COUNTY GOVERNMENT OF NYERI

PROPOSED STORM DRAINAGE AND ABLUTION BLOCK AT PAKONI OPEN AIR MARKET-KARATINA

CGN/TTC/38/2020-2021

TENDER DOCUMENT

FEBRUARY 1, 2021

PROPOSED STORM WATER DRAINAGE AND ABLUTION BLOCK AT PAKONI OPEN AIR MARKET-KARATINA

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FORM OF AGREEMENT

THIS AGREEMENT, made on the _____ day of _____ 20 _____ between the **Nyeri County Government,** whose registered office is situated at **Nyeri Town** and of **P.O. Box 1112-10100 Nyeri** (hereinafter called "the Employer") of the one part AND

_____ whose registered office is situated at and of _____

(hereinafter called "the Contractor") of the other part.

WHEREAS THE Employer is desirous that the Contractor executes the **Proposed Storm Water Drainage and Ablution Block at Pakoni Open Air Market-Karatina**(hereinafter called "the Works") located at **Mathira Sub County Karatina Town**]and the Employer has accepted the tender submitted by the Contractor for the execution and completion of the works and the remedying of any defects therein for the Contract Price of KShs._____[*Amount in figures*],Kenya Shillings_____

_____[*Amount in words]*.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.

   (i) Letter of Acceptance

   (ii) Form of Tender

   (iii) Conditions of Contract Part I

   (iv) Conditions of Contract Part II and Appendix to Conditions of Contract

   (v) Specifications

   (vi) Drawings

   (vii) Priced Bills of Quantities

3. In consideration of the payments to be made by the Employer tothe Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

InWITNESS WHEREOF the parties thereto have caused this Agreement to be executed the day and year first herein above written.

FOR AND ON BEHALF OF THE EMPLOYER (AUTHORIZED OFFICER)

NAME _____

TITLE _____

BINDING SIGNATURE _____

Witnessed by

NAME _____

ADDRESS _____

BINDING SIGNATURE _____

FOR AND ON BEHALF OF THE CONTRACTOR

NAME _____

TITLE _____

BINDING SIGNATURE _____

Witnessed by

NAME _____

ADDRESS _____

BINDING SIGNATURE _____

INVITATION TO TENDER

Tender No: CGN/TTC/38/2020-2021

1.1 The County Government of Nyeri invites sealed tender for **PROPOSED STORM WATER DRAINAGE AND ABLUTION BLOCK AT PAKONI OPEN AIR MARKET-KARATINA**

1.2 Interested eligible candidates may obtain further information tender documents at the **County Procurement Office, ground floor, Nyeri County Government Offices** during normal working hours i.e. 8am-5pm

1.3 A complete set of tender documents may be obtained by interested candidates by downloading at the **Nyeri County Government website free of charge**

1.4 Prices quoted should be net inclusive of all taxes and must be in Kenya Shillings and shall remain valid for **One Hundred and Fifty (150)** days from the closing date of tender.

1.5 Completed tender documents are to be enclosed in plain sealed envelopes **(original and copy)** marked with tender name and reference number and deposited in the Tender Box at **Nyeri County Government Offices** or to be sent to **the County Secretary, Nyeri County Government P.O. Box 1112-10100 Nyeri** so as to be received on or before **5TH MARCH 2021 AT 11.00A.M**

1.6 Tenders will be opened immediately thereafter at the **Nyeri County Government Boardroom** in the presence of the candidates or their representatives who choose to attend.

Chief Officer
Department of Trade, Tourism and Cooperative Development
NYERI

INSTRUCTIONS TO TENDERERS

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

1.1 The Nyeri County Government invites tenders for Works Contract as described in the tender documents. The successful tenderer will be expected to complete the Works by the Intended Completion Date specified in the tender documents.

1.2 Tenderers shall provide a statement that the tenderer (including all members of a joint venture and subcontractors) is not associated, or has not been associated in the past, directly or indirectly in the preparation of the design, specifications, and other documents for this project.

1.3 Tenderers shall include the following information and documents with their tenders, unless otherwise stated:

(a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the tender to commit the tenderer:

(b) total monetary value of construction work performed for each of the last five years:

(c) experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and names and addresses of clients who may be contacted for further information on these contracts;

(d) major items of construction equipment proposed to carry out the Contract and an undertaking that they will be available for the Contract.

(e) qualifications and experience of key site management and technical personnel proposed for the Contract and an undertaking that they shall be available for the Contract.

(f) reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the past three years.

(g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources).

(h) authority to seek references from the tenderer's bankers;

(i) information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount; and

(j) proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.

1.4 Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements, unless otherwise stated:

(a) the tender shall include all the information listed inclause 1.5 above for each joint venture partner;

(b) the tender shall be signed so as to be legally binding onall partners;

(c) all partners shall be jointly and severally liable for the execution of the Contract in accordance with theContract terms;

(d) one of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of all partners of the joint venture; and

(e) the execution of the entire Contract, including payment,shall be done exclusively with the partner in charge.

(f) The figures for each of the partners of a joint venture shall be added together to determine the tenderer's compliance with the minimum qualifying criteria; however, for a joint venture to qualify, each of its partners must meet at least 25 percent of minimum criteria for an individual tenderer, and the partner in charge at least 40 percent of those minimum criteria. Failure to comply with this requirement will result in rejection of the joint venture's tender. Subcontractors' experience and resources will not be taken into account in determining the tenderer's compliance with the qualifying criteria, unless otherwise stated.

1.5 Each tenderer shall submit only one tender, either individually or as a partner in a joint venture. A tenderer who submits or participates in more than one tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the tenderer's participation to be disqualified.

1.6 The tenderer shall bear all costs associated with the preparation and submission of his tender, and Nyeri County Government will in no case be responsible or liable for those costs

1.7 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine the Site of the Works and its surroundings, and obtain all information that may be necessary for preparing the tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the tenderer's own expense.

1.8 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.

1.9 The procuring entity shall allow the tenderer to review the tender document free of charge before purchase.

2. Tender Documents

2.1 The complete set of tender documents comprises the documents listed below and any addenda issued in accordance with Clause 2.4.

(a) These Instructions to Tenderers
(b) Appendix to instructions to Tenderers and evaluation criteria
(c) Form of Tender and Confidential Business Questionnaire
(d) Conditions of Contract
(e) Appendix to Conditions of Contract
(f) Specifications
(g) Bills of Quantities

2.2 The tenderer shall examine all Instructions, Forms to be filled and Specifications in the tender documents. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the tendering documents in every respect will be at the tenderer's risk and may result in rejection of his tender.

