and will not make any payment to any person, who can be perceived as an inducement to win this tender.

Signed .....*for and on behalf of the Tenderer*

Date: ……..

Official Rubber Stamp: ……

SCHEDULE OF RATES AND SPECIFICATIONS FOR ELECTRICAL INSTALLATION WORKS TO THE PROPOSEDTWIN WORKSHOP,CLASSROOMS & OFFICES' BLOCK FOR TTIs IN CONSTITUENCIES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
	GROUND FLOOR				
	Supply ,install,test and commission the following:				
G1	Lighting points wired in 3x1.5 mm2 single core PVC cables drawn in 20mm heavy gauge conduits concealed in walls and floors,1-way switched but excluding the light fitting itself	48	No		
G2	Ditto' but 2 way	48	No		
G3	1 gang 1 way switch as MK or approved equal	17	No		
G4	3 gang 2 way switch as MK or approved equal	6	No		
G5	1 gang 2 way switch as MK or approved equal	7	No		
G6	2 gang 2 way switch as MK or approved equal	3	No		
G7	Emergency lighting points wired using 3x1.5mm2 pvc cables drawn in 20mm heavy gauge pvc conduits concealed in walls and floors but excluding the fitting itself	24	No		
G8	Emergency lighting fitting fitting as Thorn or approved equivalent	24	No		
G9	1500mmx2x58watts flourescent fitting complete with aluminium open ends trough reflectors and suspended with suitable chains one metre from concrete slab ceiling.Fitting to be as thorn or approved equal	18	No		`
	Total carried forward to collection page			**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
G10	1200mmx2x36watts flourescent fitting complete with open ends aluminium reflectors but mounted on ceiling with a 25mm spacing between ceiling and the fitting,Fitting to be as Thorn or approved equal.	20	No		
G11	Ditto' but 1200mmx2x36watts with louvres	6	No		
G12	1200mmx1x36watts bare batten flourescent fitting as thorn or approved equal	33	No		
G13	28x2D energy saving light fitting as thorn or approved equal	3	No		
G14	Bulkhead Light fitting complete with 18 watts energy saving lamp	6	No		
G15	Wall bracket composed of a frosted 250mm diametre globe luminaire complete with a compact PL flourescent lamp	2	No		
G16	manually operated fire alarm gong as Menvier or approved equal	1	No		
	MAIN SWITCH/METER BOARD				
G17	Wall mounted Modular main meter/switchboard fabricated from steel sheet gauge18, spray painted off-white colour and comprising the following;-				
	(i) 160Amps TP MCCB(main switch)-(Incomer) (ii) 4x160A copper busbars (iii) 1x100A SP MCCB-outgoer (v)1x 125A TP MCCB-outgoer (v)1x 100A TP MCCB-outgoer (vi) 3xphase indicators (vii) voltmeter, ammeter and their selector switches (viii)1x space for 3 phase energy meter ix) Enclosure complete with internal wiring				
	Total carried forward to collection page			**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
	SUB-SWITCH BOARD - DB1				
G18	Wall mounted Modular sub-switchboard fabricated from steel sheet gauge18, spray painted off-white colour and comprising the following;- (i) 125Amps TP MCCB -(Incomer) (ii) 4x100A copper busbars (iii) 1x100A TP contactor complete with reset button (iii) 1x100A SP MCCB (v)8x32A TP MCCB (v) 3x10A SP MCB (vi) 3x2x30A sp MCB (vii) 3xphase indicators (viii) voltmeter, ammeter and their selector switches ix) 1x space for 3 phase energy meter x) Enclosure complete with internal wiring		item	item	
G19	Emergency stop point wired using 3x1.5mm2 single core PVC cables laid in trunking	11	No		
G20	Emergency stop button	11	No		
	DISTRIBUTION BOARD- DB2				
G21	100A x 6-ways distribution board as Hager or approved equal and complete with the following MCBs; 3x20A TP MCCB 3x10A SP MCBS 2x30A SP MCBS 4xBlank covers	1	No		
G22	8-ways sp consumer's unit 'Y' as Hager or approved equal	1	No		
	(i)30A mcb	1	No		
	(ii)10A mcb	3	No		
	Total carried forward to collection page			**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
	(iii)Blank covers	4	No		
G23	50mm diametre heavy gauge pvc conduit	28	M		
G24	100mm diametre heavy gauge pvc duct	5	M		
G25	32mm diametre heavy gauge pvc conduit	90	M		
G26	25mm diametre heavy gauge pvc conduit	30	M		
G27	Power points wired using 3x2.5mm2 pvc single core pvc cables drawn in 20mm heavy gauge pvc conduits concealed in walls and floors but excluding the socket outlet itself.	26	No		
G28	Ditto' but cable laid in metal trunking	21	No		
G29	Power points wired using 3x4.0mm2 pvc single core cable drawn in 20mm heavy gauge pvc conduits concealed in walls and floors but excluding the socket outlet itself.	11	No		
G30	32A three phase switch fuse as Mem original or approved equivalent	8	N0		
G31	20A three phase switch fuse as Mem original or approved equivalent	3	No		
G32	25.0mmx4 core sinlge core sub-main cables	10	M		
G33	16.0mmx4 core sinlge core sub-main cables	30	M		
G34	10.0mmx3 core sinlge core sub-main cables	15	M		
G35	10.0mmx1core sinlge core sub-main cables	15	M		
G36	50x150mm galvanized metal trunking	24	M		
G37	Metal frame onto which twin socket outlets are mounted on trunking	21	No		
	Total carried forward to collection page			**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
G38	Earthing the installation comprising the following; (i) 1500mmx15mm diameter copper electrode complete with clamp (ii) 10.0mm2 yellow/green PVC single cables (iii) precast inspection pit complete with cover	 1 5 1	 No M No		
	Carried forward to collection				
	COLLECTION PAGE 1 Brought forward from page H-4 Brought forward from page H-5 Brought forward from page H-6 Brought forward from page H-7 Brought down from above			 Kshs Kshs Kshs Kshs Kshs	
	Total carried forward to summary page			**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
	UPPER FLOOR				
	Supply ,install,test and commission the following:				
U1	Lighting point wired using 3x1.5mm2 pvc single core cable drawn in 20mm heavy gauge pvc conduits concealed in walls and floors ,one way switched but excluding the switch itself.	69	No		
U2	Ditto' but 2 way switched	25	No		
U3	1 gang 1 way switch as MK or approved equal	23	No		
U4	1 gang 2 way switch as Mk or approved equal	1	No		
U5	2 gang 2 way switch as MK or approved equal	5	No		
U6	3 gang 2 way switch as MK or approved equal	2	No		
U7	1200mmx2x36 watts bare batten flourescent fitting complete with tube as thorn or approved equivalent	29	No		
U8	Ditto' but with aluminium louvres	12	No		
U9	Ditto' but with prismatic controllers(diffuser)	16	No		
U10	Ditto' but 1200mmx1x36watts with prismatic diffuser	4	No		
U11	Ditto' but 1200mmx1x36watts bare batten flourescent fitting	28	No		
U12	28watts x2D compact lighting fitting complete with lamp	3	No		
U13	Power point wired using 3x2.5mm2 laid on metal trunking	32	No		
	Total carried forward to collection page			**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Kshs)
U14	Power point wired using 3x2.5mm2 drawn in heavy gauge 20 mm diameter pvc conduits concealed in walls and floors but excluding the socket outlet itself.	38	No		
U15	Ditto' but for Data /Voice outlet	34	No		
U16	13A twin switched socket outlets as MK or approved equivalent	51	No		
U17	50x200mm 2-compartment powder coated metal trunking fabricated from steel sheet gauge 18	120	M		
U18	8-ways triple pole distribution board asHager or approved equal	1	No		
U19	5 A sp MCB as make of consumer's units	10	No		
U20	30 A sp MCB as make of consumer's units	6	No		
U21	Consumer's unit blank covers	8	No		
U22	Emergency lighting fittings as thorn or approved equal	24	No		
U23	Manually operated fire alarm gong as Menvier or approved equal	1	No		
	Lightning Protection				
U24	25mm x3mm pure copper tape	68	M		
U25	Aerial rod complete with 3 spikes and ridge saddles	3	No		
U26	Tape saddles	20	No		
U27	4-way circular test clamps	2	No		
U28	1500mm x 15mm diameter copper earth electrodes complete with clamp	2	No		
U29	Pre-cast inspection chamber complete with cover	2	No		
	Total carried forward to collection page			**Kshs**	

ITEM	DESCRIPTION		QTY	UNIT	RATE	AMOUNT(Kshs)
	COLLECTION PAGE 2					
	Brought forward from page	H-9			**Kshs**	
	Brought forward from page	H-10			**Kshs**	
	Total carried forward to summary page				**Kshs**	

ITEM	DESCRIPTION	QTY	UNIT		AMOUNT(Kshs)
	SUMMARY PAGE				
	Brought forward from page H-8			**Kshs**	
	Brought forward from page H-11			**Kshs**	
	Allow for Kenya Shillings Four Hundred and Fifty Thousand only for Kenya Power Co.Ltd's power supply line			**Kshs**	450,000
	Allow for Contingencies			**Kshs**	100,000
Total for Bill No 3 Electrical Installation Works carried forward to Grand Summary				**Kshs**	

SECTION I

TECHNICAL SCHEDULE

OF

ITEMS TO BE SUPPLIED

TECHNICAL SCHEDULE

The technical schedule shall be submitted by tenderers to facilitate and enable the Project

Manager to evaluate the tenders, especially where the tenderer intends to supply or has based his

tender sum on equipment which differs in manufacture, type or performance from the

specifications indicated by the Project Manager.

Any tender without this shall be disqualified.

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED
(To be completed by Tenderer)

ITEM	DESCRIPTION	TYPE/MAKE	COUNTRY OF ORIGIN
1.	TPN Isolating switch		
2.	TPN Distribution Board		
3.	10 Amp Lighting switches		
4	Plastic molded Socket outlets		
5	Lighting fittings;		
6.	(i) 1 x 1200 mm 40 watts fluorescent batten (ii) 2 x 1200 mm 40 watts fluorescent batten. (iii) Bulkhead fluorescent (iv) Spherical screw neck (v) Tungsten Bulkhead (vi) Streetlight lantern (vii) Emergency fitting as Thorn cat. No. EFOY3 or equivalent (viii) Fluorescent fitting with metallic louvre as Philips TBS 329/340 or equivalent (ix) Self contained fitting as 8W 3Hr Weatherlite IP65 CAT. No. WLN or equivalent		
7.	Fire control panels-2-zone		
8.	Manually operated bell sounder's Consumer Units		
9.	40A 500mA sensitive ELCB		
10.	100A TP Contactor		
11.			
12			
13			
14			

BILL NO. 5

PROVISIONAL SUMS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	PROVISIONAL SUMS				
	The contractor shall include in his tender the following to be deducted in whole or in part as directed by the Project Manager				
	EXTERNAL WORKS				
A	Allow a provisional sum of Kenya ShillingsFive Hundred and Seventy Two Thousand (KES 572,000.00) only for Ablution/Cesspool to be deducted in whole or in part as directed by the Project Manager		SUM		572,000.00
	PROJECT MANAGEMENT EXPENSES				
B	Allow a Provisional sum of Kenya Shillings Five Hundred Thousand (KES 500,000.00) only for **Project Management Expenses**		SUM		500,000.00
	CONTINGENCIES				
C	Allow a Provisional Sum of Kenya Shillings One Million (KES 1,000,000.00) only for Contingencies		SUM		1,000,000.00
Total for Bill No. 5 PC Sums Carried to Grand Summary					

GRAND SUMMARY

ITEM	DESCRIPTION	TENDERER'S AMOUNT	FOR OFFICIAL USE ONLY
1	BILL NO. 1 - PRELIMINARIES (FROM PAGE PR/ 01)		
2	BILL NO. 2 - MAIN BUILDERS' WORKS - FROM PAGE K/39		
3	EXTERNAL WORKS - FROM PAGE ST/6		
4	BILL NO. 3 - MECHANICAL WORKS - FROM PAGE 80 Mech		
5	BILL NO. 4 - ELECTRICAL INSTALLATION WORKS FROM PAGE H-12		
6	BILL NO. 5 - PROVISIONAL SUMS		
GRAND TOTAL (INCLUSIVE OF ALL GOVERNMENT TAXES)CARRIED TO FORM OF TENDER			

Amount of Tender in Words: Kenya Shillings

……

…….....

Tenderer's Signature and Stamp ……

Address …….

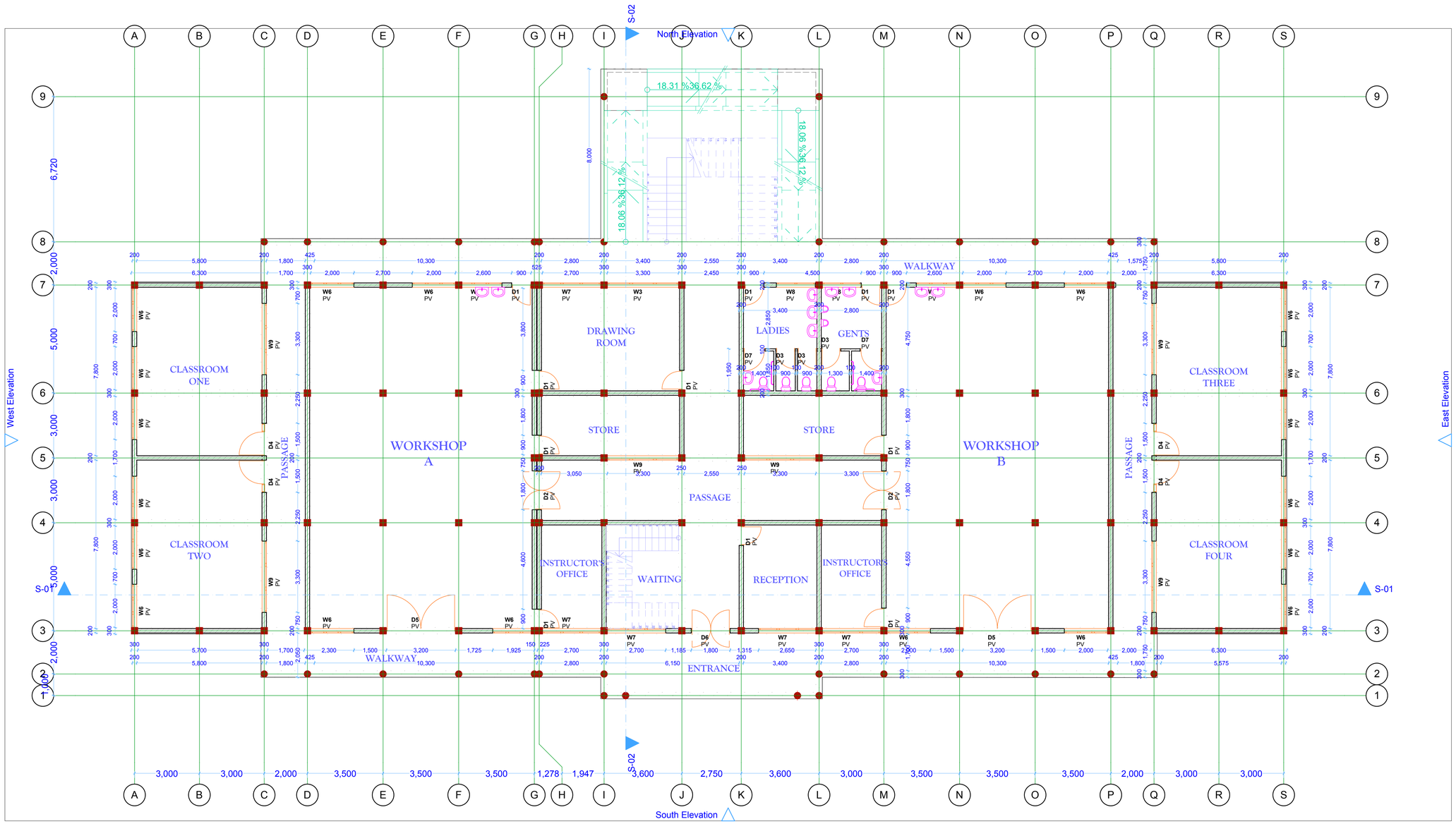
Date
……

Witness Name and Signature …….

Description
……

Address …….

Date
……



GROUND FLOOR PLAN

1:100

NOTES

GENERAL
All dimensions are in millimetres unless otherwise specified.
Drawings are not to be scaled only figured dimensions to be used.
The contractor must check and verify all dimensions before commencement of any work. Any discrepancies to be clarified with the Project Architect.

CONSTRUCTION
All slab at ground level to be poured over 1000 gauge polythene sheet on 50mm thick murram blinding on hardcore.
All soil under slab around and under foundation to be poisoned for termite control.

CIVIL
All soil on cut embarkment 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. works, 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 loop iron at every alternate course.
All adjacent R.C. work and masonery walls to be tied with strip iron at every alternate course.

MECHANICAL
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 and 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 will be uPVC to comply with BS 5255.
All inspection chambers covers and framing shall be cast iron.
Minimum slope in the drain 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 Engineer.
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 begins.
PV denotes permanent ventilation

ELECTRICALS
All conduits must be laid before plastering.

REVISIONS

PROJECT

PROPOSED TECHNICAL TRAINING INSTITUTES IN SUB COUNTIES, KENYA

DRAWING TITLE: PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

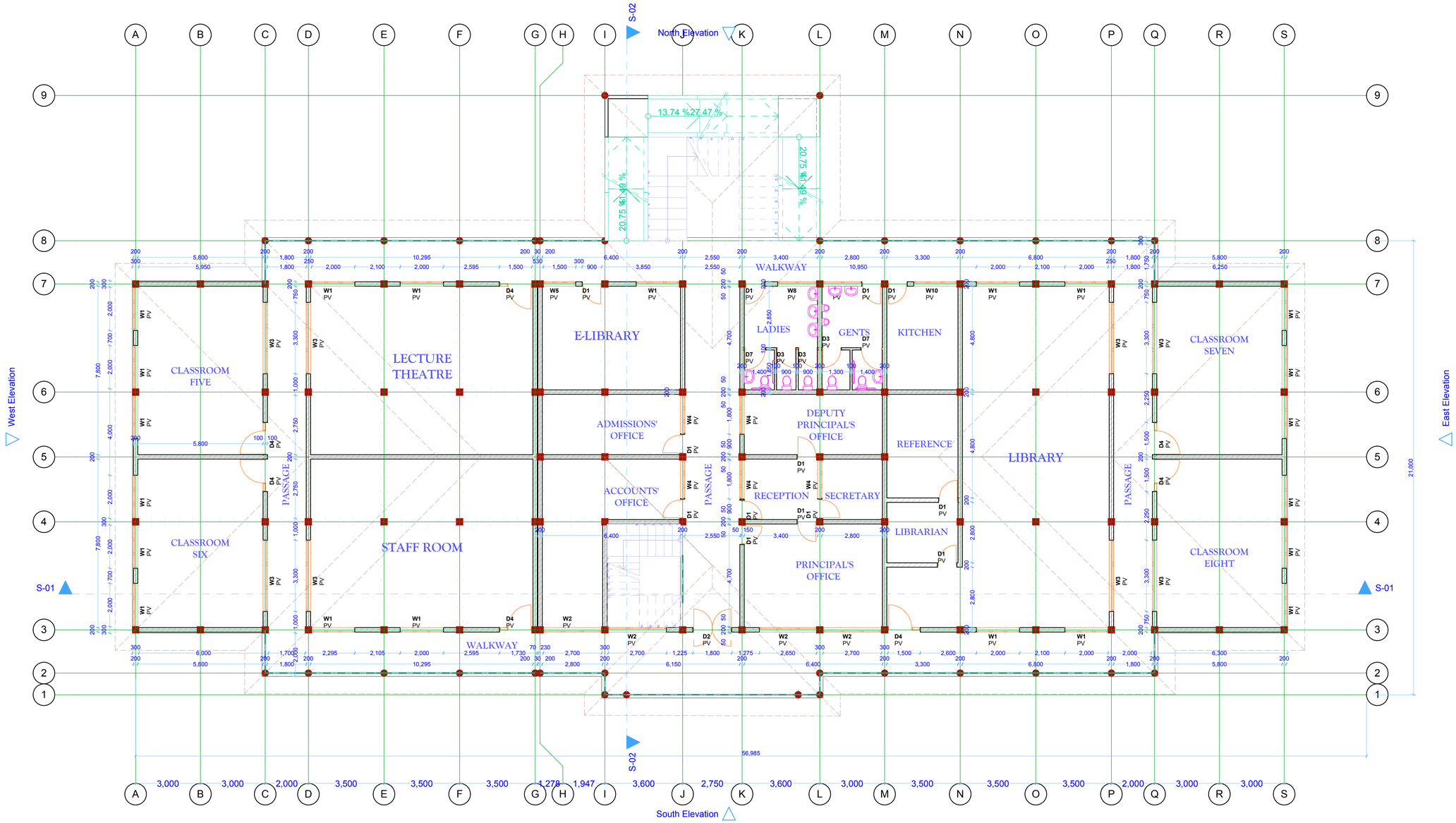
Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO.	DRG NO. ONE
SCALE	
APPROVED	

APPROVED DATE.....
A. MUNANO
CHIEF ARCHITECT

	Name	Sign	Date
Designed & Drawn By	TOO B. M. K.		JULY, 2014
	Arch S. EMASIT		JULY, 2014
Proj. Arch	Arch S. EMASIT		JULY, 2014

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.