2.3 A prospective tenderer making an inquiry relating to the tender documents may notify the Nyeri County Government in writing or by cable, telex or facsimile at the address indicated in the letter of invitation to tender. Nyeri County Government will only respond to requests for clarification received earlier than seven days prior to the deadline for submission of tenders. Copies of the response will be forwarded to all persons issued with tendering documents, including a description of the inquiry, but without identifying its source.

2.4 Before the deadline for submission of tenders, Nyeri County Government may modify the tendering documents by issuing addenda. Any addendum thus issued shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all tenderers. Prospective tenderers shall acknowledge receipt of each addendum in writing.

3. Preparation of Tenders

3.1 All documents relating to the tender and any correspondence shall be in English language.

3.2 The tender submitted by the tenderer shall comprise the following:

(a) These Instructions to Tenderers
(b) Tender Security
(c) Form of Tender and Confidential Business Questionnaire
(d) Conditions of Contract, and Appendix to Conditions of Contract
(e) Specifications
(f) Qualification Information and Documents required under the evaluation criteria
(g) Priced Bill of Quantities;
(h) Any other materials required to be completed and submitted by the tenderers

3.3 The tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause relevant to the Contract, as of 30 days prior to the deadline for submission of tenders, shall be included in the tender price submitted by the tenderer.

3.4 The rates and prices quoted by the tenderer shall only be subject to adjustment during the performance of the Contract if provided for in the Appendix to Conditions of Contract and provisions made in the Conditions of Contract.

3.5 The unit rates and prices shall be in Kenya Shillings.

3.6 Tenders shall remain valid for a period of sixty (120) days from the date of submission. However, in exceptional circumstances, the tenderers may be requested to extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting the Tender Security. A tenderer agreeing to the request will not be required or permitted to otherwise modify the tender, but will be required to extend the validity of Tender Security for the period of the extension, and in compliance with Clause 3.7 - 3.11 in all respects.

3.7 The tenderer shall furnish, as part of the tender, a Tender Security in the amount and form specified in the tender notice.

3.8 The format of the Tender Security should be in accordance with the form of Tender Security provided as part of the tender document or in any other acceptable form. Tender Security shall be valid for 30 days beyond the validity of the tender.

3.9 Any tender not accompanied by an acceptable Tender Security shall be rejected. The Tender Security of a joint venture must define as "Tenderer" all joint venture partners and list them in the following manner: a joint venture consisting of"……","……",and "……".

3.10 The Tender Securities of unsuccessful tenderers will be returned within 28 days of the end of the tender validity period specified in Clause 3.6.

3.11 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Contract Agreement and furnished the required Performance Security.

3.12 The Tender Security may be forfeited

(a) if the tenderer withdraws the tender after tender opening during the period of tender validity;

(b) if the tenderer does not confirm their tender price in case of an arithmetic error;

(c) in the case of a successful tenderer, if the tenderer fails within the specified time limit tosign the Agreement, orfurnish the required Performance Security.

3.13 Tenderers shall submit offers that comply with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. Alternatives will not be considered, unless specifically allowed in the invitation to tender. If so allowed, tenderers wishing to offer technical alternatives to the requirements of the tendering documents must also submit a tender that complies with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. In addition to submitting the basic tender, the tenderer shall provide all information necessary for a complete evaluation of the alternative, including design calculations, technical specifications, breakdown of prices, proposed construction methods and other relevant details. Only the technical alternatives, if any, ofthe lowest evaluated tender conforming to the basic technical requirements shall be considered.

3.14 The tenderer shall prepare one original of the documents comprising the tender documents as described in Clause 3.2 of these Instructions to Tenderers, bound with the volume containing the Form of Tender,
and clearly marked "ORIGINAL". In addition, the tenderer shall submit copies of the tender, in the number specified in the invitation to tender, and clearly marked as "COPIES". In the event of discrepancy between them, the original shall prevail.

3.15 The original and all copies of the tender shall be typed or written in indelible ink and shall be signed by a person or persons duly authorised to sign on behalf of the tenderer, pursuant to Clause 1.5 (a) or 1.6 (b), as the case may be. All pages of the tender where alterations or additions have been made shall be initialled by the person or persons signing the tender.

3.16 Clarification of tenders shall be requested by the tenderer not later than 7 days prior to the deadline for submission of tenders.

3.17 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.

4. Submission of Tenders

4.1 The tenderer shall seal the **original** and **a copy** of the tender in two inner envelopes and one outer envelope, duly marking the inner envelopes as "**ORIGINAL**" and "**COPY**" as appropriate. The inner and outer envelopes shall:

(a) be addressed to the Nyeri County Government at the address provided in the invitation to tender;

(b) bear the name and identification number of the Contract as defined in the invitation to tender; and

(c) Provide a warning not to open before the specified time and date for tender opening.

4.2 Tenders shall be delivered not later than the time and date specified in the invitation to tender. However, the deadline may be extended by issuing an amendment in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.

4.3 Any tender received after the deadline prescribed in clause 4.2 will be returned to the tenderer un-opened.

4.4 Tenderers may modify or withdraw their tenders by giving notice in writing before the deadline prescribed in clause 4.2. Each tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 3.13 and 4.1, with the outer and inner envelopes additionally marked "**MODIFICATION"** and "**WITHDRAWAL**", as appropriate. No tender may be modified after the deadline for submission of tenders.

4.5 Withdrawal of a tender between the deadline for submission of tenders and the expiration of the period of tender validity specified in the invitation to tender or as extended pursuant to Clause 3.6 may result in the forfeiture of the Tender Security pursuant to Clause 3.11.

4.6 Tenderers may only offer discounts to, or otherwise modify the prices of their tenders by submitting tender modifications in accordance with Clause 4.4 or be included in the original tender submission.

5. Tender Opening and Evaluation

5.1 The tenders will be opened by the Employer, including modifications made pursuant to Clause 4.4, in the presence of the tenderers' representatives who choose to attend at the time and in the place specified in the invitation to tender. Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. Tenderers' and Employer's representatives who are present during the opening shall sign a register evidencing their attendance.

5.2 The tenderers' names, the tender prices, the total amount of each tender and of any alternative tender (if alternatives have been requested or permitted), any discounts, tender modifications and withdrawals, the presence or absence of Tender Security, and such other details as may be considered appropriate, will be announced by the Employer at the opening.

5.3 Information relating to the examination, clarification, evaluation, and comparison of tenders and recommendations for the award of Contract shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced. Any effort by a tenderer to influence the Nyeri County Government officials, processing of tenders or award decisions may result in the rejection of his tender.

5.4 To assist in the examination, evaluation, and comparison of tenders, Nyeri County Government, atits discretion, may ask any tenderer for clarification of the tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by email but no change in the price or substance of the tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered in the evaluation of the tenders in accordance with Clause 5.7.

5.5 Prior to the detailed evaluation of tenders, Nyeri County Government will determine whether each tender (a) meets the eligibility criteria;(b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the tendering documents. A substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tendering requirements without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the works; (b) which limits in any substantial way, inconsistent with the tendering documents, the Employer's rights or the tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.

5.6 If a tender is not substantially responsive, it will be rejected, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

5.7 Tenders determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:

(a) where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and

(b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case the adjustment will be made to the entry containing that error.

(c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bill of Quantities, the amount as stated in the Form of Tender shall prevail.

(d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Work (i.e. Corrected tender sum less P.C. and Provisional Sums)

(e) The Error Correction Factor shall be applied to all Builder's Work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

(f) the amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 3.11.

5.8 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with Clause 5.5.

5.9 In evaluating the tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:

(a) making any correction for errors pursuant to clause 5.7;

(b) excluding prime cost and provisional sums in the Bill of Quantities, but including dayworks where priced competitively.

(c) making an appropriate adjustment for any other acceptable variations, deviations, or alternative offers submitted in accordance with clause 3.12; and

(d) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with clause 4.6

5.10 The Nyeri County Government reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in unsolicited benefits for the Employer will not be taken into account in tender evaluation.

5.11 The tenderer shall not influence the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. Any effort by the Tenderer to influence the Employer or his employees in his decision on tender evaluation, tender comparison or Contract award may result in the rejection of the tender.

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

6. Award of Contract

6.1 Subject to Clause 6.2, the award of the Contract will be made to the tenderer whose tender has been determined to be substantially responsive and who has offered the lowest evaluated tender price, provided that such tenderer has been determined to be (a) eligible in accordance with the all the tender requirements.

6.2 Notwithstanding clause 6.1 above, Nyeri County Government reserves the right to accept or reject any tender, and to cancel the tendering process and reject all tenders, at any time prior to

the award of Contract, without thereby incurring any liability to the affected tenderer or tenderers or any obligation to inform the affected tenderer or tenderers of the grounds for the action.

6.3 The tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing. This notification (hereinafter and in all Contract documents called the "Letter of Acceptance") will state the sum (hereinafter and in all Contract documents called the "Contract Price")that the Nyeri County Government will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract. At the same time the other tenderers shall be informed that their tenders have not been successful.

6.4 The contract shall be formed on the parties signing a contract. Within 14 days of receipt the contract, successful tenderer will sign the contract agreement and return it to Nyeri County Government

6.5 Within 21 days after receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in the amount stipulated in the Appendix to Conditions of Contract and in the form stipulated in the Tender documents. The Performance Security shall be in the amount and specified form

6.6 Failure of the successful tenderer to comply with the requirements of clause 6.5 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Tender Security.

6.7 Upon the furnishing by the successful tenderer of the Performance Security, the Employer will promptly notify the other tenderers that their tenders have been unsuccessful.

6.8 Preference where allowed in the evaluation of tenders shall not be allowed for contracts not exceeding one year (12 months)

6.9 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.

6.10 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.

6.11 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.

6.12 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.

6.13 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

7. Corrupt and Fraudulent practices

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

APPENDIX TO INSTRUCTIONS TO TENDERERS

The following information shall complement or amend the Provisions of the instructions to tenderers. Wherever there is a conflict between the provisions of the instructions to tenderers and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the instructions to tenderers.

EVALUATION CRITERIA

A three-stage procedure will be adopted in evaluating the tenders

1. Preliminary evaluation
2. Technical evaluation
3. Financial evaluation

STAGE 1 - PRELIMINARY EVALUATION

Tenderers shall meet the following **mandatory requirements** to pass the preliminary evaluation:-

1) Duly filled, signed and stamped Form of Tender
2) Duly filled, signed and stamped Confidential Business Questionnaire
3) Tender security for **KSH 151,355.00** which must remain valid for 30 days after expiry of the tender validity period in the form a bank guarantee or from an approved insurance company
4) Valid copy of certificate of Incorporation/Registration
5) Valid copy of Tax Compliance Certificate
6) Valid copy of National Construction Authority (NCA) Registration Certificate **(NCA 7 and above)**
7) Valid copy of current National Construction Authority (NCA) Annual Licence for **2020/2021**
8) Pre-tender site visit certificate duly signed by the client's representative
9) Copies of company/business audited accounts for the last three years **(2017, 2018 and 2019) s**igned by registered/certified public accountant
10) Original bank statements for the last one year **certified** by the respective bank(s)
11) Letter from a reputable bank operating in Kenya under license from the Central Bank of Kenya, confirming the tenderer's credit worthiness
12) Valid Copy of CR 12 issued within the one (1) year
13) Valid business permit/license
14) Two copies of tender document (original and copy)

Failure to meet the preliminary mandatory requirements will lead to automatic disqualification

STAGE 2. TECHNICAL EVALUATION

	Evaluation Criterion	%	Score %
1	**Number of years in operation**	**5**	
	a) Less than 1 year	1	
	b) 1-3 years	2	
	c) 4-5 years	3	
	d) 6-10 years	4	
	e) Over 10 years	5	
2	**WorkExperience.** Provide project completion certificates, signed by a project manager, as evidence of completed building projects of over KShs.5 million	**30**	
	a) 1project	10	
	b) 2-3 projects	15	
	b) 4-5 projects	25	
	d) >6 projects	30	
3	**Director of the firm***(Provide CVs and academic certificates*)	**5**	
	a) Holder of degree in a construction course	5	
	b) Holder of diploma in a construction course	4	
	c) Holder of certificate in a construction course	3	
	d) Holder of trade test certificate in construction	2	
	e) No relevant training	1	
4	**At least 1No. degree/diploma Building Construction/Civil Engineering** *(Provide CVs and academic certificates*)	**8**	
	a) With over 10 years relevant experience	8	
	b) With over 5 years relevant experience	5	
	c) With under 5 years relevant experience	2	
5	**At least 1 No Trade test certificate holder in Building Construction/Civil Engineering** *Provide CVs and academic certificates*)	**5**	
	a) With over 5 years relevant experience	5	
	b) With over 1-2 years relevant experience	2	
6	**At least 1 no. diploma in electrical engineering with ERC (C2) license** *(Provide CVs and academic certificates)*	**6**	
	a) With over 5 years relevant experience	6	
	b) With over 1-2 years relevant experience	3	
7	**At least 1No. artisan/trade test certificate in Plumbing (***Provide CVs and academic certificates)*	**6**	
	a) With over 5 years relevant experience	6	
	b) With over 1-2 years relevant experience	3	