1. FIRST FLOOR 1:100

NOTES

GENERAL
All dimensions are in millimetres unless otherwise specified.
Drawings are not to be scaled only figured dimensions to be used.
The contractor must check and verify all dimensions before commencement of any work. Any discrepancies to be clarified with the Project Architect.

CONSTRUCTION
All slab at ground level to be poured over 1000 gauge polythene sheet on 50mm thick murram blinding on hardcore.
All soil under slab around and under foundation to be poisoned for termite control.

CIVIL
All soil on cut embarkment 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. works, 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 loop iron at every alternate course.
All adjacent R.C. work and masonery walls to be tied with strip iron at every alternate course.

MECHANICAL
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 and 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 will be uPVC to comply with BS 5255.
All inspection chambers covers and framing shall be cast iron.
Minimum slope in the drain 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 Engineer.
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 begins.
PV denotes permanent ventilation

ELECTRICALS
All conduits must be laid before plastering.

REVISIONS

PROJECT

PROPOSED TECHNICAL TRAINING INSTITUTES IN SUB COUNTIES, KENYA

DRAWING TITLE PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

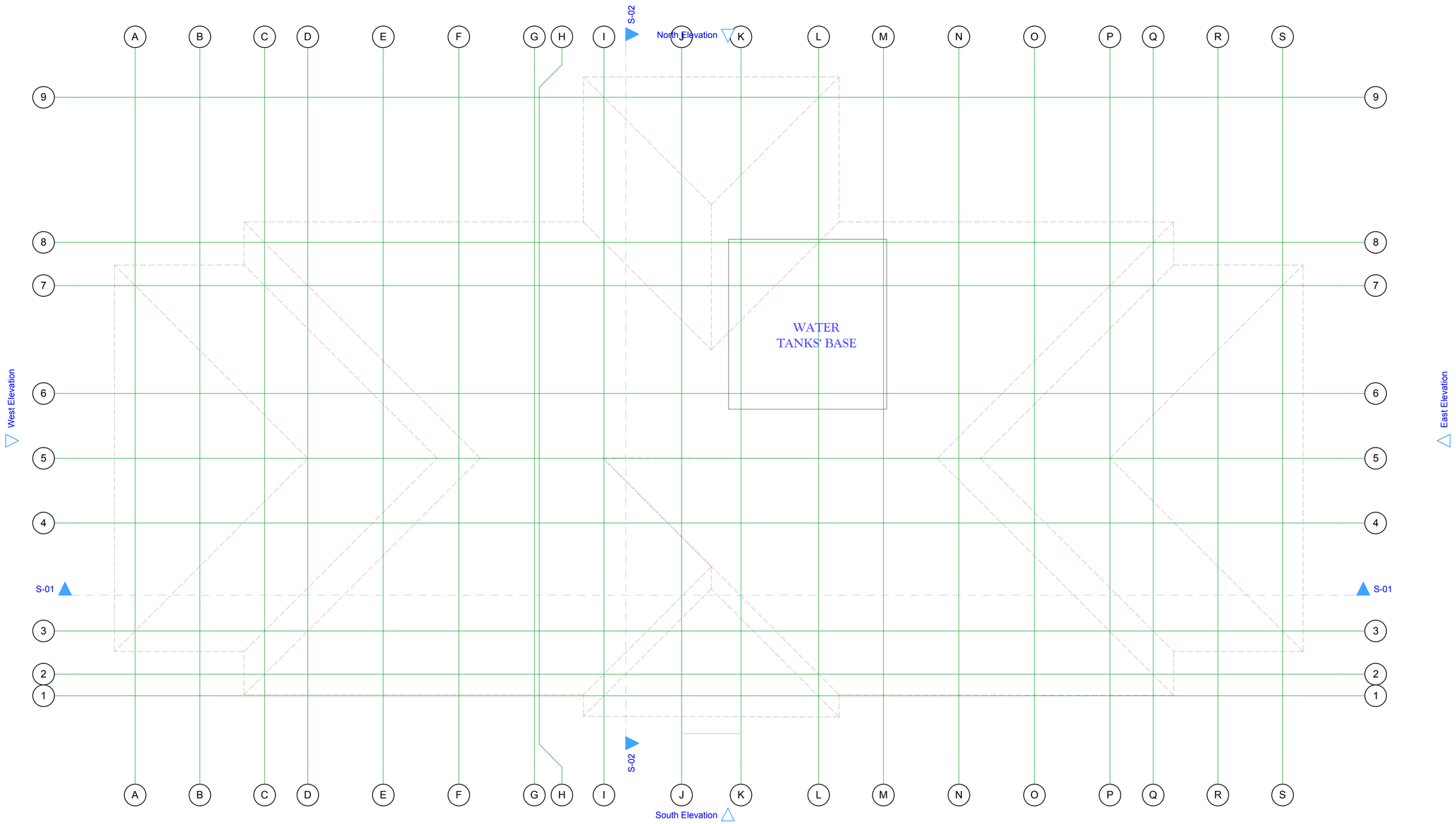
Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO.	DRG NO. TWO
SCALE	
APPROVED	

A. MUNANO
APPROVED DATE..... CHIEF ARCHITECT

	Name	Sign	Date
Designed & Drawn By	TOO B. M. K.		JULY, 2014
	Arch S. EMASIT		JULY, 2014
Proj. Arch	Arch S. EMASIT		JULY, 2014

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.



2. ROOF PLAN 1:100

NOTES

GENERAL
All dimensions are in millimetres unless otherwise specified.
Drawings are not to be scaled only figured dimensions to be used.
The contractor must check and verify all dimensions before commencement of any work. Any discrepancies to be clarified with the Project Architect.

CONSTRUCTION
All slab at ground level to be poured over 1000 gauge polythene sheet on 50mm thick murram blinding on hardcore.
All soil under slab around and under foundation to be poisoned for termite control.

CIVIL
All soil on cut embarkment 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. works, 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 loop iron at every alternate course.
All adjacent R.C. work and masonery walls to be tied with strip iron at every alternate course.

MECHANICAL
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 and 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 will be uPVC to comply with BS 5255.
All inspection chambers covers and framing shall be cast iron.
Minimum slope in the drain 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 Engineer.
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 begins.
PV denotes permanent ventilation

ELECTRICALS
All conduits must be laid before plastering.

REVISIONS

PROJECT

PROPOSED TECHNICAL TRAINING INSTITUTES IN SUB COUNTIES, KENYA

DRAWING TITLE PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

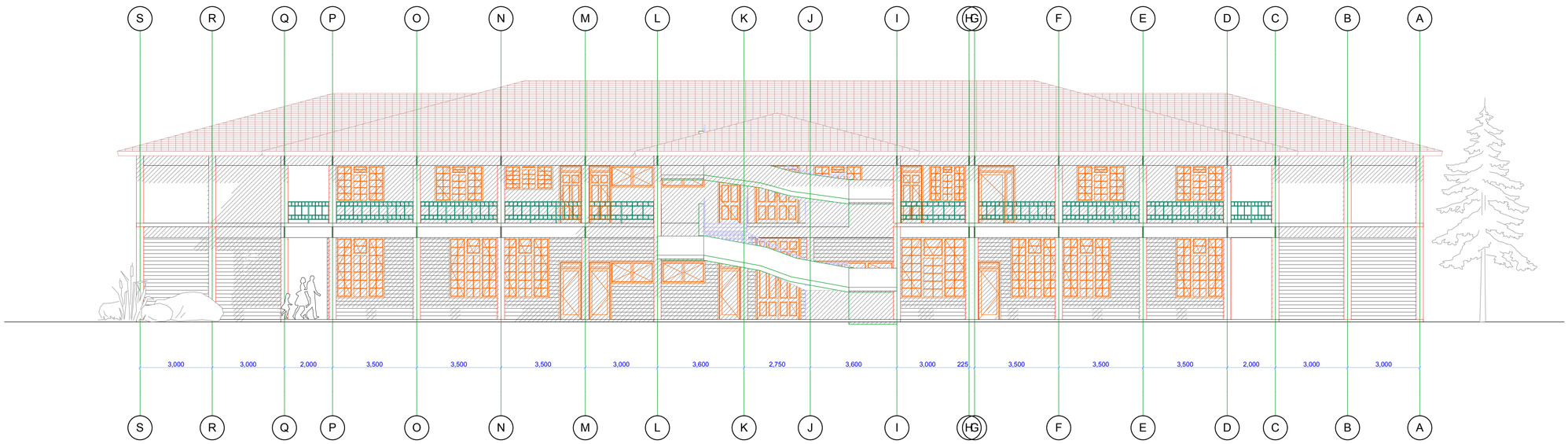
Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO.	DRG NO. THREE
SCALE	
APPROVED	

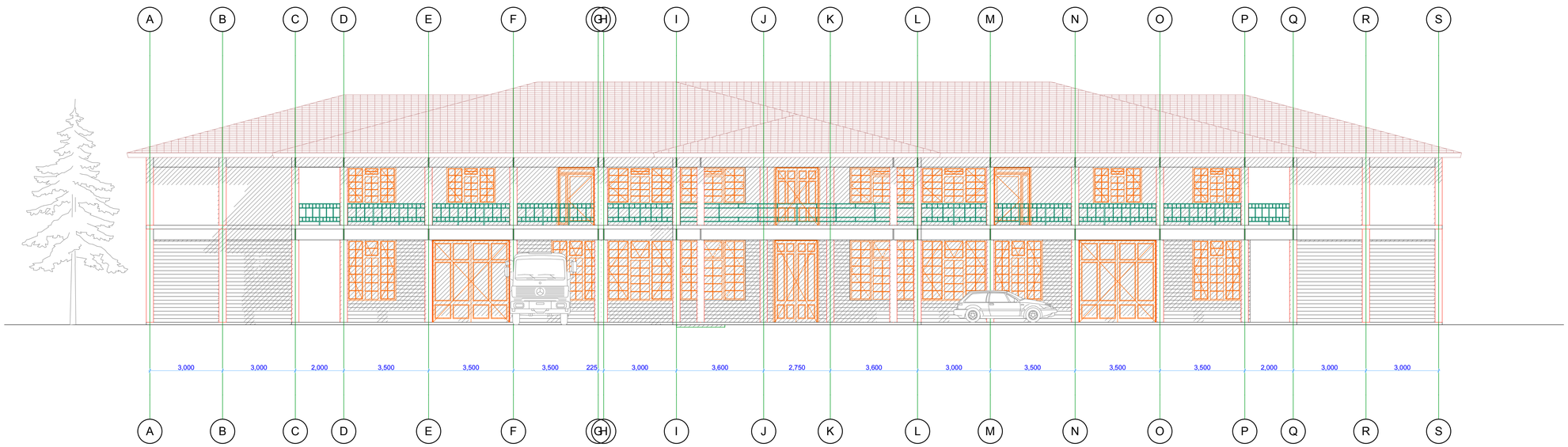
APPROVED DATE.....
A. MUNANO
CHIEF ARCHITECT

	Name	Sign	Date
Designed & Drawn By	TOO B. M. K.		JULY, 2014
	Arch S. EMASIT		JULY, 2014
Proj. Arch	Arch S. EMASIT		JULY, 2014

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.



North Elevation 1:100



South Elevation 1:100

NOTES

GENERAL
All dimensions are in millimetres unless otherwise specified.
Drawings are not to be scaled only figured dimensions to be used.
The contractor must check and verify all dimensions before commencement of any work. Any discrepancies to be clarified with the Project Architect.

CONSTRUCTION
All slab at ground level to be poured over 1000 gauge polythene sheet on 50mm thick murram blinding on hardcore.
All soil under slab around and under foundation to be poisoned for termite control.

CIVIL
All soil on cut embarkment 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. works, 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 loop iron at every alternate course.
All adjacent R.C. work and masonery walls to be tied with strip iron at every alternate course.

MECHANICAL
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 and driveways to be encased in 150mm concrete surround.
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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 begins.
PV denotes permanent ventilation

ELECTRICALS
All conduits must be laid before plastering.

REVISIONS

PROJECT

PROPOSED TECHNICAL TRAINING INSTITUTES IN SUB COUNTIES, KENYA

DRAWING TITLE PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

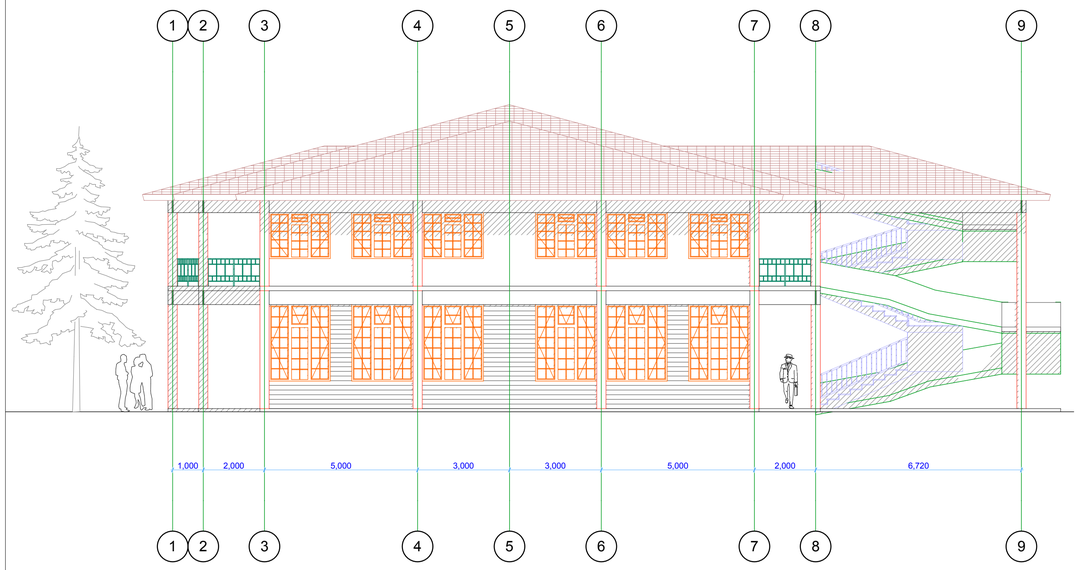
Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO.	DRG NO. FOUR
SCALE	
APPROVED	

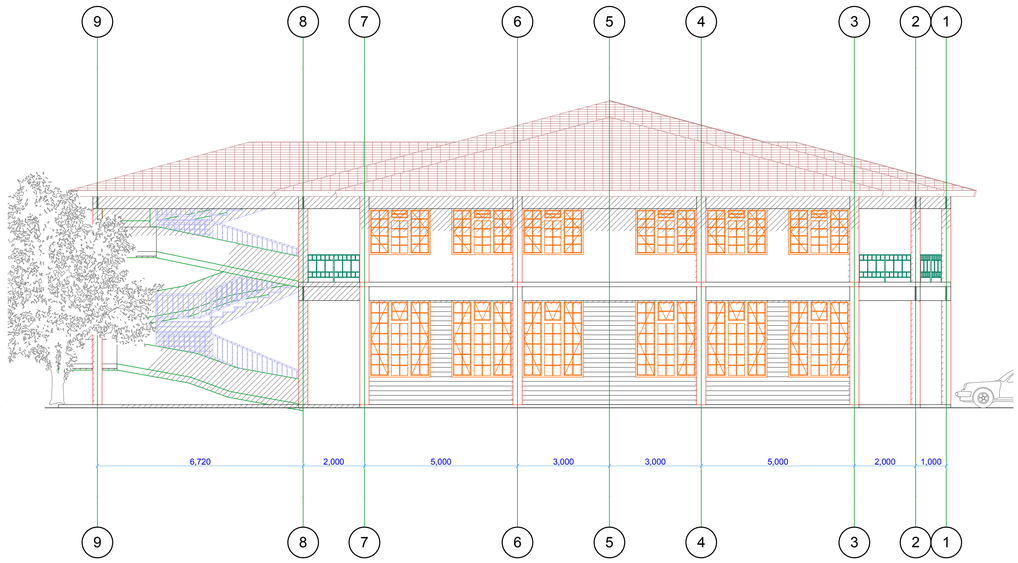
APPROVED DATE.....
A. MUNANO
CHIEF ARCHITECT

	Name	Sign	Date
Designed & Drawn By	TOO B. M. K.		JULY, 2014
	Arch S. EMASIT		JULY, 2014
Proj. Arch	Arch S. EMASIT		JULY, 2014

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.



East Elevation 1:100



West Elevation 1:100

Window List

ID	W1	W2	W3	W4	W5	W6	W7	W7	W8	W9	W10
Quantity	21	4	9	5	1	21	1	5	4	6	1
W x H Size	2,000x1,500	2,700x1,500	3,300x900	1,800x900	1,500x1,500	2,000x2,500	2,000x2,500	2,700x2,500	1,800x900	3,300x1,900	2,000x1,000
Window sill height	900	900	1,500	1,500	900	900	900	900	1,500	1,500	1,400
Window head height	2,400	2,400	2,400	2,400	2,400	3,400	3,400	3,400	2,400	3,400	2,400
2D Symbol											
3D Back View											

Window List 1:0.60

Door List

ID	D1	D2	D3	D4	D5	D6	D7
Quantity	24	3	6	11	2	1	4
W x H Size	900x2,400	1,800x2,400	900x2,100	1,500x2,400	3,200x3,400	1,800x3,400	1,000x2,100
Door sill height	0	0	0	0	0	0	0
Door head height	2,400	2,400	2,100	2,400	3,400	3,400	2,100
2D Symbol							
3D Back View							

Door List 1:0.75

NOTES

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REVISIONS

PROJECT

PROPOSED TECHNICAL TRAINING INSTITUTES IN SUB COUNTIES, KENYA

DRAWING TITLE PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO.

DRG NO. FIVE

SCALE

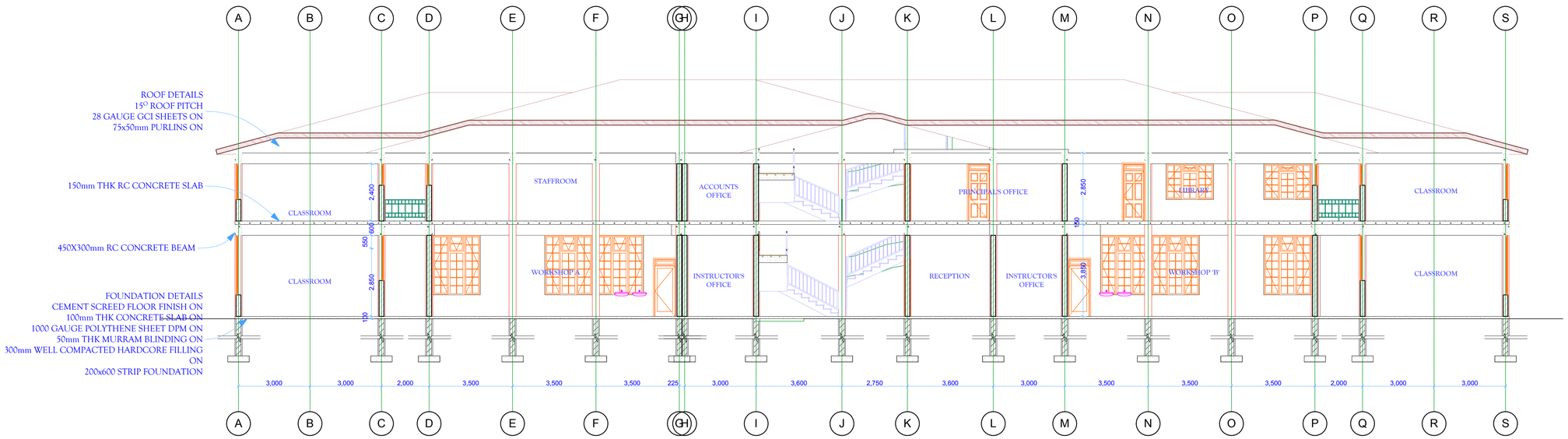
APPROVED

APPROVED DATE.....