8 9	**Plant and Equipment**(*Provide proof of ownership or lease agreements)* a) Only leases plant and equipment (max 5 marks) b) Owns relevant means of transport (vehicles and trucks) b) Owns means of transport plus other relevant equipment	**10** 2 5 10	
	Financial Capacity (*Audited Financial Reports (last three (3) Years)* a) Average annual turn-over equal to or greater than the costof the project b) Average annual turn-over above 50% but below 100% of the cost of the project c) Average annual turn-over below 50% of the cost of the project	**20** 20 15 10	
10	**Serializing of the tender document**	**5**	
	TOTAL	**100**	

Only tenders with a technical score of 70% and above out of 100% shall be considered technically responsive to qualify for financial evaluation.

STAGE 3- FINANCIAL EVALUATION

Tenders shall be checked for arithmetic errors and compared with the estimated cost of the works. The lowest evaluated tender to be considered for award must be economically responsive i.e. unit rates in the bill of quantities must realistically be within market rates and the tender sum be within reasonable range of the estimated budget.

CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

1. Definitions

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

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

"Compensation Events" are those defined in Clause 24 hereunder.

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

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

"The Contractor" refers to the person or corporate body whose tender to carry out the Works has been accepted by the Employer.

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

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

"Days" are calendar days; **"Months"** are calendar months.

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

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

"The Defects Liability Period" is the period named in the Contract Data and calculated from the Completion Date.

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

"Dayworks" are Work inputs subject to payment on a time basis for labour and the associated materials and plant.

"Employer", orthe**"Procuring entity"** as defined in the Public Procurement Regulations (i.e. Central or Local Government administration, Universities, Public Institutions and Corporations, etc) is the party who employs the Contractor to carry out the Works.

"Equipment" is the Contractor's machinery and vehicles brought temporarily to the Site for the execution of the Works.

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

"Materials" are all supplies, including consumables, used by the Contractor for incorporation in the Works.

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

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

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

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

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

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

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

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

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

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

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning in English Language unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.

2.2 If sectional completion is specified in the Appendix to Conditions of Contract, reference in the Conditions of Contract to the Works, the Completion Date and the Intended Completion Date apply to any section of the Works (other than references to the Intended Completion Date for the whole of the Works).

2.3 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;

(a) Agreement,
(b) Letter of Acceptance,
(c) Contractor's Tender,
(d) Appendix to Conditions of Contract,
(e) Conditions of Contract,
(f) Specifications,
(g) Drawings,
(h) Bill of Quantities,
(i) Any other documents listed in the Appendix to Conditions of Contract as forming part of the Contract.

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

3. Language and Law

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

4 Project Manager's Decisions

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

5 Delegation

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

6 Communications

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

7 Subcontracting

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

8 Other Contractors

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

9 Personnel

The Contractor shall employ the key personnel named in the Qualification Information, to carry out the functions stated in the said Information or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Qualification Information. If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the Work in the Contract.

10 Works

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

11 Safety and Temporary Works

11.1 The Contractor shall be responsible for the design of temporary works. However before erecting the same, he shall submit his designs including specifications and drawings to the Project Manager and to any other relevant third parties for their approval. No erection of temporary works shall be done until such approvals are obtained.

11.2 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent Works, shall be subject to prior approval by the Project Manager before they can be used.

11.3 The Contractor shall be responsible for the safety of all activities on the Site.

12. Discoveries

Anything of historical or other interest or of significant value unexpectedly discovered on Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

13. Work Program

Within the time stated in the Appendix to Conditions of Contract, the Contractor shall submit to the Project Manager for approval a program showing the general methods, arrangements, order, and timing for all the activities in the Works. An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining Work, including any changes to the sequence of the activities.The Contractor shall submit to the Project Manager for approval an updated program at intervals no longer than the period stated in the Appendix to Conditions of Contract. If the Contractor does not submit an updated program within this period, the Project Managermay withhold the amount stated in the said Appendix from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue program has been submitted. The Project Manager's approval of the program shall not alter the Contractor's obligations. The Contractor may revise the program and submit it to the Project Manager again at any time. A revised program shall show the effect of Variations and Compensation Events.

14. Possession of Site

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

15. Access to Site

15.1 The Contractor shall allow the Project Manager and any other person authorised by the Project Manager, access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

16. Instructions

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

17. Extension or Acceleration of Completion Date

17.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a variation is issued which makes it impossible for completion to be achieved by the

Intended Completion Date without the Contractor taking steps to accelerate the remaining Work, which would cause the Contractor to incur additional cost. The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager in writing for a decision upon the effect of a Compensation Event or variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay caused by such failure shall not be considered in assessing the new (extended) Completion Date.

17.2 No bonus for early completion of the Works shall be paid to the Contractor by the Employer.

18. Management Meetings

18.1 A Contract management meeting shall be held monthly and attended by the Project Manager and the Contractor. Its business shall be to review the plans for the remaining Work and to deal with matters raised in accordance with the early warning procedure. The Project Manager shall record the minutes of management meetings and provide copies of the same to those attending the meeting and the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

19. Early Warning

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

19.2 The Contractor shall cooperate with the Project Manager in making and considering proposals on how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the Work and in carrying out any resulting instructions of the Project Manager.

20. Defects

20.1 The Project Manager shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a defect and to uncover and test any Work that the Project Manager considers may have a defect. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor, However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.

20.2 The Project Manager shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the Appendix to Conditions of Contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.

20.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Project Manager's notice. If the Contractor has not corrected a defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

21. Bills of Quantities

21.1 The Bills of Quantities shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rate in the Bills of Quantities for each item.

21.2 If the final quantity of the Work done differs from the quantity in the Bills of Quantities for the particular item by more than 25 percent and provided the change exceeds 1 percent of the Initial Contract price, the Project Manager shall adjust the rate to allow for the change.

21.3 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bills of Quantities.

22. Variations

22.1 All variations shall be included in updated programs produced by the Contractor.

22.2 The Contractor shall provide the Project Manager with a quotation for carrying out the variations when requested to do so. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period as may be stated by the Project Manager and before the Variation is ordered.