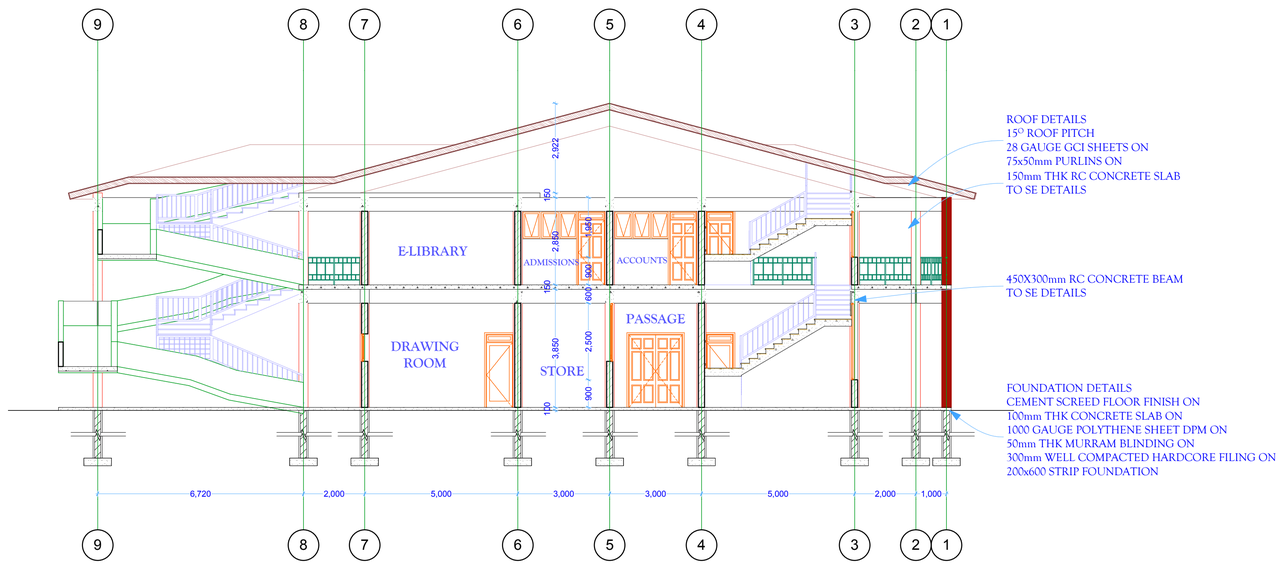
A. MUNANO
CHIEF ARCHITECT

	Name	Sign	Date
Designed & Drawn By	TOO B. M. K.		JULY, 2014
	Arch S. EMASIT		JULY, 2014
Proj. Arch	Arch S. EMASIT		JULY, 2014

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.



S-01 Building Section 1:100



S-02 Building Section 1:100

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REVISIONS

PROJECT

PROPOSED TECHNICAL TRAINING INSTITUTES IN CONSTITUENCIES, KENYA

DRAWING TITLE: PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO. | DRG NO. SIX

SCALE

APPROVED

APPROVED DATE.....
A. MUNANO
CHIEF ARCHITECT

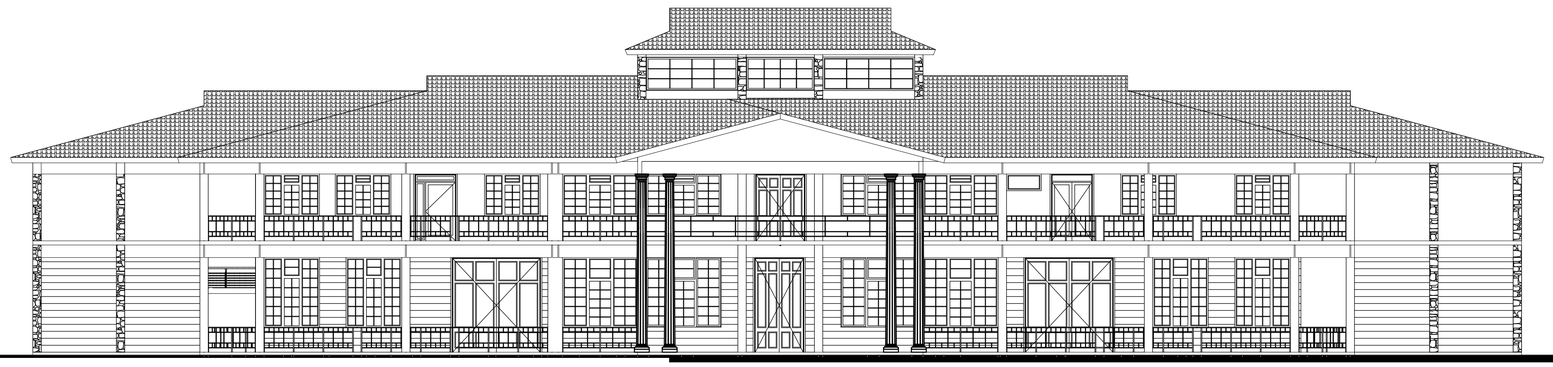
	Name	Sign	Date
Designed & Drawn By	TOO B. M. K.		JULY, 2014
	Arch S. EMASIT		JULY, 2014
Proj. Arch	Arch S. EMASIT		JULY, 2014

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.

SIDE ELEVATION

SIDE ELEVATION

REAR ELEVATION



FRONT ELEVATION

NOTES

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REVISIONS

PROJECT
PROPOSED KERICHO TOWNSHIP TECHNICAL TRAINING INSTITUTE AT AINAMOI, KERICHO

DRAWING TITLE: PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

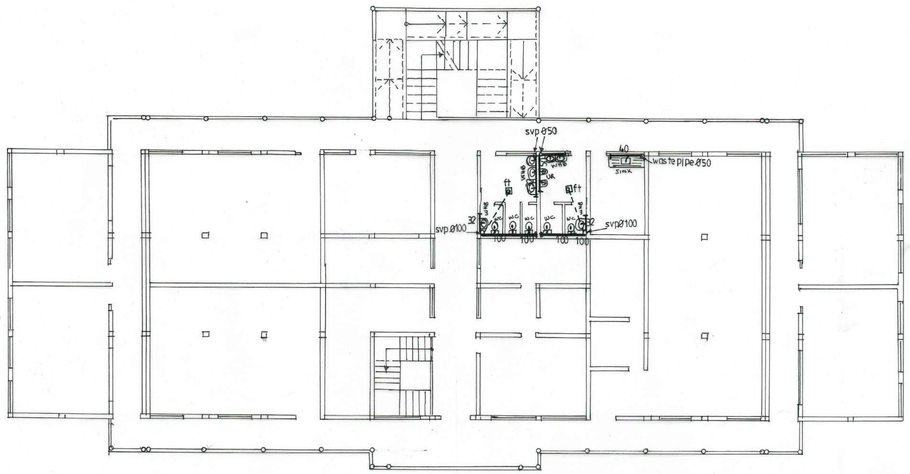
PROJECT JOB NO.	DRG NO.
SCALE	
APPROVED	

APPROVED DATE..... COUNTY WORKS OFFICER

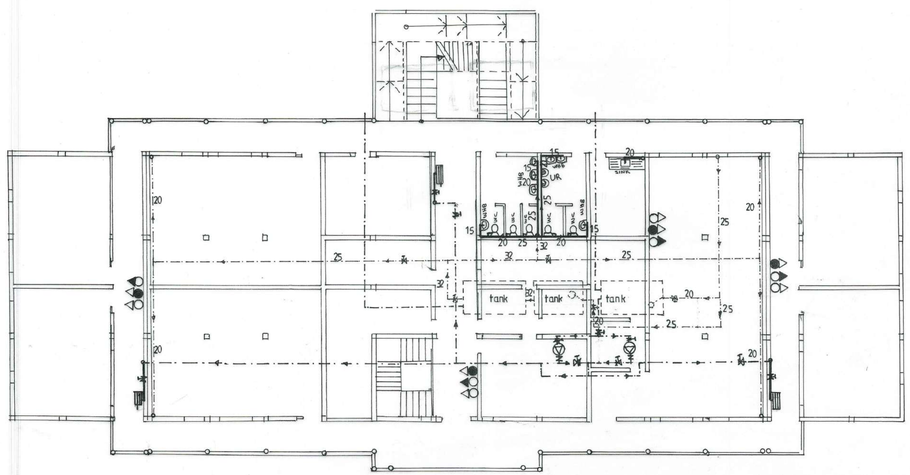
	Name	Sign	Date
Designed & Drawn By	M.K.MITEI		FEB, 2016
Proj. Arch	Arch Sang J . K		FEB, 2016

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - NAKURU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.

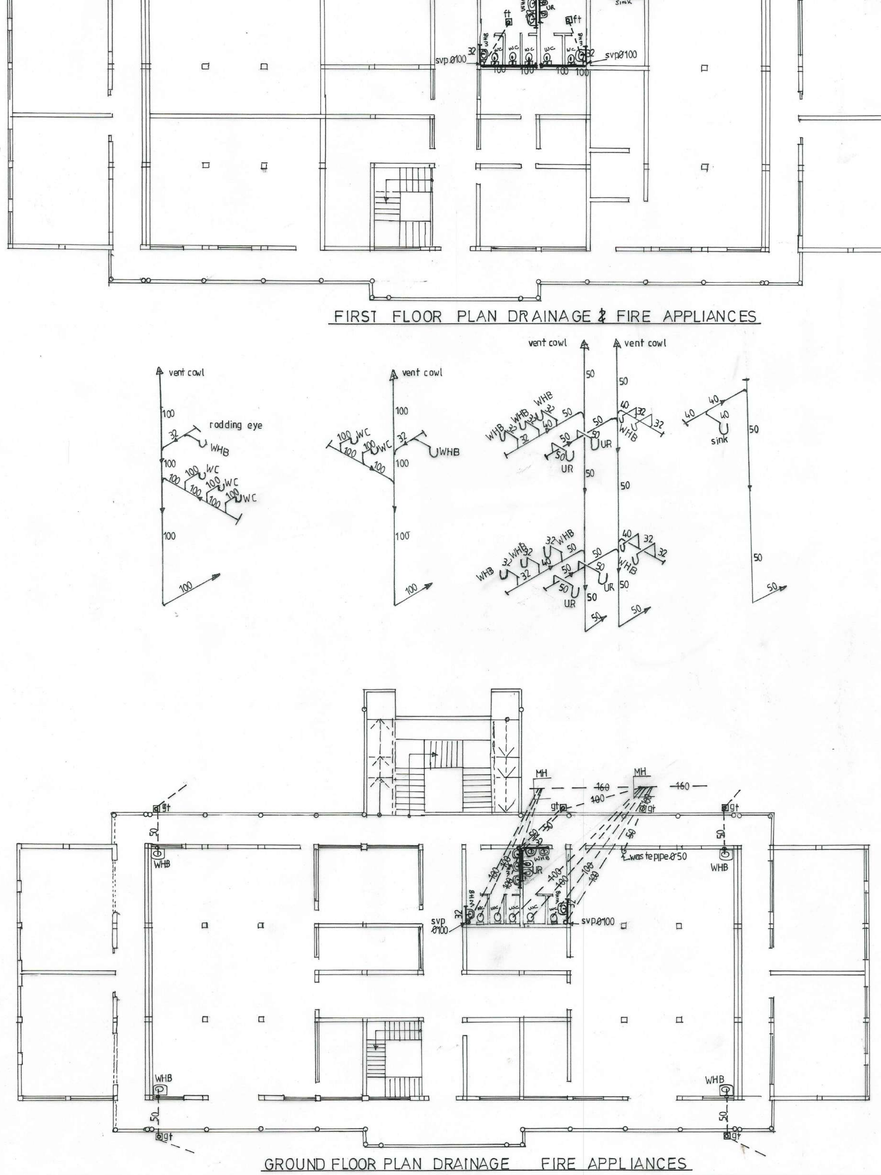
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA



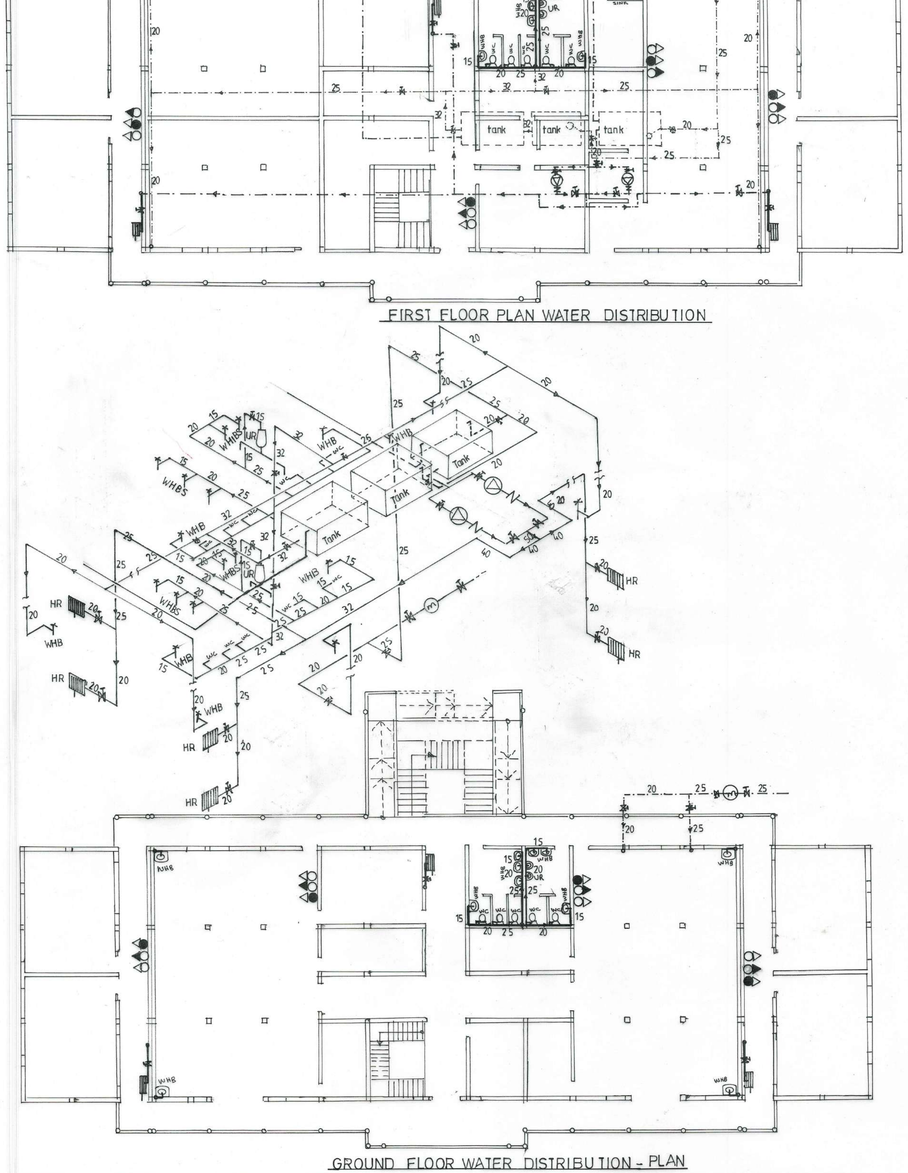
FIRST FLOOR PLAN DRAINAGE & FIRE APPLIANCES



FIRST FLOOR PLAN WATER DISTRIBUTION



GROUND FLOOR PLAN DRAINAGE FIRE APPLIANCES



GROUND FLOOR WATER DISTRIBUTION - PLAN

KEY

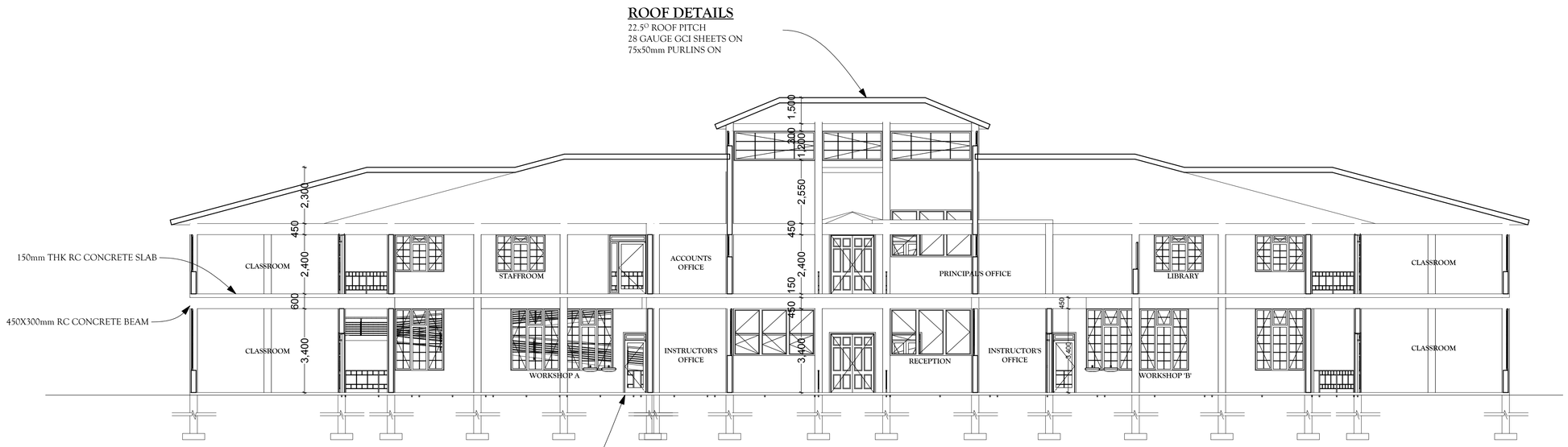
- waste pipe hidden in wall with flow direction
- waste pipe under slab or underground
- water pipe chased in wall
- water pipe hidden in ceiling or underground
- WC water closet
- WHB wash hand basin
- UR urinal system
- gt gulley trap
- ft floor trap
- MH man hole
- s-vp stack vent pipe
- rodding eye
- CO_2 fire extinguishers
- CO_2/water fire extinguishers
- dry chemical powder fire extinguishers
- HR hose reel
- hose reel water booster pump
- gate valve
- hose reel water distribution
- non-return valve
- water meter

REVISION

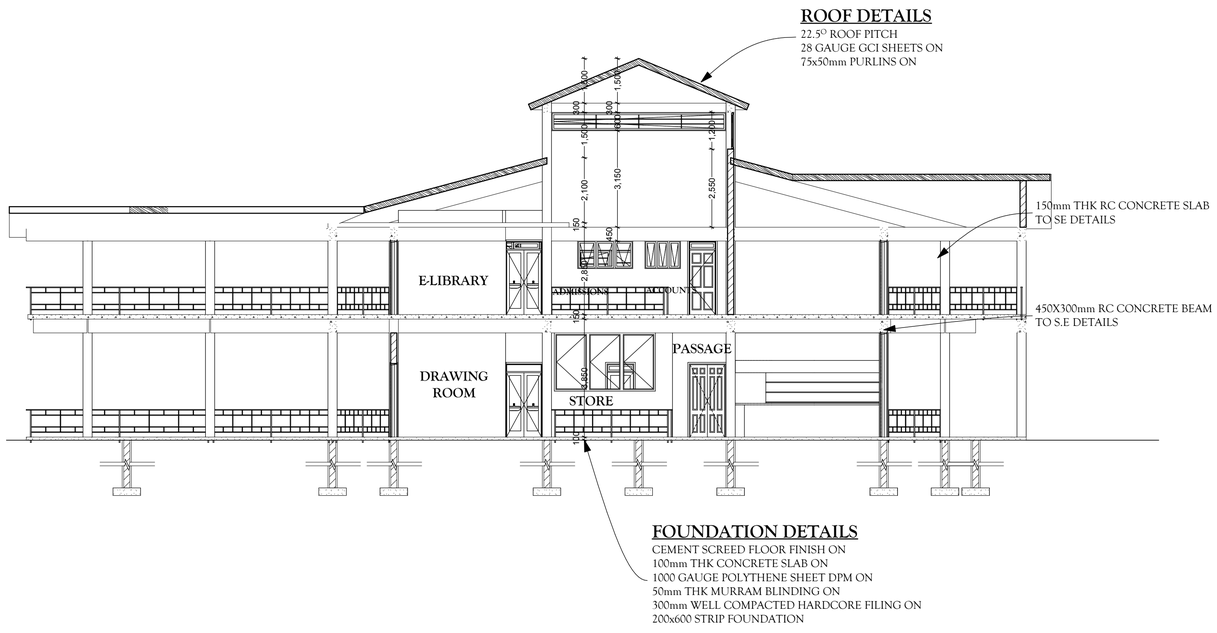
date	description	remarks

CLIENT	MINISTRY OF EDUCATION SCIENCE AND TECH. P.O BOX ..... NAIROBI.
PROJECT	PROPOSED GENERIC TWIN WORKSHOPS, CLASSROOMS AND OFFICES FOR NEW TVET INSTITUTIONS
LOCATION	
TITLE	-plan drainage, isometric drainage and water distribution -plan water distribution and fire appliances
CONSULTANT	MINISTRY OF LANDS HOUSING AND URBAN DEVELOPMENT DIRECTORATE OF PUBLIC WORKS, P.O BOX 53-30100, ELDORET.