22.3 If the work in the variation corresponds with an item description in the Bills of Quantities and if in the opinion of the Project Manager, the quantity of work is not above the limit stated in Clause 21.2 or the timing of its execution does not cause the cost per unit of quantity to change, the rate in the Bills of Quantities shall be used to calculate the value of the variation. If the cost per unit of quantity changes, or
if the nature or timing of the work in the variation does not correspond with items in the Bills of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.

22.4 If the Contractor's quotation is unreasonable, the Project Manager may order the variation and make a change to the Contract price, which shall be based on the Project Manager's own forecast of the effects of the variation on the Contractor's costs.

22.5 If the Project Manager decides that the urgency of varying the Work would prevent a quotation being given and considered without delaying the Work, no quotation shall be given and the variation shall be treated as a Compensation Event.

22.6 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

22.7 When the Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.

23. Payment Certificates, Currency of Payments and Advance Payments

23.1 The Contractor shall submit to the Project Manager monthly applications for payment giving sufficient details of the Work done and materials on Site and the amounts which the Contractor considers himself to be entitled to. The Project Manager shall check the monthly application and certify the amount to be paid to the Contractor within 14 days. The value of Work executed and payable shall be determined by the Project Manager.

23.2 The value of Work executed shall comprise the value of the quantities of the items in the Bills of Quantities completed, materials delivered on Site, variations and compensation events. Such materials shall become the property of the Employer once the Employer has paid the Contractor for their value. Thereafter, they shall not be removed from Site without the Project Manager's instructions except for use upon the Works.

23.3 Payments shall be adjusted for deductions for retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of issue of each certificate. If the Employer makes a late payment, the Contractor shall be paid simple interest on the late payment in the next payment. Interest shall be calculated on the basis of number of days delayed at a rate three percentage points above the Central Bank of Kenya's average rate for base lending prevailing as of the first day the payment becomes overdue.

23.4 If an amount certified is increased in a later certificate or as a result of an award by an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculatedfrom the date upon which the increased amount would have been certified in the absence of dispute.

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

23.6 The Contract Price shall be stated in Kenya Shillings. All payments to the Contractor shall be made in Kenya Shillings and foreign currency in the proportion indicated in the tender, or agreed prior to the execution of the Contract Agreement and indicated therein. The rate of exchange for the calculation of the amount of foreign currency payment shall be the rate of exchange indicated in the Appendix to Conditions of Contract. If the Contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services the Employer reserves the right to pay the equivalent at the time of payment in the currencies of the countries of such goods and services. The Employer and the Project Manager shall be notified promptly by the Contractor of an changes in the expected foreign currency requirements of the Contractor during the execution of the Works as indicated in the Schedule of Foreign Currency Requirements and the

23.7 foreign and local currency portions of the balance of the Contract Price shall then be amended by agreement between Employer and the Contractor in order to reflect appropriately such changes.

23.7 In the event that an advance payment is granted, the following shall apply:-

a) On signature of the Contract, the Contractor shall at his request, and without furnishing proof of expenditure, be entitled to an advance of 10% (ten percent) of the original amount of the Contract. The advance shall not be subject to retention money.

b) No advance payment may be made before the Contractor has submitted proof of the establishment of deposit or a directly
liable guarantee satisfactory to the Employer in the amount of the advance payment. The guarantee shall be in the same currency as the advance.

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

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

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

Where:

R = the amount to be reimbursed

A = the amount of the advance which has been granted

X^1 = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This figure will exceed 20% but not exceed 80%.

X^{11} = the amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80%but not less than 20%.

d) with each reimbursement the counterpart of the directly liable guarantee may be reduced accordingly.

24. Compensation Events

24.1 The following issues shall constitute Compensation Events:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Appendix to Conditions of Contract.

(b) The Employer modifies the List of Other Contractors, etc., in a way that affects the Work of the Contractor under the Contract.

(c) The Project Manager orders a delay or does not issue drawings, specifications or instructions required for execution of the Works on time.

(d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon the Work, which is then found to have no defects.

(e) The Project Manager unreasonably does not approve a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to tenderers (including the Site investigation reports), from information available publicly and from a visual inspection of the Site.

(g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The effects on the Contractor of any of the Employer's risks.

(j) The Project Manager unreasonably delays issuing a Certificate of Completion.

(k) Other compensation events described in the Contract or determined by the Project Manager shall apply.

24.2 If a compensation event would cause additional cost or would prevent the Work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

24.3 As soon as information demonstrating the effect of each compensation event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's

forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The
Project Manager will assume that the Contractor will react competently and promptly to the event.

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

24.5 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Appendix to Conditions of Contract.

24.6 The Contractor shall give written notice to the Project Manager of his intention to make a claim within thirty days after the event giving rise to the claim has first arisen. The claim shall be submitted within thirty days thereafter.

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

25. Price Adjustment

25.1 The Project Manager shall adjust the Contract Price if taxes, duties and other levies are changed between the date 30 days before the submission of tenders for the Contract and the date of Completion. The adjustment shall be the change in the amount of tax payable by the Contractor.

25.2 The Contract Price shall be deemed to be based on exchange rates current at the date of tender submission in calculating the cost to the Contractor of materials to be specifically imported (by express provisions in the Contract Bills of Quantities or Specifications) for permanent incorporation in the Works. Unless otherwise stated in the Contract, if at any time during the period of the Contract exchange rates shall be varied and this shall affect the cost to the Contractor of such materials, then the Project Manager shall assess the net difference in the cost of such materials. Any amount from time to time so assessed shall be added to or deducted from the Contract Price, as the case may be.

25.3 Unless otherwise stated in the Contract, the Contract Price shall be deemed to have been calculated in the manner set out below and in sub-clauses 25.4 and 25.5 and shall be subject to adjustment in the events specified thereunder;

25.4

(i) The prices contained in the Contract Bills of Quantities shall be deemed to be based upon the rates of wages and other
emoluments and expenses as determined by the Joint Building Council of Kenya (J.B.C.) and set out in the schedule of basic rates issued 30 days before the date for submission of tenders.A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.

(ii) Upon J.B.C. determining that any of the said rates of wages or other emoluments and expenses are increased or decreased, then the Contract Price shall be increased or decreased by the amount assessed by the Project Manager based upon the difference, expressed as a percentage, between the rate set out
in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of labour incorporated within the amount of Work remaining to be executed at the date of publication of such increase or decrease.

(iii) No adjustment shall be made in respect of changes in the rates of wages and other emoluments and expenses which occur after the date of Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.

25.5 The prices contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the Works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.

25.6 Upon the J.B.C. determining that any of the said basic prices are increased or decreased then the Contract Price shall be increased or decreased by the amount to be assessed by the Project Manager based upon the difference between the price set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of the relevant materials which have not been taken into account in arriving at the amount of any interim certificate under clause 23 of these Conditions issued before the date of publication of such increase or decrease.

25.7 No adjustment shall be made in respect of changes in basic prices of materials which occur after the date for Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.

25.8 The provisions of sub-clause 25.1 to 25.2 herein shall not apply in respect of any materials included in the schedule of basic rates.

26. Retention

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

27. Liquidated Damages

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

27.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rate specified in Clause 23.30

28. Securities

28.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a reputable bank acceptable to the Employer, and denominated in Kenya Shillings. The Performance Security shall be valid until a date 30 days beyond the date of issue of the Certificate of Completion.

29. Dayworks

29.1 If applicable, the Dayworks rates in the Contractor's tender shall be used for small additional amounts of Work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

29.2 All work to be paid for as Dayworks shall be recorded by the Contractor on Forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the Work being done.

29.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

30. Liability and Insurance

30.1 From the Start Date until the Defects Correction Certificate has been issued, the following are the Employer's risks:

(a) The risk of personal injury, death or loss of or damage to property (excluding the Works, Plant, Materials and Equipment), which are due to;

(i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works, or

(ii) negligence, breach of statutory duty or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.

(b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in Employer's design, or due to war or radioactive contamination directly affecting the place where the Works are being executed.

30.2 From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is the Employer's risk except loss or damage due to;

(a) a defect which existed on or before the Completion Date.

(b) an event occurring before the Completion Date, which was not itself the Employer's risk

(c) the activities of the Contractor on the Site after the Completion Date.

30.3 From the Start Date until the Defects Correction Certificate has been issued, the risks of personal injury, death and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risk are Contractor's risks.

The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts stated in the Appendix to Conditions of Contract for the following events;
(a) loss of or damage to the Works, Plant, and Materials;
(b) loss of or damage to Equipment;
(c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract, and
(d) personal injury or death.

30.4 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date.

30.5 All such insurance shall provide for compensation required to rectify the loss or damage incurred.

30.6 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

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

31. Completion and taking over

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

32. Final Account

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

33. Termination

33.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These fundamental breaches of Contract shall include, but shall not be limited to, the following;

(a) the Contractor stops work for 30 days when no stoppage of work is shown on the current program and the stoppage has not been authorised by the Project Manager;

(b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days;

(c) the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 30 days (for Interim Certificate) or 60 days (for Final Certificate)of issue.

(e) the Project Manager gives notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;

(f) the Contractor does not maintain a security, which is required.

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

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

33.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible. The Project Manager shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials , goods, equipment and temporary buildings on Site.

34. Payment Upon Termination

34.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the Work done and materials ordered and delivered to Site up to the date of the issue of the certificate. Additional liquidated damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable by the Contractor.

34.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the Work done, materials ordered, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the
Works, and the Contractor's costs of protecting and securing the Works.

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

34.4 The Contractor shall, during the execution or after the completion of the Works under this clause remove from the Site as and when required, within such reasonable time as the Project Manager may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.
Until after completion of the Works under this clause the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefore the Project Manager shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

35. Release from Performance

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

36. Corrupt gifts and payments of commission

The Contractor shall not;

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

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

or disfavour to any person in relation to this or any other contract for the Employer.

(b) Enter into this or any other contract with the Employer in connection with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the Contract is made particulars of any such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Employer.

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

37. Settlement Of Disputes

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

(i) Architectural Association of Kenya

(ii) Institute of Quantity Surveyors of Kenya

(iii) Association of Consulting Engineers of Kenya

(iv) Chartered Institute of Arbitrators (Kenya Branch)

(v) Institution of Engineers of Kenya

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

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

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

37.4 Notwithstanding the issue of a notice as stated above, the arbitration of such a dispute or difference shall not commence unless an attempt has in the first instance been made by the parties to settle such dispute or difference amicably with or without the assistance of third parties. Proof of such attempt shall be required.

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

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

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

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

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

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

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

37.8 The Arbitrator shall, without prejudice to the generality of his powers,

have powers to open up, review and revise any certificate, opinion, decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision requirement or notice had been given.

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

APPENDIX TO CONDITIONS OF CONTRACT

1) The employer is: **The County Government of Nyeri**
2) The employer's representative is: - **Chief Officer - Department Trade, Tourism and Cooperative Development**
3) The project manager will be the **Chief Officer, Department of Roads Infrastructure and Public Works** or another appointed officer of Nyeri County Government
4) The site is located in within **Pakoni Open Air Market,** in **Karatina Town**
5) The performance security shall be **5.0%** of the Contract Price in form of **a bank guarantee or in the form of an insurance policy from an approved insurance company**
6) Advance payment **shall not be granted**
7) The Price Adjustment clause is **cancelled - it shall not apply**
8) The commencement date shall be **as agreed with the Project Manager**
9) The project will be undertaken over a period of 16weeks.
10) The percentage of certified value retained in payment certificates is **10%**
11) The limit of retention is **10%** of the contract sum
12) The liquidated and Ascertained Damages for the whole of the works a **KShs. 20,000.00** per week
13) The Defects Liability Period is **180 days** (six months after practical completion period)
14) The period of final measurement (final account) is 3 months after practical completion
15) The minimum insurance cover shall be**(All Contractors Risk Policy covering the whole contract)**
    a. Loss of or damage to the Works, Plant, and Materials;
    b. Loss of or damage to Equipment;
    c. loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract, and
    d. Personal injury or death.
    e.
16) **Contractor's 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.

FORM OF TENDER

TO: _____ (Name of Employer)

_____ (Name of Contract)

Dear Sir/Madam,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete suchWorks and remedy any defects therein for the sum of_____ **(Amount in figures)**KenyaShillings_____

   _____ (**Amount in words**)

2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Project Manager's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.

3. We agree to abide by this tender until _____(**Insert date**), and it shall remain binding upon us and may be accepted at any time before that date.

4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.

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

Dated this _____ day of _____20_____

Signature _____ In the capacity of_____

Duly authorized to sign tenders for and on behalf of:-

_____ (Name)

_____(Address)

Witness; Name_____

Address_____

Signature_____

Date_____

CONFIDENTIAL BUSINESS QUESTIONNAIRE

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

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

Part 1 – General

Business Name ……..

Location of business premises; Town…….

Plot No…… Street/Road ……..

Postal Address…… Tel No……..

Nature of Business……..