	NAME	SIGN.	DATE
designed by	P.T.S NYAKUNDI		07-07-2014
drawn by	P.T.S NYAKUNDI		07-07-2014
checked by			
approved by			



SECTION S-01



SECTION S-02

NOTES

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REVISIONS

PROJECT
PROPOSED KERICHO TOWNSHIP TECHNICAL TRAINING INSTITUTE AT AINAMOI, KERICHO

DRAWING TITLE: PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK

FOLIO NO.

Client Ministry/Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

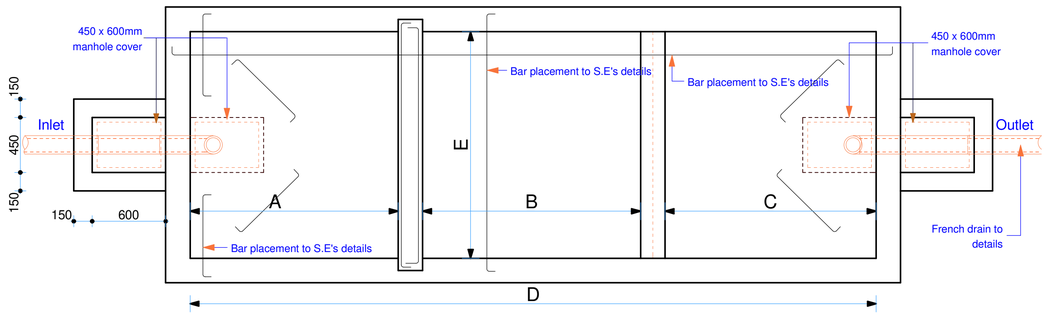
PROJECT JOB NO.	DRG NO.
SCALE	
APPROVED	

APPROVED DATE..... COUNTY WORKS OFFICER

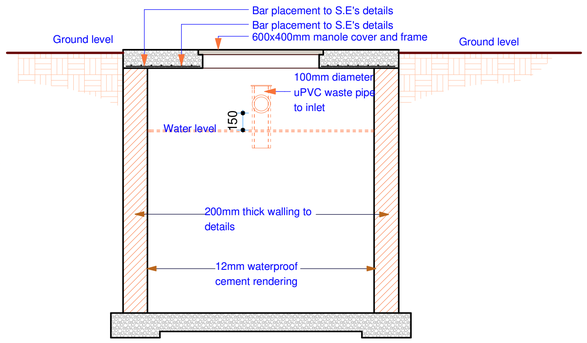
	Name	Sign	Date
Designed & Drawn By	M.K.MITEI		FEB, 2016
Proj. Arch	Arch Sang J . K		FEB, 2016

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - NAKURU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.

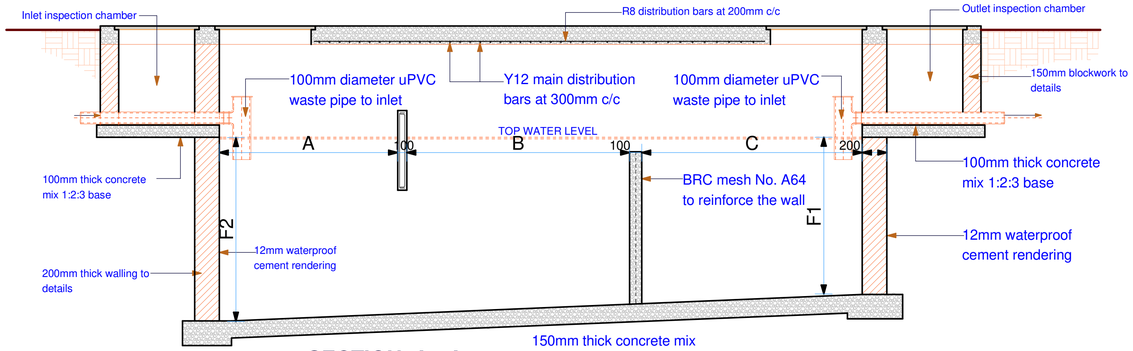
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA



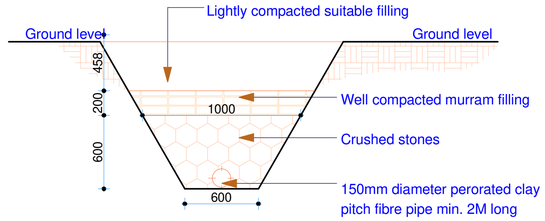
PLAN WITH COVER SLAB REINFORCEMENT DETAILS



SECTION B - B

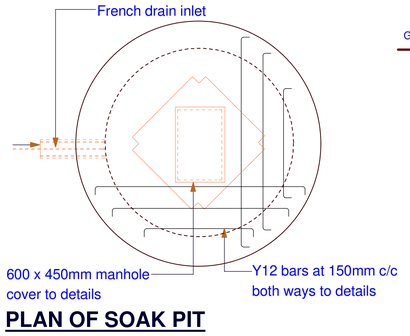


SECTION A - A

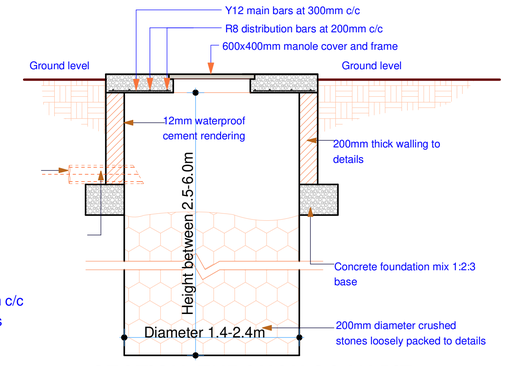


FRENCH DRAINS TO DETAILS

SEPTIC TANK DETAILS
(scale 1:50)



PLAN OF SOAK PIT



SECTION THROUGH SOAK PIT

CAPACITY		Number of	Disludging intervals	Dimensions in millimetres						
Gallons	Litres	persons	(time)	A	B	C	D	E	F1	F2
300	1360	UP TO 10	2 years	400	300	1300	2200	700	900	1000
600	2720	11 - 20	2 years	750	600	1350	2950	900	1100	**1150**
900	4080	21 - 30	2 years	900	750	1350	3200	1100	1200	1300
1200	**5440**	**31 - 40**	**2 years**	**900**	**900**	**1350**	**3300**	**1300**	**1300**	1420
1500	6800	41 - 50	2 years	1000	950	1350	3500	1400	1400	1530
1800	8160	51 - 60	2 years	1100	1000	1350	3700	1500	1500	1630
2100	9520	61 - 70	2 years	1200	1100	1350	3900	1700	1700	1740
2400	10880	71 - 80	2 years	1300	1200	1350	4100	1800	1800	1840
2700	12240	81 - 90	2 years	1400	1300	1350	4300	1900	1900	1940
3000	13600	91 - 100	2 years	1500	1400	1350	4500	2100	2100	2040
3300	14960	101 -110	2 years	2000	2000	1500	5700	2750	2750	2600
	90000	400	1.5 years	8800	4400		13400	4600	1500	2830

NOTES

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REVISIONS

PROJECT
PROPOSED TECHNICAL TRAINING INSTITUTES IN CONSTITUENCIES, KENYA

DRAWING TITLE: **PROPOSED TWIN WORKSHOP, CLASSROOMS & OFFICES' BLOCK**

FOLIO NO.

Client Ministry/ Department
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

PROJECT JOB NO.

DRG NO.: DETAIL-B1 SEPTIC TANK

SCALE

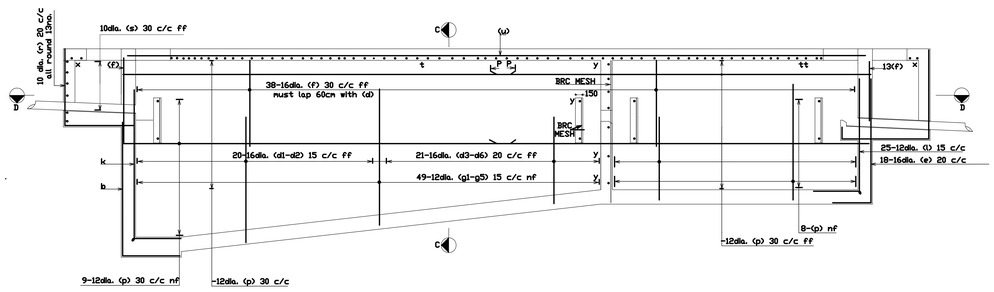
APPROVED

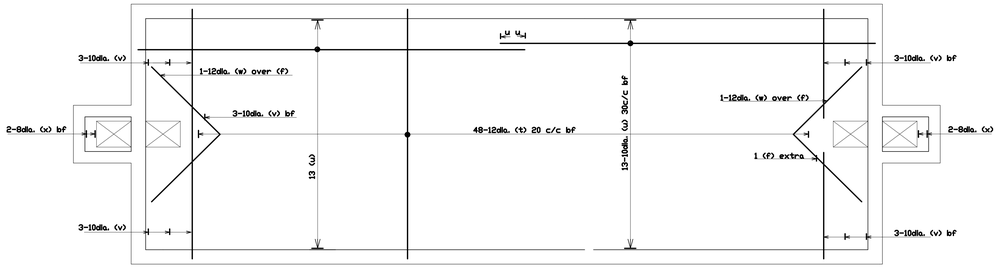
APPROVED DATE.....

A. MUNANO
CHIEF ARCHITECT

	Name	Sign	Date
Designed & Drawn By	TOO B. M. K. (RVTTI)		JUNE, 2015
	Arch S. EMASIT(P.H.)		JULY, 2014
Proj. Arch	Arch S. EMASIT(P.H.)		JULY, 2014

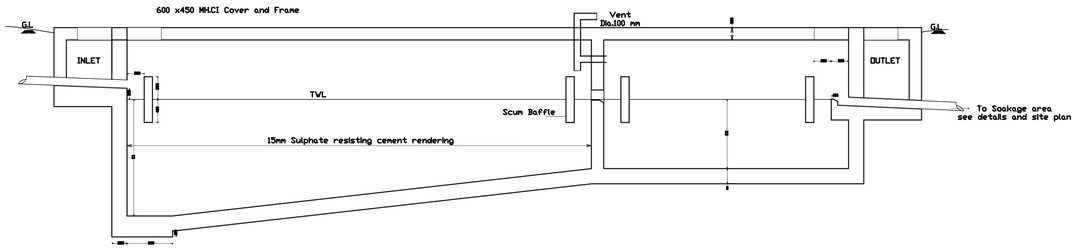
MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS - UASIN GISHU COUNTY
FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA.



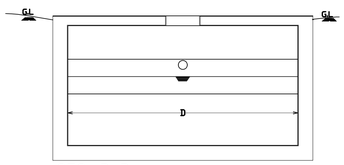


ROOF SLAB

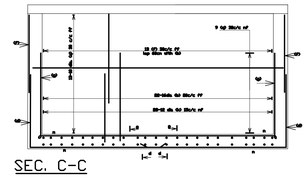
1:50 R.C FOR 67,500 SEPTIC TANK (300P)



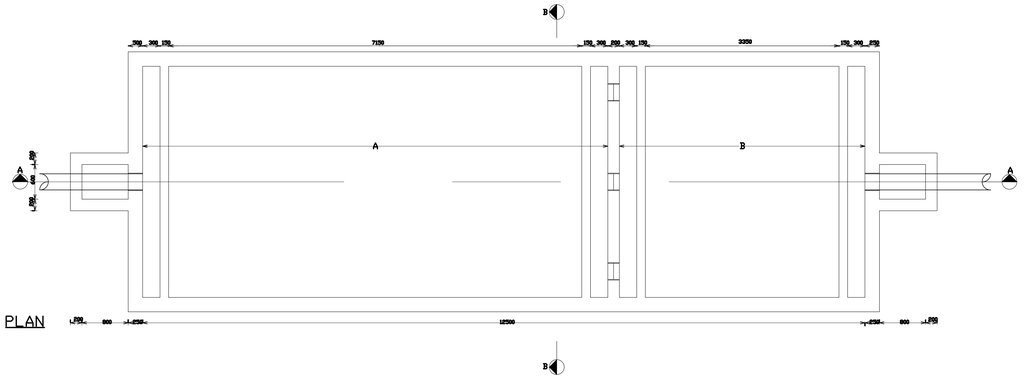
SEC. A-A



SEC. B-B



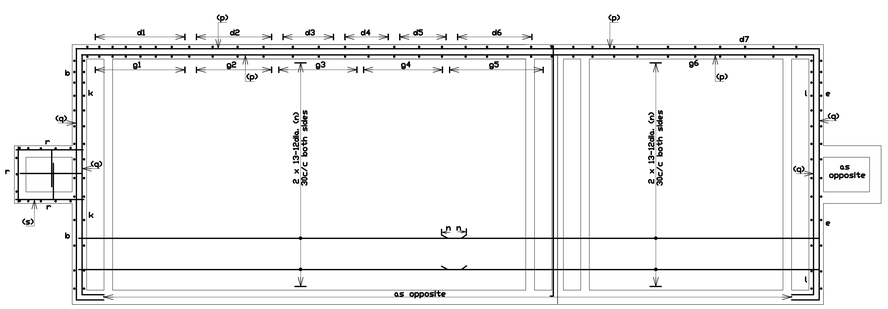
SEC. C-C



PLAN

CAPACITY IN LITRES	NUMBER OF PERSONS	YEARS	DIMENSIONS IM (MM)					
			A	B	C	D	E1	E2
90000	400	1.5	8800	4400	13400	4600	2830	1500

SEPTIC TANK DETAILS



SECTION D-D

ITEM	BAR MK	DIA. (mm)	NO OFF	TOTAL NO.	LENGTH METRE	BENDING DETAILS (CM)
	a	16		37	3.90	
	b	16		22	3.40	
	c1	16		20	6.00	
	c2	16		20	5.90	
	c3	16		20	5.80	
	c4	16		20	5.60	
	c5	16		20	5.50	
	c6	16		20	5.40	
	c7	16		20	5.30	
	c8	16		56	5.70	
	d1	16		20	5.40	
	d2	16		20	5.20	
	d3	16		10	5.10	
	d4	16		10	5.00	
	d5	16		10	4.80	
	d6	16		10	4.70	
	d7	16		10	4.60	
	d8	16		6	4.50	
	d9	16		42	4.40	
	e	16		28/21	3.10	
	f	16				
	g1	12		20	6.25	
	g2	12		20	6.05	
	g3	12		20	5.85	
	g4	12		20	5.75	
	g5	12		20	5.55	
	g6	12		14	5.05	
	g7	12		56	5.35	
	h1	12		20	6.55	
	h2	12		20	6.35	
	h3	12		20	6.25	
	h4	12		20	6.05	
	h5	12		20	5.95	
	h6	12		14	5.75	
	h7	12		56	5.65	

ITEM	BAR MK	DIA. (mm)	NO OFF	TOTAL NO.	LENGTH METRE	BENDING DETAILS (CM)
	j	12		28	4.65	
	k	12		28	4.35	
	l	12		28	3.55	
	m	12		28	3.85	
	n	12		60/60	7.30	
	p	12		------	7.90	
	q	12		------	6.10	
	r	10		26/26		
	s	10		------	3.16	
	t	16		49	5.10	
	u	10		30	7.30	
	v	12		12	2.10	
	w	12		2	3.20	
	x	12		4	0.90	
	y	12		9	5.15	

NOTES

1. This drawing is to be read in conjunction with all other relevant Architectural / Structural drawings.
2. The Contractor to confirm all dimensions on site before commencing the works.
3. Figured dimensions only to be taken and all dimensions are in millimetres unless stated otherwise.
4. Structural Concrete to be class 20/20 (1:2:4 mix) Concrete cover to reinforcement including links;
   Beams = 25mm
   Slab = 20mm
   Foundation = 50mm
5. Reinforcement steel to be;
   Y-square twisted high yield bars to BS 4461.
   R-round mild bars to BS 4449.
6. All Structural works must be inspected and approved by the Structural Engineer .

ISSUES

DATE	TO	APPLICATION	

REVISIONS

	DATE	BY	DESCRIPTIONS	GRP. LDR.	C.S. ENG.

REFERENCE DRAWINGS

No.	DESCRIPTIONS

CLIENT

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY.
P.O. BOX 9583 - 00200, NAIROBI.

PROJECT TITLE

PROPOSED MODEL TECHNICAL TRAINING INSTITUTES IN CONSTITUENCIES.

DRAWING TITLE

90,000 LITRES SEPTIC TANK. (400 PERSONS)

FOR THE GOVERNMENT OF THE REPUBLIC OF KENYA

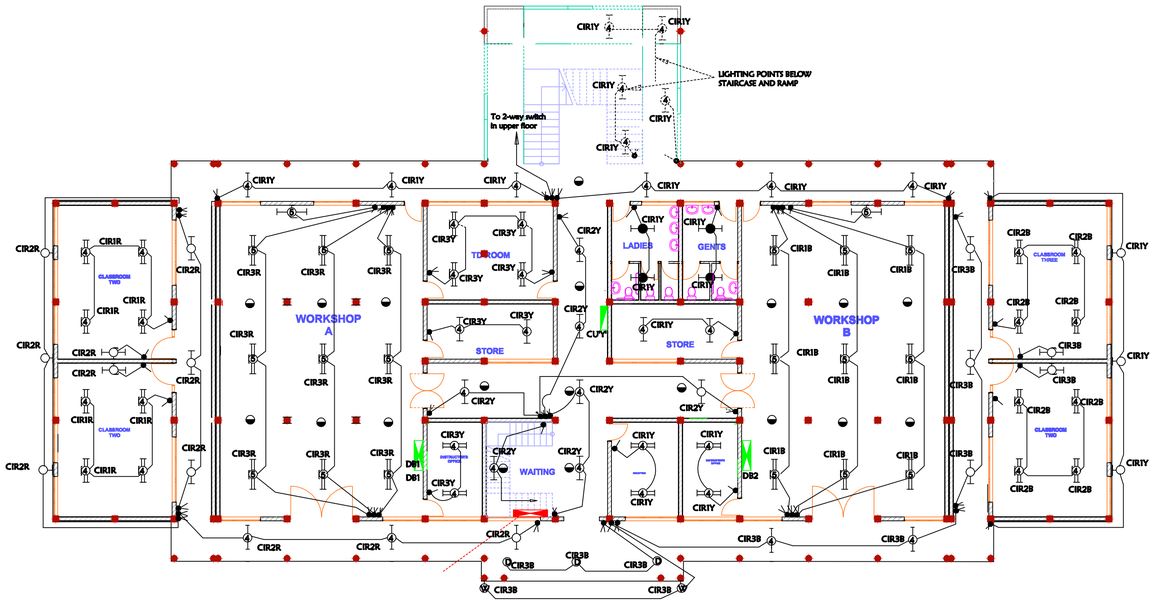
C1/Sfb		
	DRG No.	**UGC/TTI/STR/01a**
	FILE No.	
SCALE(S) 1:100		FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING

APPROVED BY

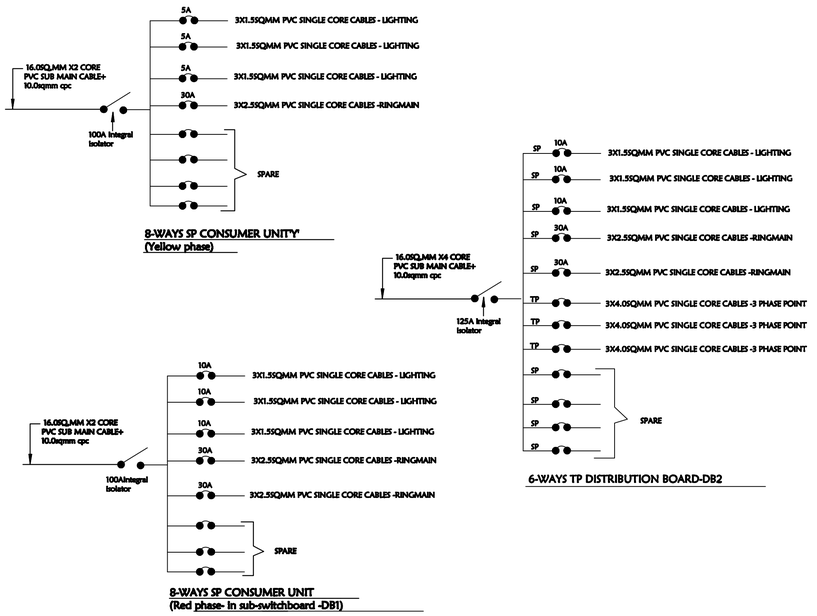
THE CHIEF ENGINEER (STRUCTURAL)
DIRECTORATE OF PUBLIC WORKS.