Current Trade License No……

Maximum value of business which you can handle at any time: Ksh……..

Name of your bankers……

Branch……

Part 2 (a) – Sole Proprietor

Your name in full…… Age……

Nationality…… Country of Origin……

*Citizenship details ……

Part 2 (b) – Partnership

Give details of partners as follows:

	Name in full	*Nationality*	*Citizenship Details*	*Shares*
1	……			
2	……			
3	……			

Part 2(c) – Registered Company:

Private or public……

State the nominal and issued capital of the Company-

Nominal Ksh……

Issued Ksh……

Give details of all directors as follows:

Name in full .	Nationality.	Citizenship Details*.	Shares.
1. ……			
2. ……			
3. ……			
4. ……			

Part 2(d) – Interest in the Firm:

Is there any person / persons in …… …… (**Nyeri County Government**) who has interest in this firm? Yes/No…… (*Delete as necessary*)

I certify that the information given above is correct.

…… …… ……
(Title) *(Signature)* *(Date)*

- ***Attach proof of citizenship***

CERTIFICATE OF MANDATORY TENDERER'S SITE VISIT

This is to certify that, ……

(Name of Tenderer or his representative) of the firm of,

……. (Name of Firm Tendering)

Visited the site in connection with Tender for;

PROPOSED STORM WATER DRAINAGE AND ABLUTION BLOCK AT KARATINA OPEN AIR MARKET

Having previously studied the Tender documents, I have visited the site and;

1. I have made myself familiar with all the local conditions likely to influence the works and cost thereof.

2. I further certify that I am satisfied with the description of the work and the explanations given by the Client's representative and that I understand perfectly the work to be done as specified and implied in the execution of the contract.

Signed…….

(Tenderer or his representative)

Witnessed……..

(Signature of Client's representative)

Date……..

NB:

The County Government of Nyeri shall not be held liable for tenderer's failure to verify the details of works to be undertaken respect to their final tender sum.

GENERAL SPECIFICATIONS

GENERALLY

All work to be carried out in accordance with the Ministry of Public Works General Specifications for Building Works issued in 1976 or as qualified or amended.

MANUFUCTURES' NAMES

A.MATERIAL GENERALLY

Allmaterialsusedontheworksshallbenewandofthequalitiesandkindsspecifiedhereinandequaltoapprovedsamples. Deliveriesshallbemadesufficientlyinadvancetoenablesamplestobetakenandtestedifrequired.Nomaterialsshallbeu seduntilapprovedandallmaterialswhicharenoteapprovedorwhicharedamaged,contaminatedorhavedeteriorate dinanywayordonotcomplyinanywaywiththerequirementsofthisspecificationshallbeimmediatelyremovedfro mthesiteattheContractor'sexpense.

B.MATERIALS FOR WHICH THERE IS A KENYA BUREAU OF STANDARDSSPECIFICATION

AllmaterialsusedintheworksforwhichaKenyaBureauofStandardSpecificationhasbeenpublishedshallconform withthelatesteditionthereofineveryway.TheArchitectreservestherighttodemandthattheContractorshallobtainathis ownexpensea
certificateinrespectofanymaterialtostatethatitisinaccordancewiththeKenyaBureauofStandardSpecifications.

C.MATERIALS FOR WHICH THERE IS NO KENYA BUREAU OF STANDARDSSPECIFICATION

AllmaterialsusedintheworksforwhichnoKenyaBureauofStandardSpecificationhasbeenpublishedshallconformwit hthe BritishStandardSpecificationsforsuchmaterial.Iftherearenopublishedstandardasspecifiedforanymaterials,t hequalityof
suchmaterialsshallbegenerallyofaStandardequaltothoseforwhichthereisaKenyaBureauofStandardorBritishStand ard Specification.

D.ALTERNATIVES TO PROPRIETARY BRANDS

Where used, manufactures' names and catalogue references are given for guidance to quality and standards only, alternative manufacturer of equal quality will be accepted at the discretion of the
Project Manager.

Wherematerialsarespecifiedbytheirproprietarynamesorwherefittingsarespecifiedbycataloguenumbers,ordesc riptions,thecontractormayoffermaterialorfittingsofalternativemanufacturewhichareofequalquality.Suchalter nativesmustbeapprovedbeforebeingusedintheworksandtheContractorshallallowforthis,butpriortotenderinghema ysubmittotheArchitect for
approvalthenamesofanysuppliersormanufacturerswhoseproductsheintendstouse,togetherwithcataloguenumbersa nddescriptionsand/orsamplesbutthedecisionoftheArchitectwillbefinal.

E.SAMPLES

TheContractorshallfurnishforapproval,withreasonablepromptnessallsamplesofmaterialandworkmanshiprequired bythe
Architect.TheArchitectshallcheckandapprovesuchforconformancewiththedesignconceptoftheworksandforcomp liancewiththeinformationgivenintheContractDocuments.Theworkshallbeinaccordancewithapprovedsamples.

(a)AllmaterialsamplesshallbedeliveredtotheArchitect'sOfficewithallchargesin

connectiontherewithpaidbytheContractor.

(b) Duplicatefinalapprovedsamples,inadditiontoanyrequiredfortheContractor'suse, shallbefurnishedtotheArchitect,oneforofficeuseandoneforthesite.

Samplesshallbefurbishedsoasnottodelayfabrication,allowingtheArchitectreasonabletimeforc onsiderationofthesamplesubmitted.

(d)Eachsampleshallbeproperlylabelledwiththenameandqualityofthematerial, manufacturer'sname,nameofproject,theContractor'snameandthedateofsubmissionandthespe cificationnumbertowhichthesamplerefers.

GENERALSPECIFICATIONS

AMEASUREMENT AND TESTING EQUIPMENT

TheContractorshallprovidethefollowingequipmentforcarryingoutmeasuringandcontroltestsonthesiteand maintaininfull
workingorder:

(a)Straightedges2metresand4metreslongfortestingtheaccuracyofthefinished concrete.

(b)Aglassgraduatedcylinderforuseinthesilttestoforganicimpuritiesinthesand.

(c)Slumptestapparatus

(d)150mmsteelcubemouldswithbaseplatesandtampingrodtoBS1881.

(e)Two 30metresteel tapes

(f)Onedumpyorquicksetlevelandstaff.

(g)Micrometer.