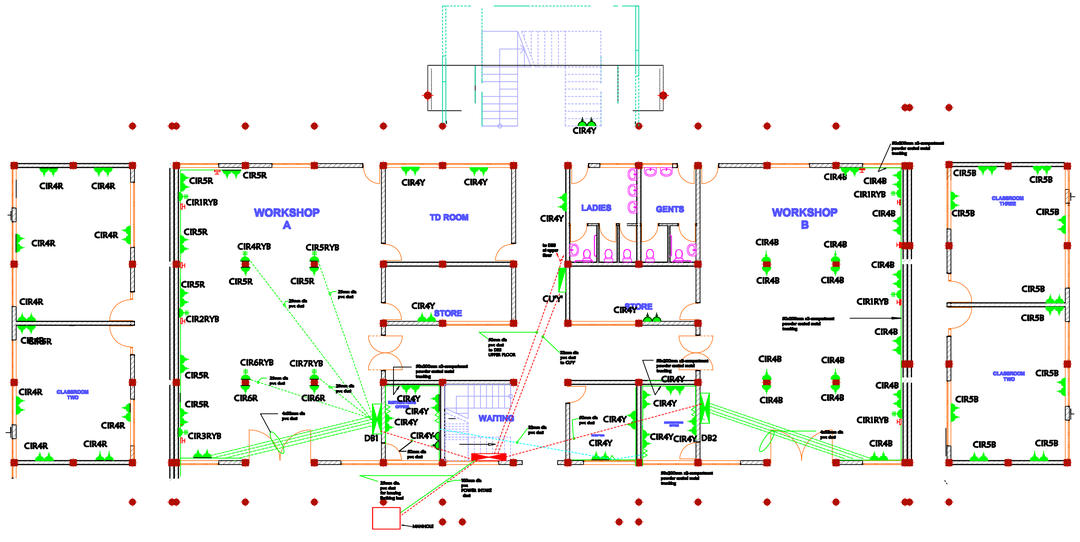
	NAME	SIGNATURE	DATE
DESIGNED	J. M. MWENDA		JULY 2015
DRAWN	J. M. MWENDA		JULY 2015
CHIEF. SUPT. ENG.	Eng. A.M. WATHOME		JULY 2015

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT.
DIRECTORATE OF PUBLIC WORKS.
UASIN GISHU COUNTY

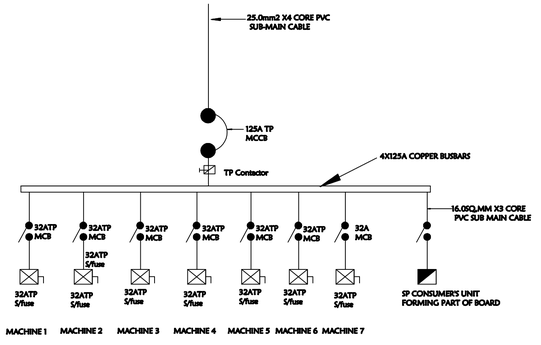


GROUND FLOOR -LIGHTING LAYOUT - PROPOSED TT INSTITUTES
(Drawing No.TVET/E-01)





GROUND FLOOR -POWER LAYOUT - PROPOSED TT INSTITUTES
(Drawing No.TVET/E-02)



SUB-SWITCH BOARD-DB1

SYMBOLS	DESCRIPTION
	1 gang 1 wey switch as MK. or approved equal
	1 gang 2 way switch as MK. or approved equal
	2 gang 2 way switch as MK. or approved equal
	Intermediate switch as MK. or approved equal
	3 gang 2way switch as MK. or approved equal
	13A twin switched socket outlet as MK.
	3 phase switchfuse as MEM or approved equal
	Emergency stop button MK. or approved equal
	1200mmx2x36watts flouresent light fitting with open end trough reflectoras Thorn or approved equal
	1500mmx2x58watts flouresent light fitting with open end trough reflectoras Thorn or approved equal
	Twin data/voice outlet
	28wx2D light fitting as Thorn or approved equal
	Emergency light fitting
	1200mmx1x36 watts bare batten flouresent light fitting as Thorn or approved equal
	1200mmx1x36watts flouresent light fitting complete with prismatic diffuser

NOTES

1. THIS DRAWING MUST BE READ TOGETHER WITH THE ARCHITECTURAL DRAWING.
2. ALL SWITCHES TO BE MOUNTED AT 1400MM ABOVE FINISHED FLOOR LEVEL
3. THE METAL TRUNKINGS TO BE MOUNTED AT 150MM ABOVE WORKTOPS
4. THIS ELECTRICAL INSTALLATION TO CONFORM WITH CURRENT EDITION OF IEE REGULATIONS
5. THIS ELECTRICAL INSTALLATION TO CONFORM WITH CURRENT EDITION OF IEE REGULATIONS

Client:

PRINCIPALSECRETARY
MINISTRY OF EDUCATION,SCIENCE &TECHNOLOGY
P.O. BOX 9583-00200
NAIROBI

Project:

PROPOSED TECHNICAL TRAINNING INSTITUTES

Title:

ELECTRICAL INSTALLATION

Designed:
J. K. GACHARI
M LH & U DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS
P.O. BOX 53-30100
ELDORET

Drawn: J. K. GACHARI

Scale: 1:100

Drawing No. TVET/E-01&02

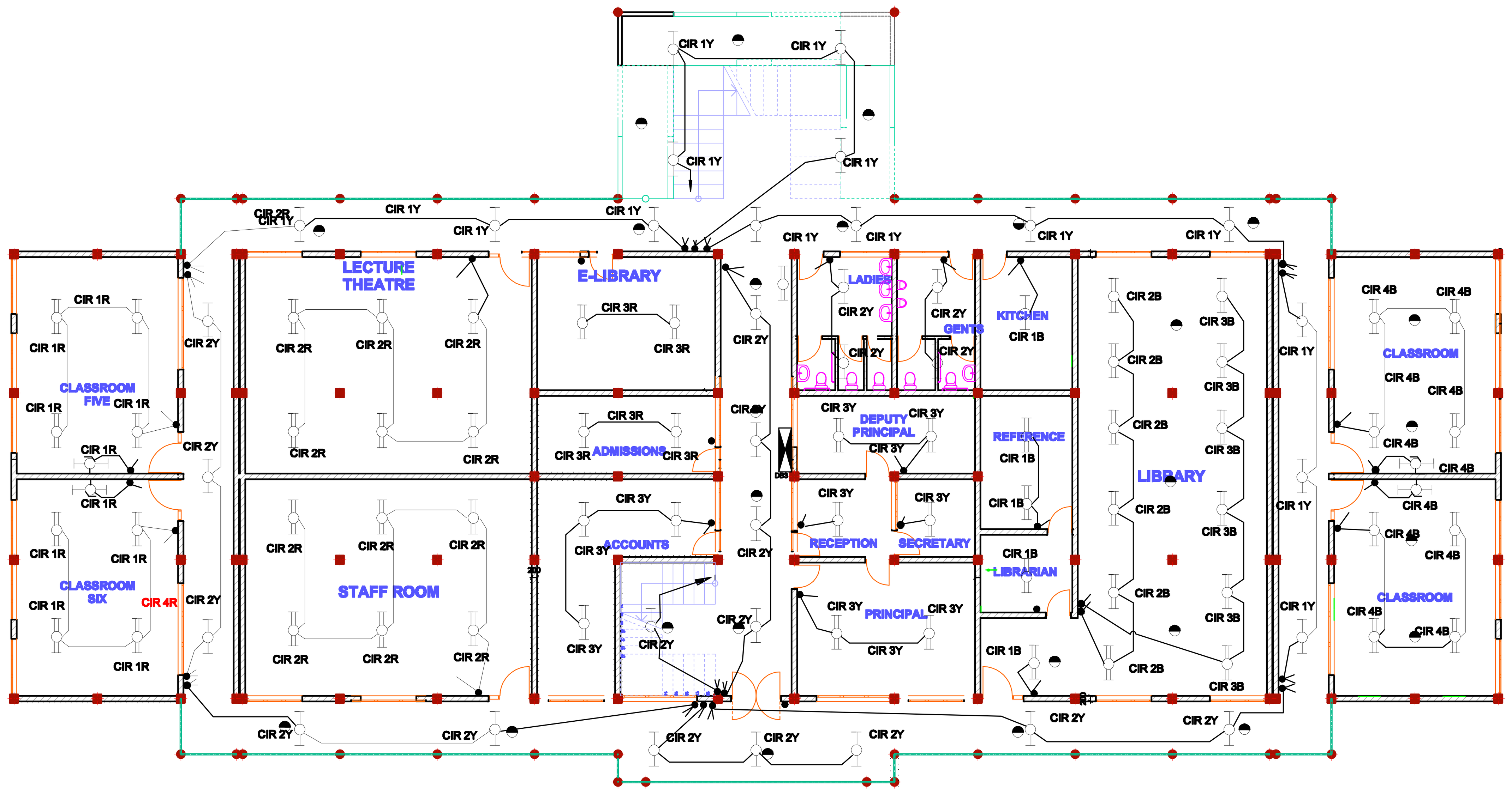
Checked & approved

Eng. E.N.Wekhaka
Chief Electrical Engineer, Ministry of Lands,Housing & Urban Development
Directorate of Public Works, NAIROBI

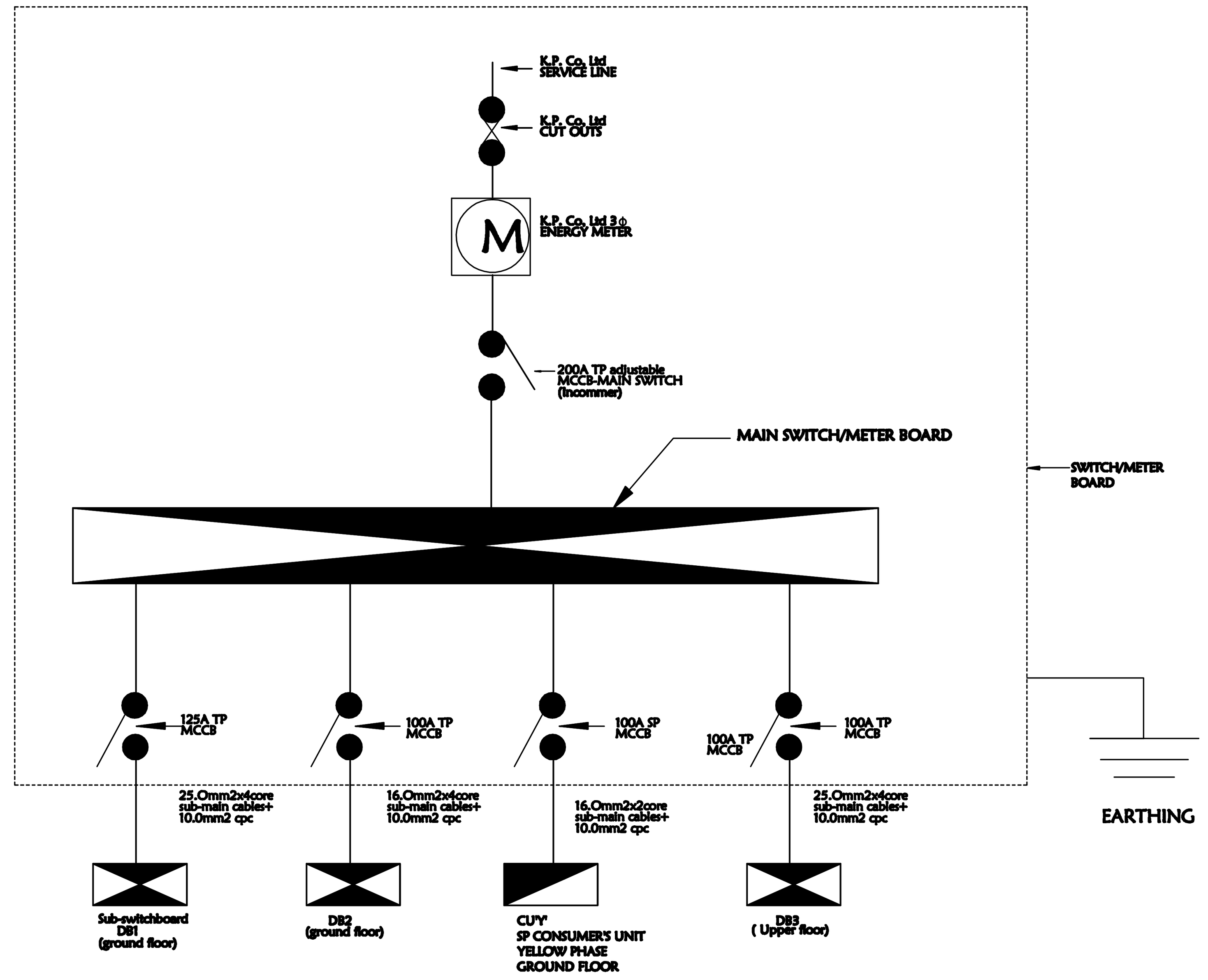
MINISTRY OF LANDS,HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS

ELECTRICAL DEPARTMENT
UASIN GISHU COUNTY FOR THE REPUBLIC OF KENYA

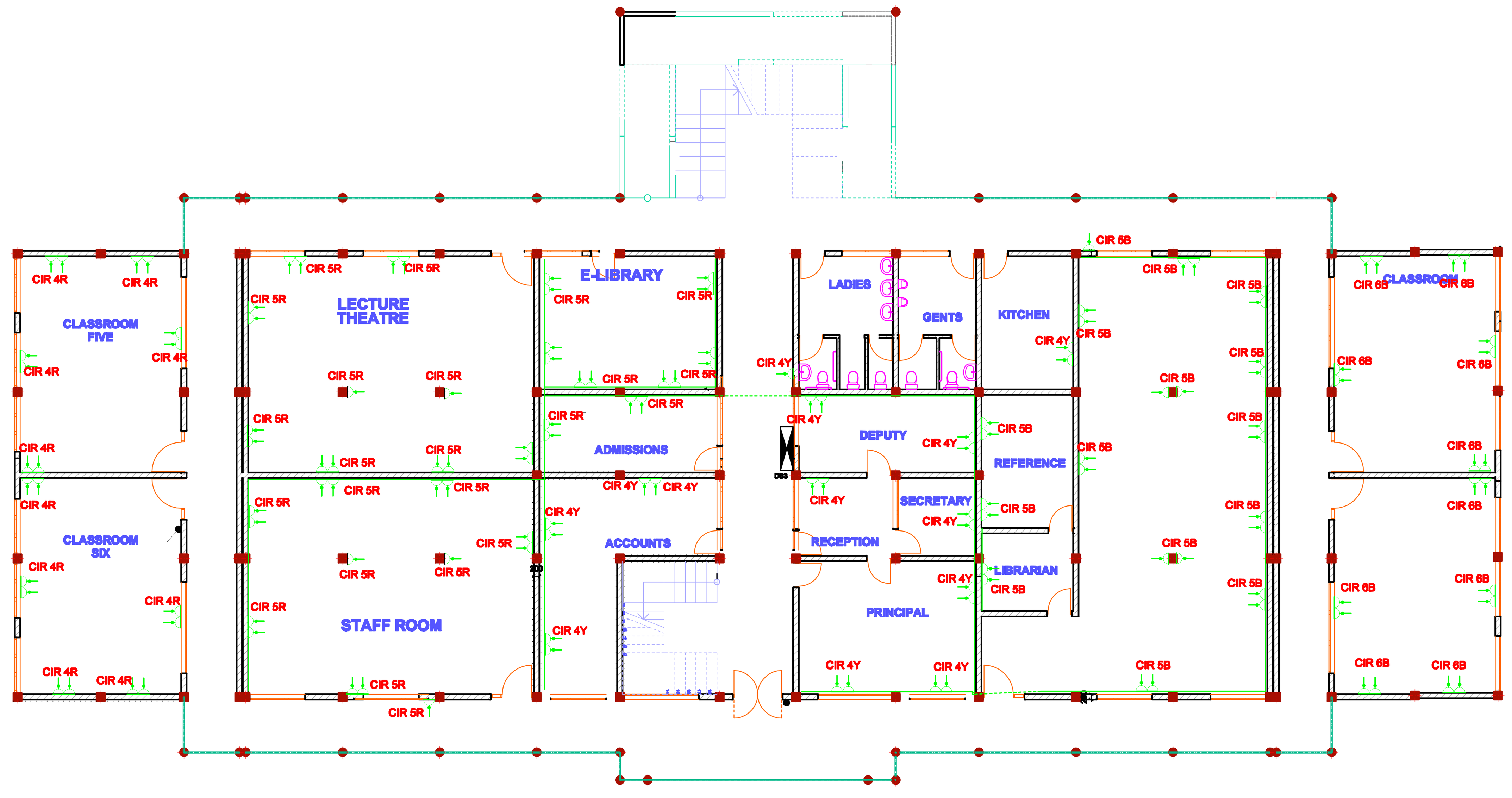
This is not an authorised drawing unless properly approved



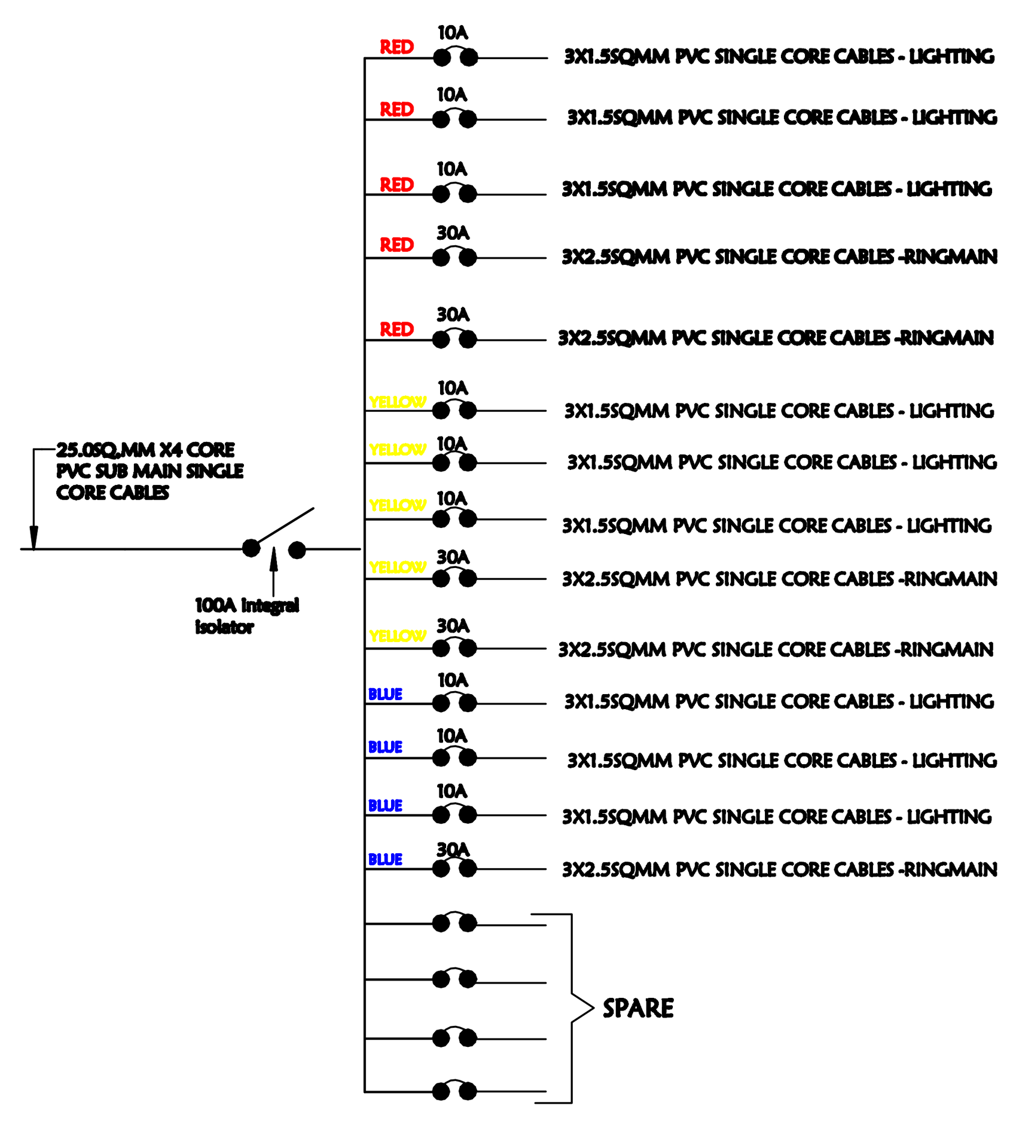
UPPER FLOOR-LIGHTING LAYOUT-PROPOSED TT INSTITUTES
(Drawing No. TVET/E-03)



POWER DISTRIBUTION - SCHEMATIC
(Drawing No. TVET/E-05)



UPPER FLOOR-POWER LAYOUT-PROPOSED TT INSTITUTES
(Drawing No. TVET/E-04)



6-WAYS TP DISTRIBUTION BOARD-DB2
IN UPPER FLOOR

SYMBOLS	DESCRIPTION
	1 gang 1 way switch as MK. or approved equal
	1 gang 2 way switch as MK. or approved equal
	2 gang 2 way switch as MK. or approved equal
	Intermediate switch as MK. or approved equal
	3 gang 2way switch as MK. or approved equal
	13A twin switched socket outlet as MK.
	3 phase switchfuse as MEM or approved equal
	Emergency stop button MK. or approved equal
	1200mmx2x36watts flourescent light fitting with open end trough reflectoras Thorn or approved equal
	1500mmx2x58watts flourescent light fitting with open end trough reflectoras Thorn or approved equal
	28wx2D light fitting as Thorn or approved equal
	Emergency light fitting
	1200mmx1x36 watts bare batten flourescent light fitting as Thorn or approved equal
	1200mmx1x36watts flourescent light fitting complete with prismatic diffuser

NOTES

1. THIS DRAWING MUST BE READ TOGETHER WITH THE ARCHITECTURAL DRAWING.
2. ALL SWITCHES TO BE MOUNTED AT 1400MM ABOVE FINISHED FLOOR LEVEL
3. THE METAL TRUNKINGS TO BE MOUNTED AT 150MM ABOVE WORKTOPS
4. THIS ELECTRICAL INSTALLATION TO CONFORM WITH CURRENT EDITION OF IEE REGULATIONS
5. THIS ELECTRICAL INSTALLATION TO CONFORM WITH CURRENT EDITION OF IEE REGULATIONS

Client:

PRINCIPALSECRETARY
MINISTRY OF EDUCATION,SCIENCE &TECHNOLOGY
P.O. BOX 9583-00200
NAIROBI

Project:

PROPOSED TECHNICAL TRAINNING INSTITUTES

Title:

ELECTRICAL INSTALLATION

Designed:	Drawn:	Scale:
J. K. GACHARI M L,H & U DEVELOPMENT DIRECTORATE OF PUBLIC WORKS P.O. BOX 53-30100 ELDORET	J. K. GACHARI	1:100
	Drawing No. TVET/E-03&04	

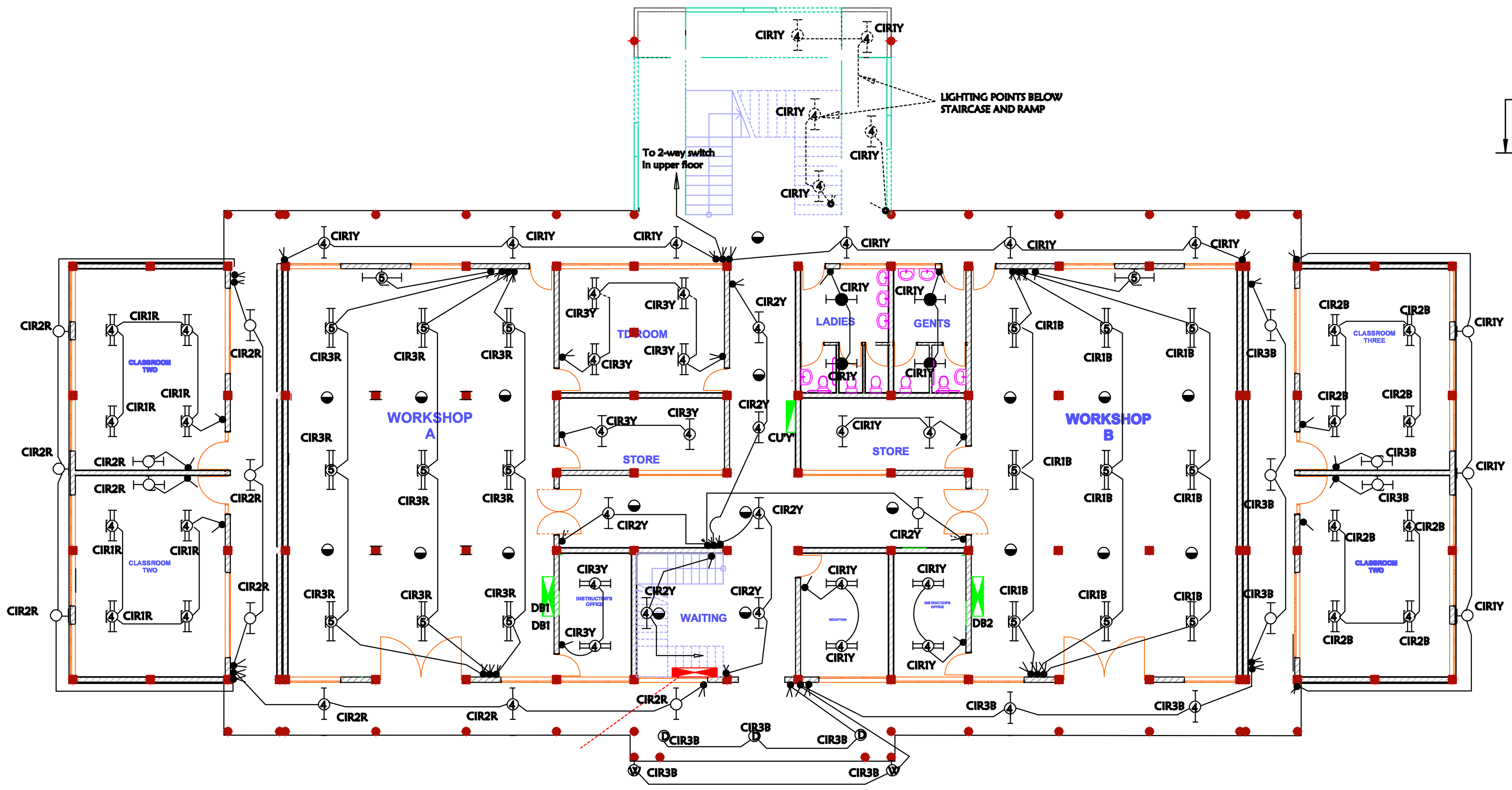
Checked & approved

Eng. E.N.Waithaka
Chief Electrical Engineer,Ministry of Lands,Housing & Urban Development
Directorate of Public Works, NAIROBI

MINISTRY OF LANDS,HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS

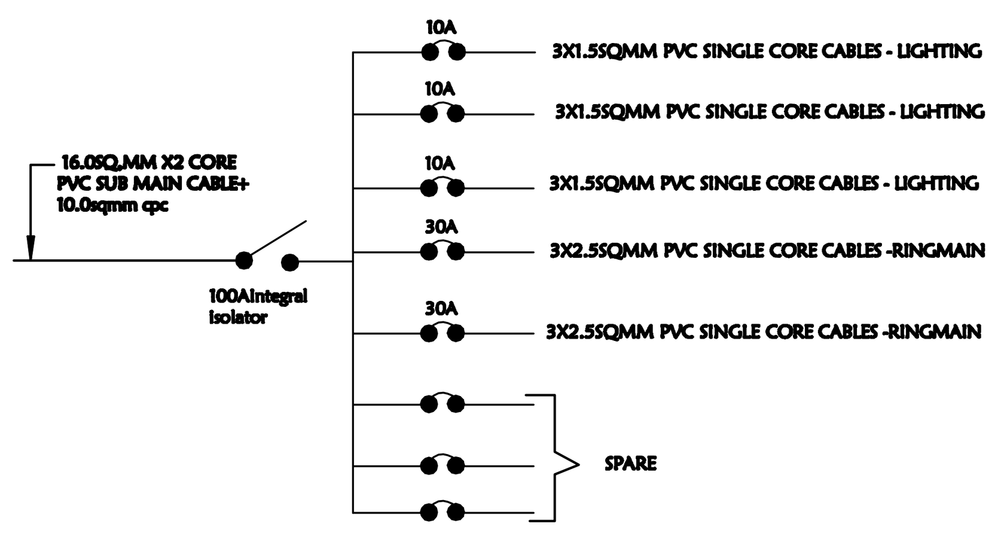
ELECTRICAL DEPARTMENT
UASIN GISHU COUNTY FOR THE REPUBLIC OF KENYA

This is not an authorised drawing unless properly approved

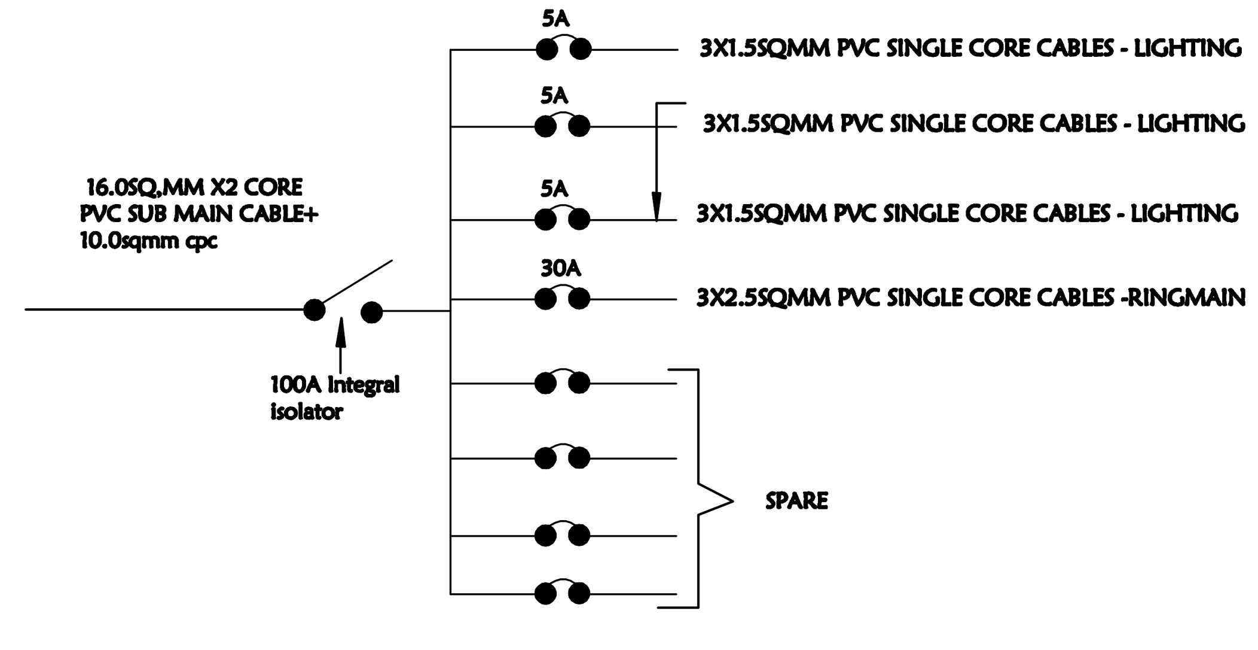


GROUND FLOOR -LIGHTING LAYOUT - PROPOSED TT INSTITUTES

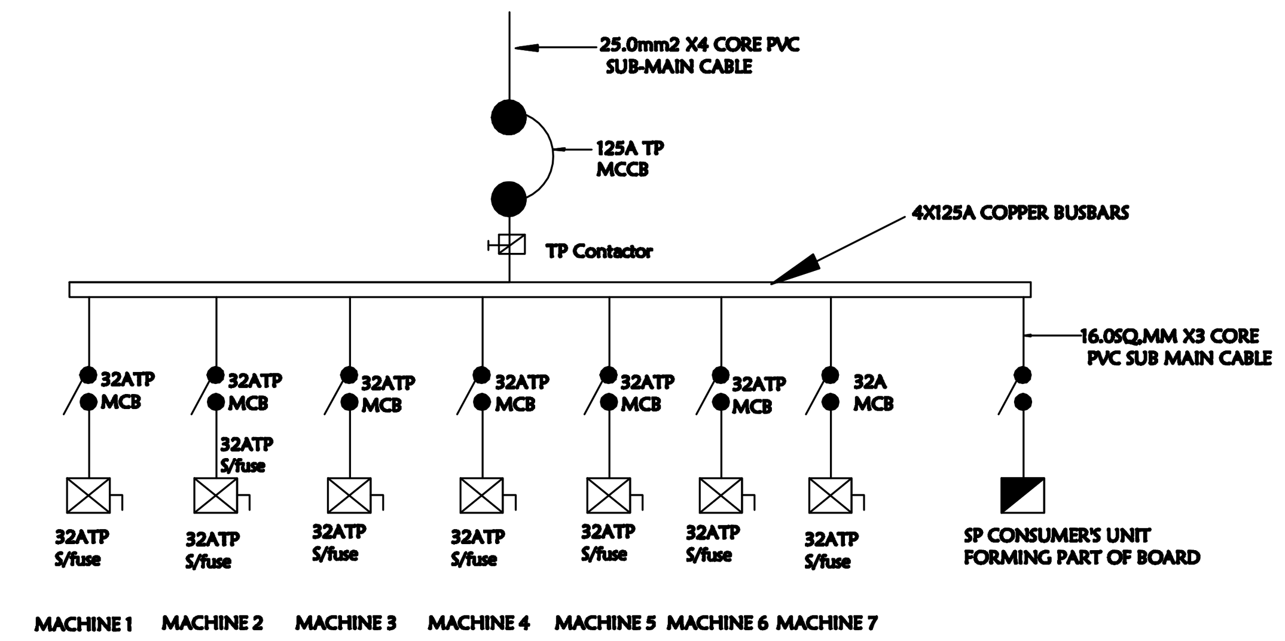
(Drawing No.TVET/E-01)



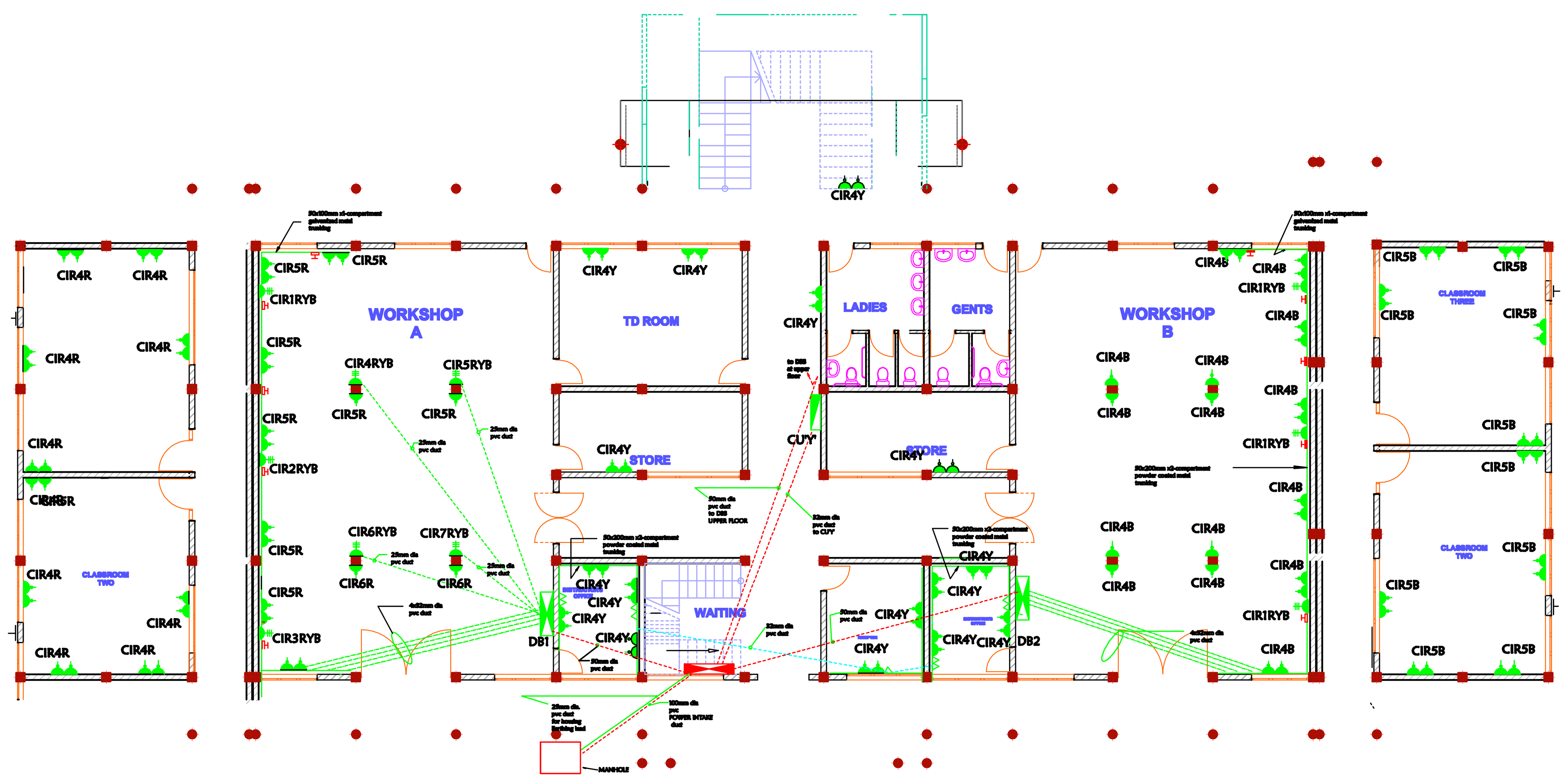
8-WAYS SP CONSUMER UNIT
(Red phase- In sub-switchboard -DB1)



8-WAYS SP CONSUMER UNIT"
(Yellow phase)

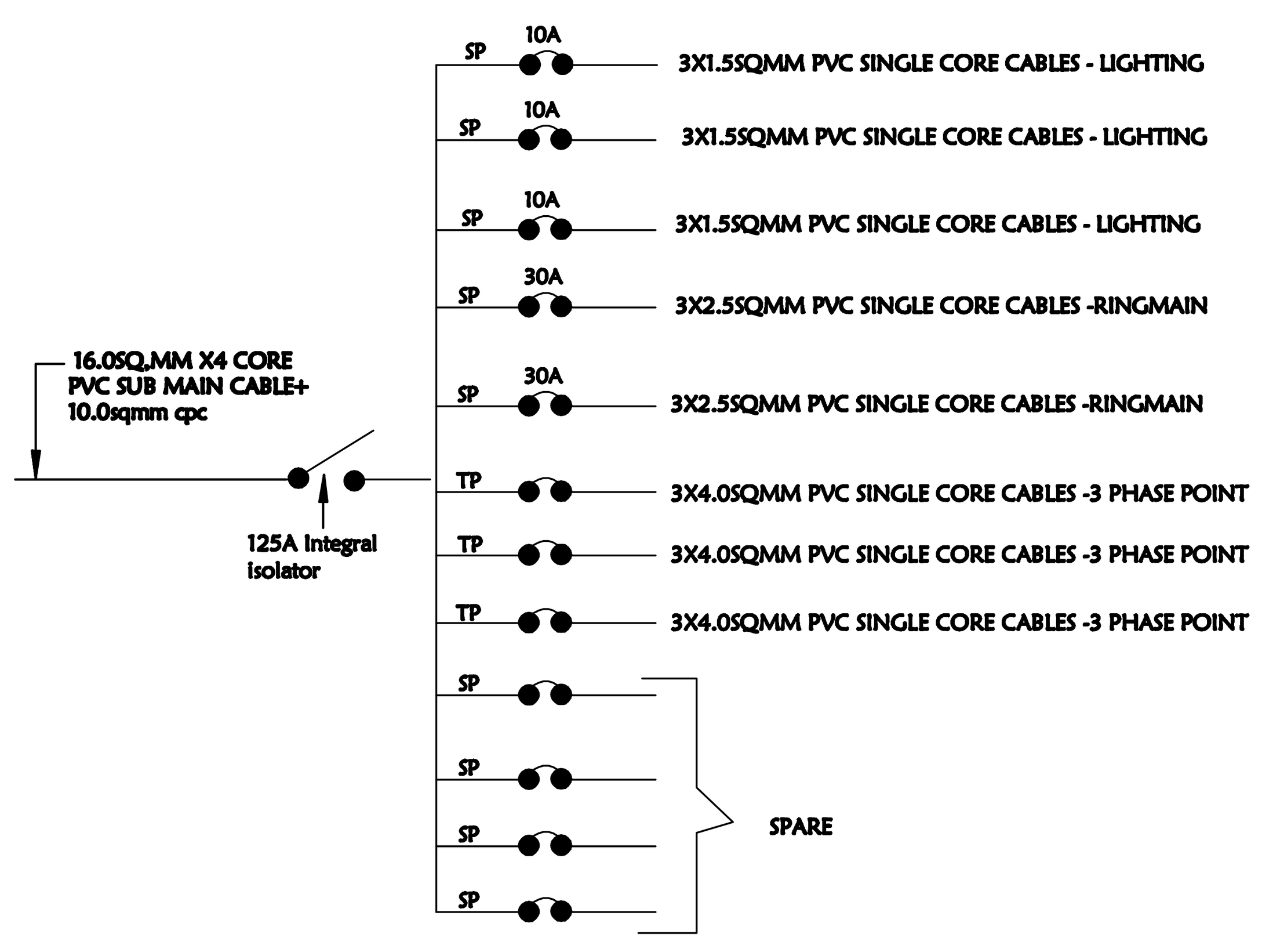


SUB-SWITCH BOARD-DB1



GROUND FLOOR -POWER LAYOUT - PROPOSED TT INSTITUTES

(Drawing No.TVET/E-02)



6-WAYS TP DISTRIBUTION BOARD-DB2

SYMBOLS	DESCRIPTION
	1 gang 1 way switch as MK. or approved equal
	1 gang 2 way switch as MK. or approved equal
	2 gang 2 way switch as MK. or approved equal
	Intermediate switch as MK. or approved equal
	3 gang 2way switch as MK. or approved equal
	13A twin switched socket outlet as MK.
	3 phase switchfuse as MEM or approved equal
	Emergency stop button MK. or approved equal
	1200mmx2x36watts flourescent light fitting with open end trough reflectoras Thorn or approved equal
	1500mmx2x58watts flourescent light fitting with open end trough reflectoras Thorn or approved equal
	Twin data/voice outlet
	28wx2D light fitting as Thorn or approved equal
	Emergency light fitting
	1200mmx1x36 watts bare batten flourescent light fitting as Thorn or approved equal
	1200mmx1x36watts flourescent light fitting complete with prismatic diffuser

NOTES

1. THIS DRAWING MUST BE READ TOGETHER WITH THE ARCHITECTURAL DRAWING.
2. ALL SWITCHES TO BE MOUNTED AT 1400MM ABOVE FINISHED FLOOR LEVEL
3. THE METAL TRUNKINGS TO BE MOUNTED AT 150MM ABOVE WORKTOPS
4. THIS ELECTRICAL INSTALLATION TO CONFORM WITH CURRENT EDITION OF IEE REGULATIONS
5. THIS ELECTRICAL INSTALLATION TO CONFORM WITH CURRENT EDITION OF IEE REGULATIONS

Client:
PRINCIPALSECRETARY
MINISTRY OF EDUCATION,SCIENCE &TECHNOLOGY
P.O. BOX 9583-00200
NAIROBI

Project:
PROPOSED TECHNICAL TRAINNING INSTITUTES

Title:
ELECTRICAL INSTALLATION

Designed:
J. K. GACHARI
M L,H & U DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS
P.O. BOX 53-30100
ELDORET

Drawn: J. K. GACHARI

Scale: 1:100

Drawing No. TVET/E-01,02,03,04 &05

Checked & approved
Eng. E.N.Waithaka

MINISTRY OF LANDS,HOUSING AND URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS
ELECTRICAL DEPARTMENT
UASIN GISHU COUNTY
OF KENYA

NOTES

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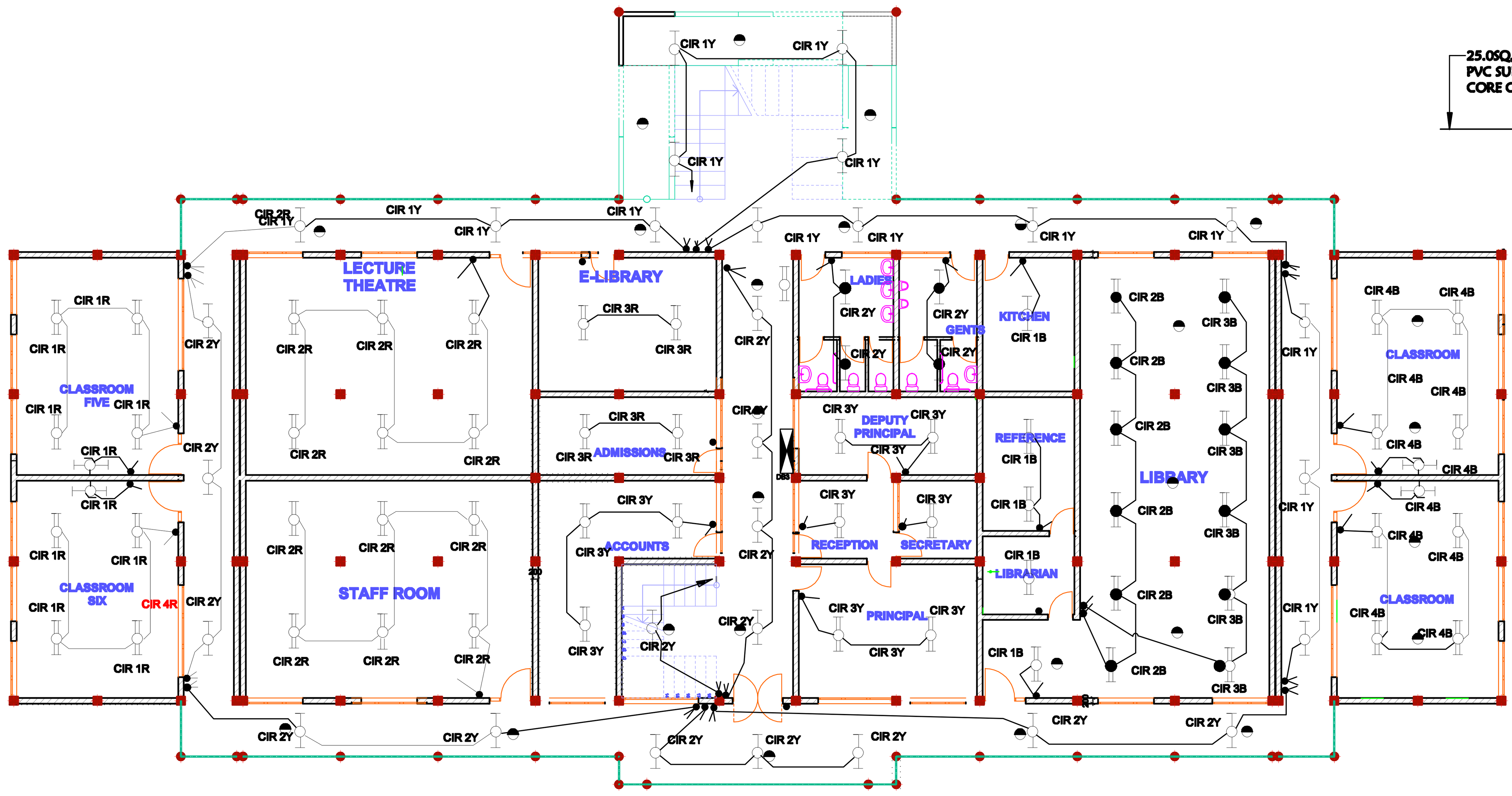
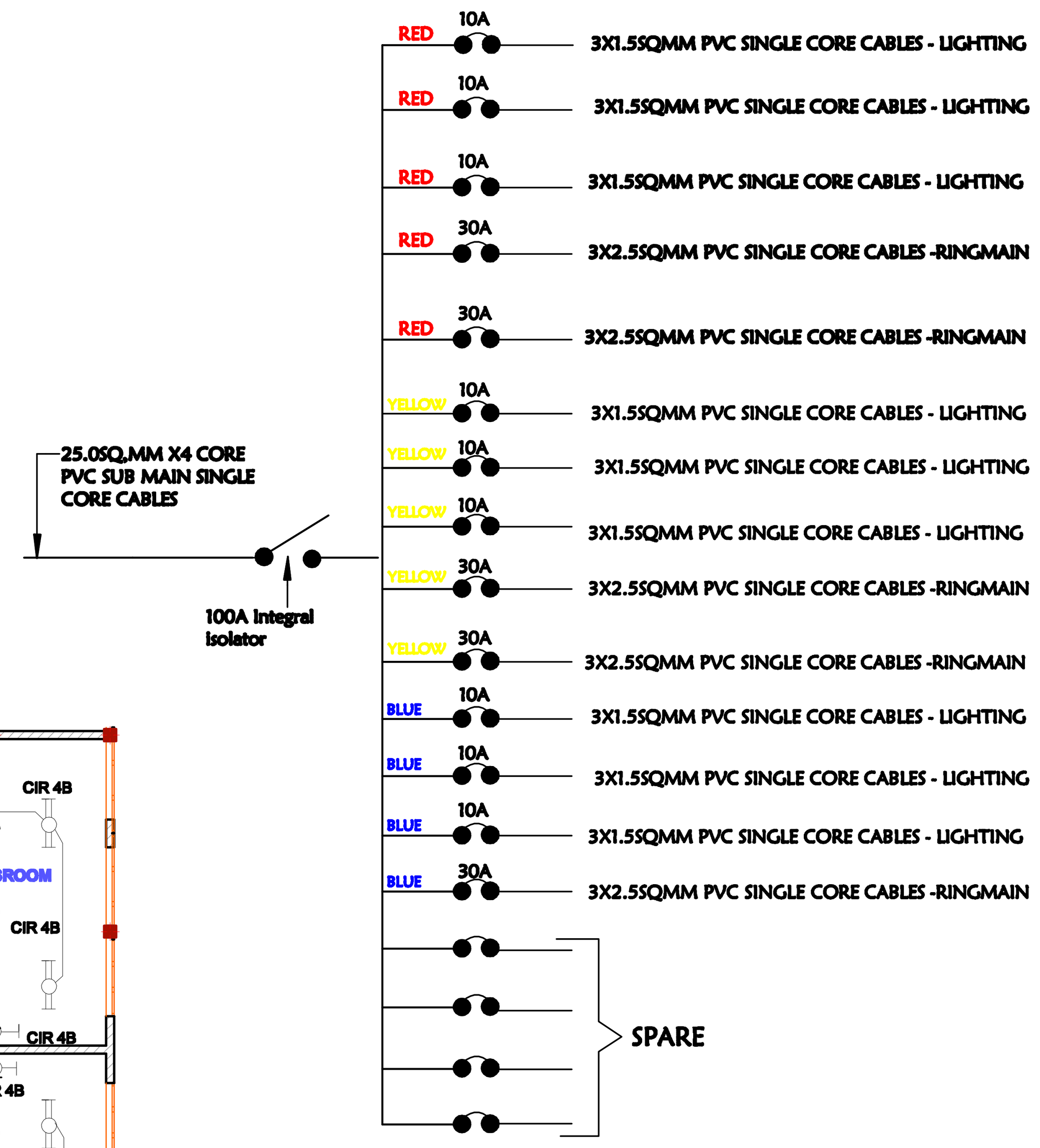
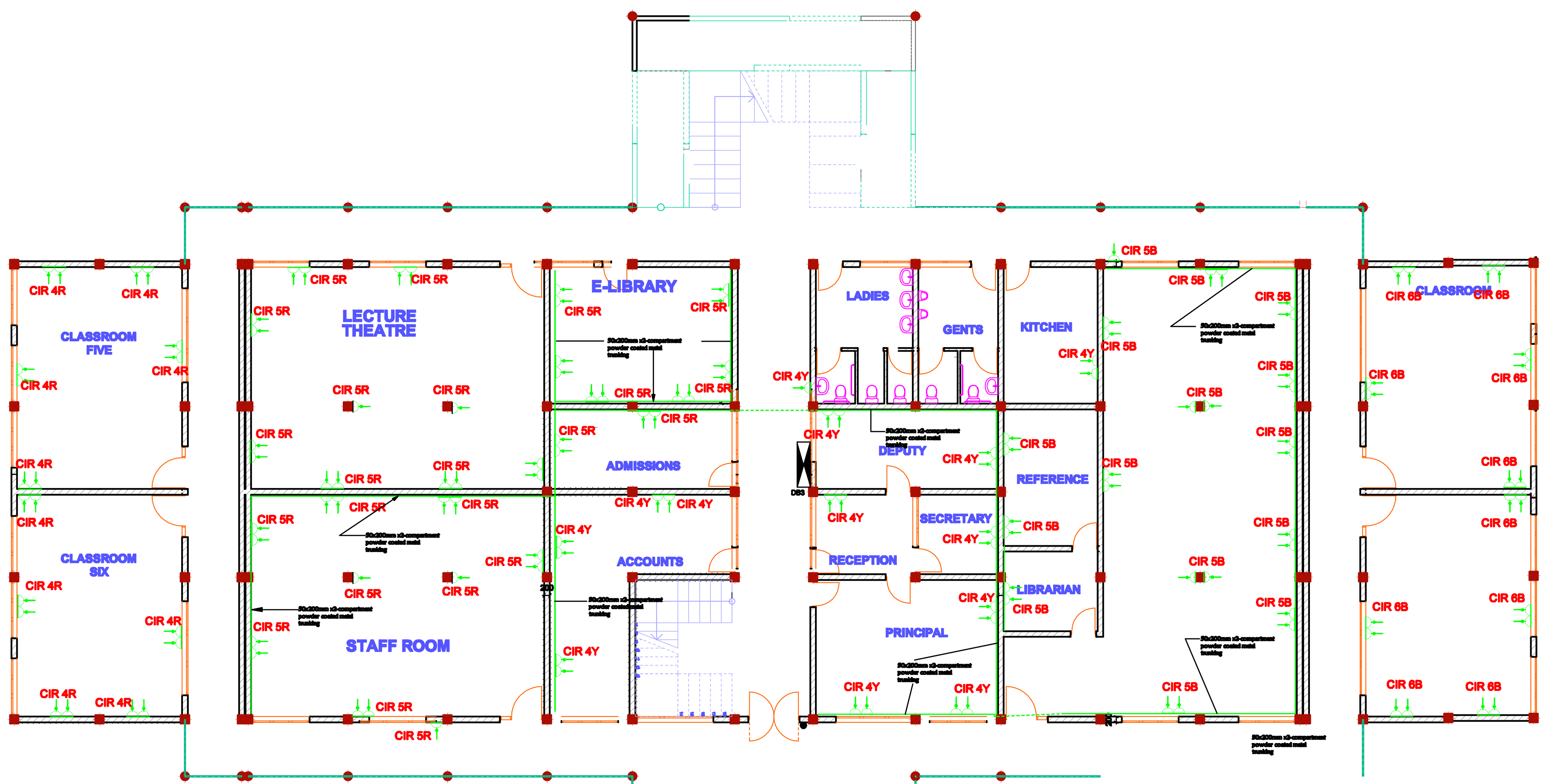


UPPER FLOOR-LIGHTING LAYOUT-PROPOSED TT INSTITUTES
(Drawing No. TVET/E-03)

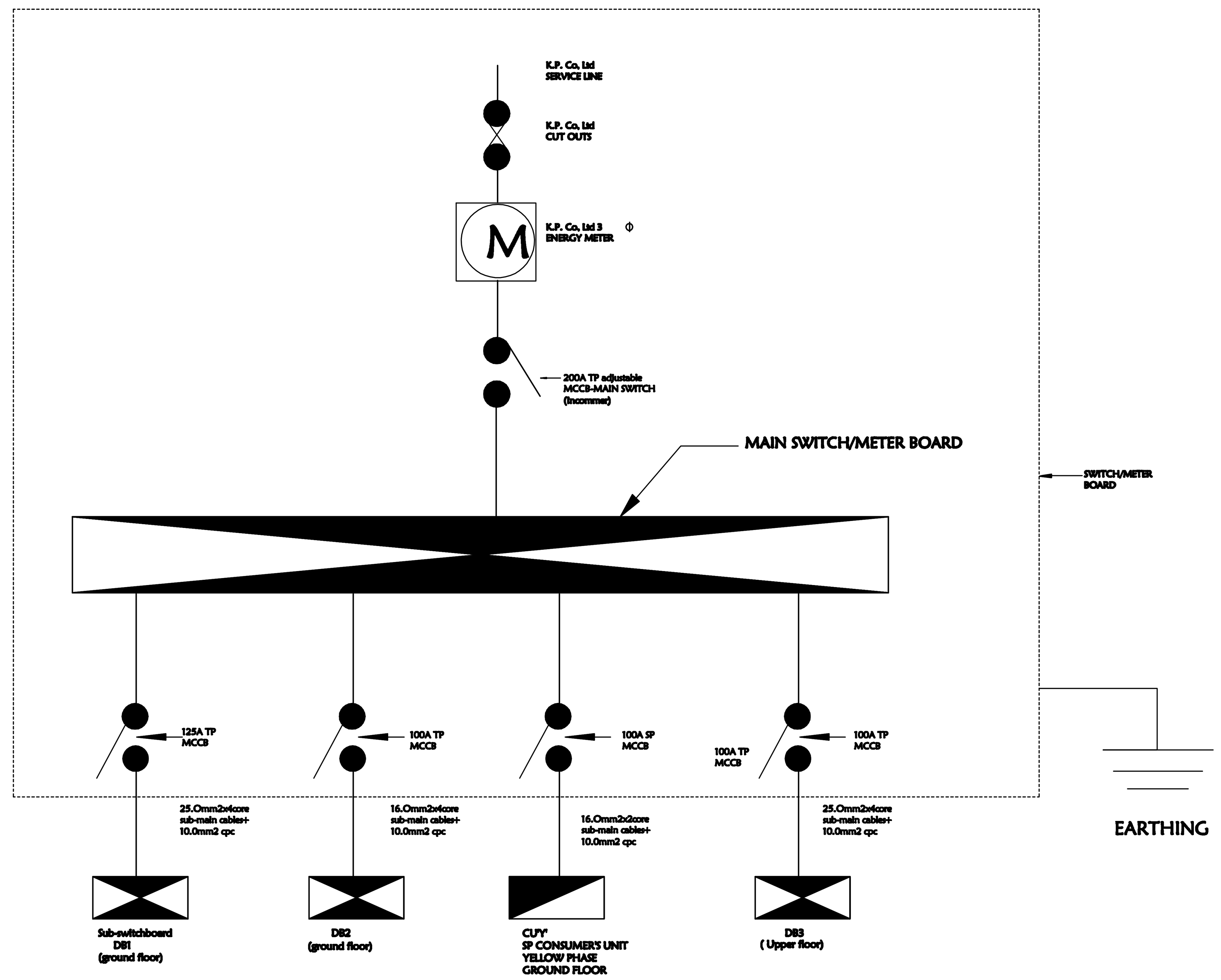


6-WAYS TP DISTRIBUTION BOARD-DB2
IN UPPER FLOOR

SYMBOLS	DESCRIPTION
	1 gang 1 way switch as MK. or approved equal
	1 gang 2 way switch as MK. or approved equal
	2 gang 2 way switch as MK. or approved equal
	Intermediate switch as MK. or approved equal
	3 gang 2way switch as MK. or approved equal
	13A twin switched socket outlet as MK.
	3 phase switchfuse as MEM or approved equal
	Emergency stop button MK. or approved equal
	1200mmx2x36watts flourescent light fitting with open end trough reflectoras Thorn or approved equal
	1500mmx2x58watts flourescent light fitting with open end trough reflectoras Thorn or approved equal
	Twin data/voice outlet
	28wx2D light fitting as Thorn or approved equal
	Emergency light fitting
	1200mmx1x36 watts bare batten flourescent light fitting as Thorn or approved equal
	1200mmx1x36watts flourescent light fitting complete with prismatic diffuser



UPPER FLOOR-POWER LAYOUT-PROPOSED TT INSTITUTES
(Drawing No. TVET/E-04)



POWER DISTRIBUTION - SCHEMATIC
(Drawing No. TVET/E-05)

Client:
PRINCIPALSECRETARY
MINISTRY OF EDUCATION,SCIENCE &TECHNOLOGY
P.O. BOX 9583-00200
NAIROBI

Project:
PROPOSED TECHNICAL TRAINNING INSTITUTES

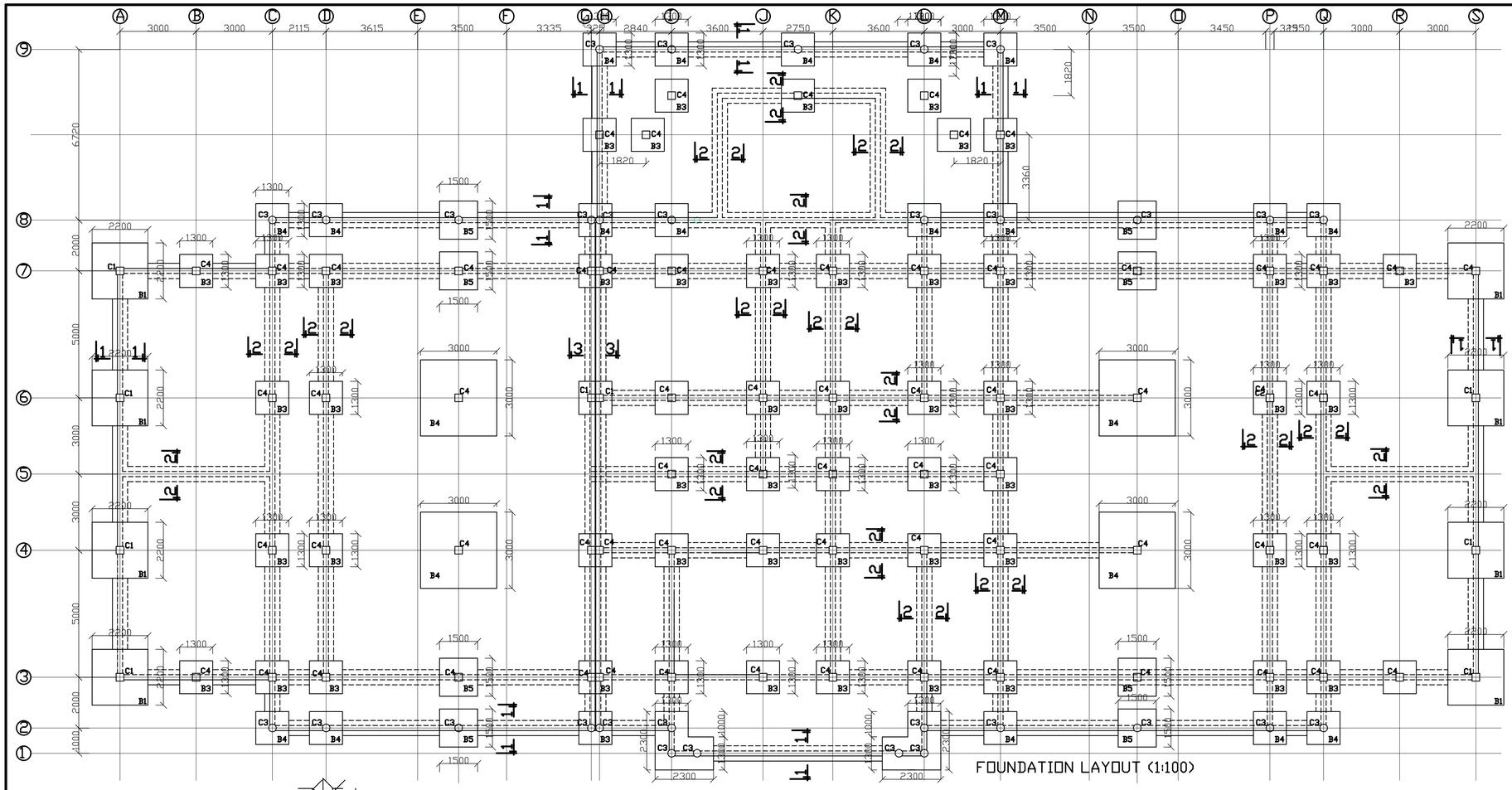
Title:
ELECTRICAL INSTALLATION

Designed:	Drawn:	Scale:
J. K. GACHARI M L,H & U DEVELOPMENT DIRECTORATE OF PUBLIC WORKS P.O. BOX 53-30100 ELDORET	J. K. GACHARI	1:100
	Drawing No. TVET/E-01,02,03,04 &05	

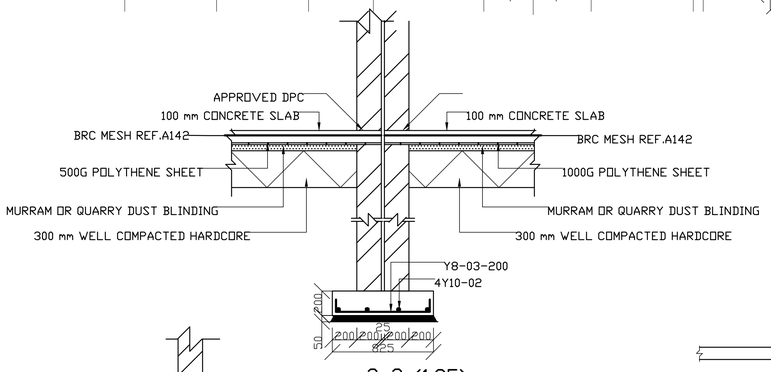
Checked & approved

MINISTRY OF LANDS,HOUSING AND
URBAN DEVELOPMENT
DIRECTORATE OF PUBLIC WORKS

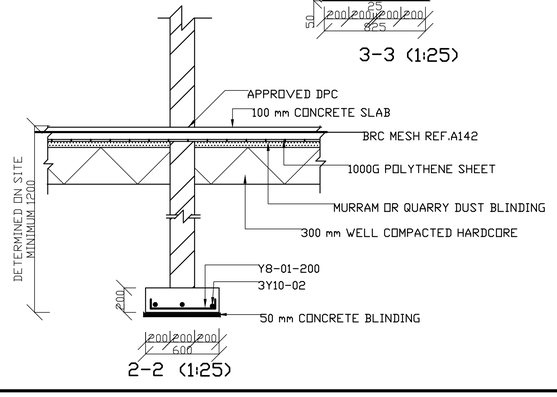
ELECTRICAL DEPARTMENT
UASIN GISHU COUNTY
OF KENYA



FOUNDATION LAYOUT (1:100)

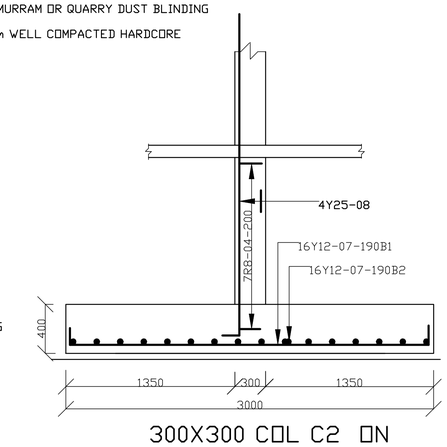


3-3 (1:25)

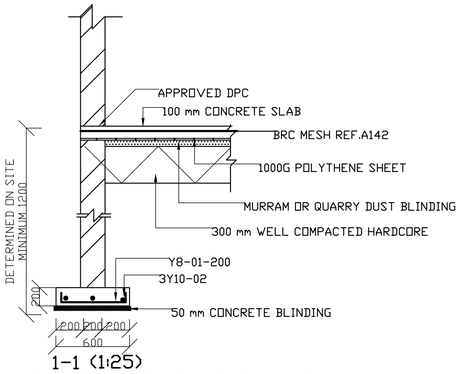


2-2 (1:25)

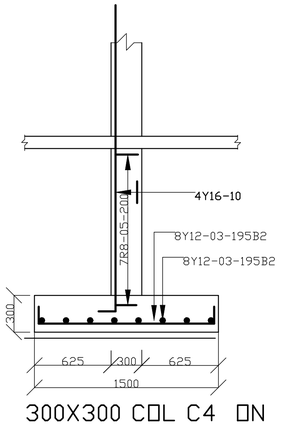
B1 2200X2200X400
B2 2400X2400X400
B3 1300X1300X300
B4 3000X3000X400
B5 1500X1500X300



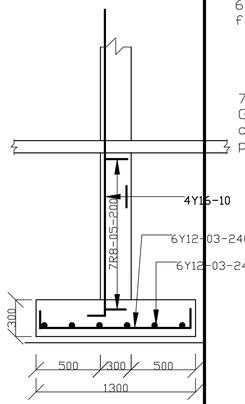
300X300 COL C2 ON
3000X3000X400 BASE
TYPE B4(4No.Thus)



1-1 (1:25)
TYPICAL FOUNDATION SECTIONS



300X300 COL C4 ON
1500X1500X300 BASE
TYPE B5(4No.Thus)



300X300 COL C4 ON
1300X1300X300 BASE
TYPE B2(67No.Thus)

NOTES

All dimensions are in millimetres unless otherwise stated.
2.This drawing to be read in conjunction with all relevant architectural and other structural drawings.
3.Concrete to be class 20(20) mix 1:2:4 for reinforced concrete works.
4.Concrete for blinding to be class 15,1:3:6.
5.All excavations to be carried out to firm ground.
6.Cover to reinforcement to be as follows:
Foundations 50mm
Columns 40mm
Beams 25mm
Slab/staircase 20mm.
7. All timber to be sawn cypress of GS(structura grade of timber) cured to an optimum moisture content of 12-15% preservative treated.

ISSUES			
DATE	TO	APPLICATION	BY

REVISIONS					
NO	DATE	BY	DESCRIPTION	GRP LDR	C.S.ENG

REFERENCE DRAWINGS	
NO	DESCRIPTION

CLIENT
MINISTRY OF EDUCATION SCIENCE AND TECHNOLOGY

PROJECT TITLE
PROPOSED SUB COUNTY TECHNICAL TRAINING INSTITUTES

DRG. TITLE
FOUNDATION LAYOUT AND R.C. DETAILS

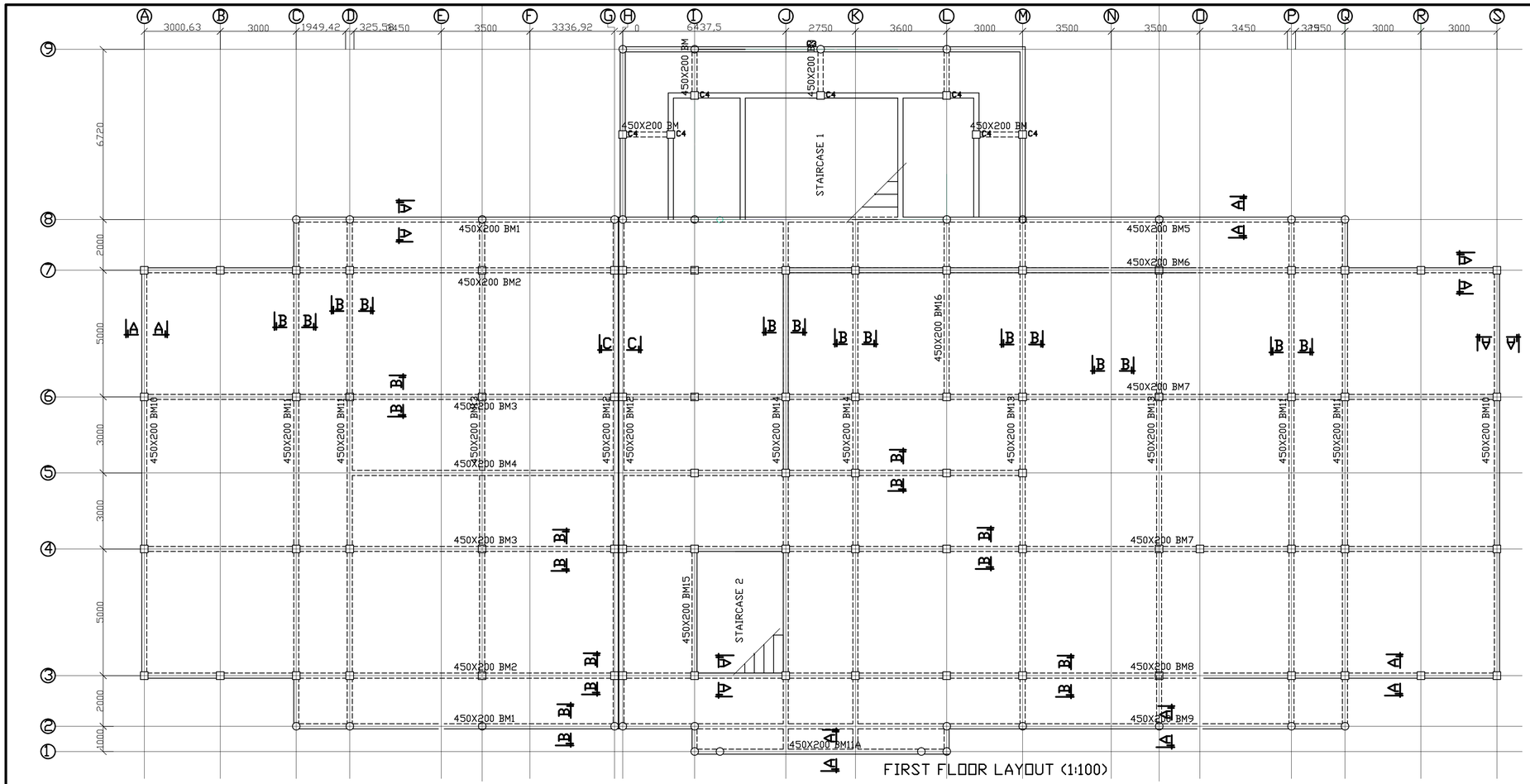
CI/sfb	( )	
	DRG. No.	TTI/STR/01
	FILE No.	
SCALE(S) AS SHOWN		FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING

APPROVED

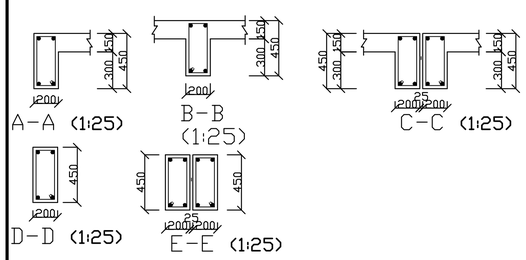
THE CHIEF ENGINEER(STRUCTURAL)

	NAME	SIGNATURE	DATE
DESIGNED	WATHOME A.M.		JUL 2015
DRAWN	WATHOME A.M.		JUL 2015

DIRECTORATE OF PUBLIC WORKS-UASIN GISHU COUNTY STRUCTURAL DEPARTMENT



FIRST FLOOR LAYOUT (1:100)



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ISSUES

DATE	TO	APPLICATION	BY

REVISIONS

NO	DATE	BY	DESCRIPTION	GRP LDR	C.S.ENG

REFERENCE DRAWINGS

NO	DESCRIPTION

CLIENT
MINISTRY OF EDUCATION SCIENCE AND TECHNOLOGY

PROJECT TITLE
PROPOSED SUB COUNTY TECHNICAL TRAINING INSTITUTES

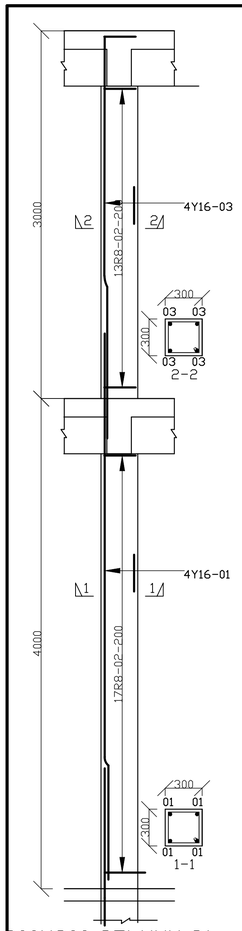
DRG. TITLE
FIRST FLOOR LAYOUT.

CI/sfb	( )	
	DRG. No.	TTI/STR/02
	FILE No.	
SCALE(S) AS SHOWN		FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING

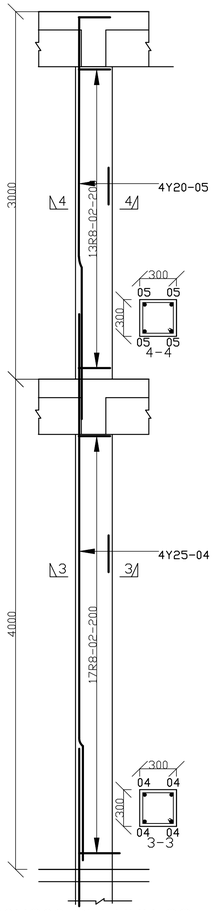
APPROVED
THE CHIEF ENGINEER(STRUCTURAL)

	NAME	SIGNATURE	DATE
DESIGNED	WATHOME A.M.		JUL 2015
DRAWN	WATHOME A.M.		JUL 2015

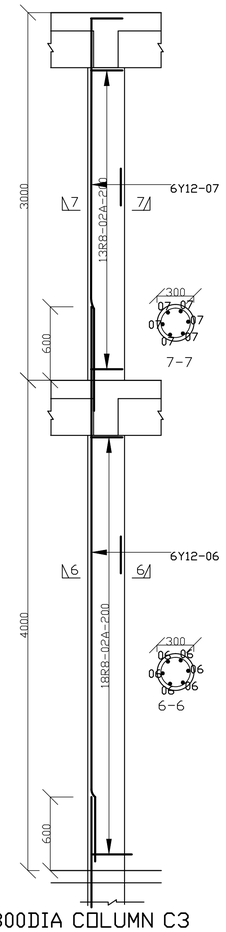
DIRECTORATE OF PUBLIC WORKS-UASIN GISHU COUNTY STRUCTURAL DEPARTMENT



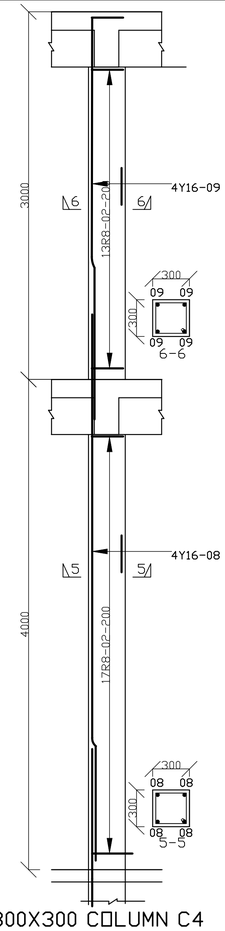
300X300 COLUMN C1
(8No. Thus)(1:25)



300X300 COLUMN C2
(4No. Thus)(1:25)



300DIA COLUMN C3
(33No. Thus)(1:25)



300X300 COLUMN C4
(67No. Thus)(1:25)

NOTES

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ISSUES

DATE	TO	APPLICATION	BY

REVISIONS

NO	DATE	BY	DESCRIPTION	GRP LDR	C.S.ENG

REFERENCE DRAWINGS

NO	DESCRIPTION

CLIENT MINISTRY OF EDUCATION SCIENCE AND TECHNOLOGY

PROJECT TITLE
PROPOSED SUB COUNTY TECHNICAL TRAINING INSTITUTES

DRG. TITLE
COLUMN R.C. DETAILS

CI/sfb	( )	
	DRG. No.	TTI/STR/03
	FILE No.	
SCALE(S) AS SHOWN		FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING

APPROVED

THE CHIEF ENGINEER(STRUCTURAL)

	NAME	SIGNATURE	DATE
DESIGNED	WATHOME A.M.		JUL 2015
DRAWN	WATHOME A.M.		JUL 2015

DIRECTORATE OF PUBLIC WORKS-UASIN GISHU COUNTY
STRUCTURAL DEPARTMENT