BSAFETY

TheContractorshallpracticehighsafetystandardsinexecutionoftheworksandshallcomplywith:
(a)SHElawsthatincludebutmaynotbelimitedto:
(i)WorkInjuryBenefitAct(WIBA)2007
(ii)OccupationalSafetyandHealthAct2007
(iii)EnvironmentalManagement&CoordinationAct1999anditssubsidiary legislations

(b)Thebuildingcode/buildingbylaws
(c)Anyotherlaws,regulationsorpracticesasmayberequiredbytheemployer

PARTTWO

DEMOLITIONS & ALTERATIONS SPECIFICATIONS

DEMOLITIONS AND ALTERATIONS

A.DEMOLITIONS

Demolitions,takingoutandcuttingawayshallbecarefullyperformedandeveryprecautionshallbetakentoensureth esafetyofthework.Ifdamageshouldoccurinthecarryingoutthedemolitionsoralterationsthecontractorshallreinstatea ndmakegoodthe sameathisownexpense.

B.PROTECTION

Supply,erectandmaintainduringthecuttingofopeningsetc.,allnecessaryprotectiontotheexistingpremisesagainst damagebyweatherorothercases.

C.LAYING THE DUST

Allowforlayingthedustasfaraspossibleduring thealterationbywateringwithahoseorothermeans

D.MAKINGGOOD

Allmakinggoodofblockwork,buildingupofopeningetc.,shallbesolidblockworkunlessotherwisedescribed,i ncementmortar
(1:4)properlycut,toothedandbondedandpinneduptoexistingworkandpointedwherenecessary.

E.CREDIT FOR MATERIALS

Unlessotherwisespecifiedmaterialsarisingfromthedemolitionsandalterationswillbecomethepropertyo fthecontractor.IftheContractorwishestoallowacreditforanysuchmaterialstheappropriateallowancesho uldbeincludedinthecreditcolumnoftheBillsofQuantities.IntheeventthattheEmployerwishestotakeposses sionofanysuchmaterialsthecontractorwillonlybe entitledtoreceivecompensationtotheamount ofcreditindicated.

F.DEFINITIONS OF TERMS

Thefollowingdefinitionsexplainandsimplifythetermsindicatedinthedescriptionoftheworks.

Removalshallinclude:

Dismantling/pullingdown/takingout/takingup/strippingetc.,atthesiteoftheworks,gettingfromthesiteof theworkstotheoutsideofbuildingbywhatevermeansisnecessaryanddisposal.

Disposalshallinclude:

handlingonsitetostoreortopickuppointforloadingloadingintoskipsorlorriestransportingawayfromsitet oyard,storeortip paymentofalltipcharges.

PARTTHREE

EXCAVATIONS & EARTHWORKS SPECIFICATIONS

EXCAVATION AND EARTHWORKS

A.CODES OF PRACTICE

Thecontractorshallcomplywiththefollowingcodesofpractice:

SiteInvestigationsC.P2001
EarthworksC.P2003
FoundationsC.P2004
ProtectionofbuildingagainstwaterfromthegroundC.P102

B.INSPECTION OF SITE

Thecontractorisdeemedtohavevisitedthesiteandtohaveascertainedthenatureofthesoilandsub-soilstobeexcavated.
No
claimwillbeallowedonaccountofthesebeingofadifferentnaturefromthatforwhichhehadallowedinhisprices.

C.PROCEDURE

TheexcavationsandfillingsshallbecarriedoutinsuchamannerandorderastheArchitectmaydirect.

D.EXISTING TREES SHRUBS AND GRUBBING UPROOTS

(a)Directions

Cutdownandremoveshrubsandtreesasdirected.Noshrubs,trees,plantsetc.,shallberemovedexceptasdirectedbythe

Architectandthecontractorshallbeheldresponsibleforanydamagecausedbythebuildingoperationstothoseshrubs,treesetc.,notsodirectedtoberemoved.

(b)Grubbinguproots

Grubbinguprootsetc. shallincludethefollowinganddisposalshallbedescribedundertheforegoingclause:

(1)Stumpsandrootsoflargetreesshallbecompletelyremoved.

(2)Stumpsandrootsofsmalltrees,bushesorothervegetationshallbecompletelyremovedtoadepthofatleast600mm belowformation.
(3)Smallerstumpsandrootsofvegetationupto25mmthickshallbecompletelyremovedtoadepthof230mm below
formation.

(4)Finerootsshallberemovedtoasgreatdepthasispracticablebyhand.

Exceptwherethereareaofgrubbingistobeexcavated,allresultingholesshallbefilledupsolidwithapprovedmaterial
compactedtothesamerelativedensityasthesurrounding.

E.SITE CLEARANCE

Allgrass,vegetablematteretc.,mustberemovedfromorburnedonsiteatthecommencementofthecontracto verareasas
directedbytheArchitect.

F.WHITE ANT-INSECTICIDE TREATMENT

TheContractormustdestroyanywhiteant'snestsfoundwithintheperimeterofthebuildingsandwithinadistanc eof20metres fromthebuildingsexternallyandtakeoutanddestroyqueenants, impregnateholesandtunnelswithapprovedinsecticidesand back-fillwithhardmaterialswellrammedandconsolidated.

G.EXCAVATION

(i)Theexcavationsaretobeexecutedtothewidthsshownontheprawings,andtothe depthbelowexistinggroundlevelsasdirectedbytheArchitectinordertoobtainsatisfactoryfoundat ions.Ifthecontractor
excavatestoanywidthsordepthsgreaterthanthoseshownonthedrawingsorasinstructedbytheArc hitectheshallathisownexpensefillinsuchwidthsordepthsofexcavationbeyondthatinstructedorsho wnwithconcretetothesatisfactiontotheArchitect.

(ii)
Levelandrambottomsofallexcavationstoreceiveconcrete,formsteppingsifnecessaryor directedtoallowforslopingground,andwellwaterexcavationsbeforepouringconcrete.

(iii)
ThecontractorshallreporttotheArchitectwhensecurebottomstotheexcavationshavebee nobtained.Anyconcreteofotherworkexecutedbeforetheexcavationshavebeeninspectedandapp rovedshall,ifsodirected,beremovedandnewworksubstitutedaftertheexcavationsgavebeenapprove dallatthecontractor's expense.

(iv)Excavationsmadebelowrequiredlevelsshallbefilledwithmassconcrete(1:4:8)atthecontractor'sexpe nse.

H.ROCK

(a)Definition

Rockisdefinedasanymaterialmetwithintheexcavationswhichisofsuchsizeorpositionthatitcanonlyberemov edby meansofwedges,compressedairplant,orotherspecialplantandtheArchitectsopinionshallbefinal.

(b)Othermaterialstobetakenwithnormalexcavations

Excavationsinanymaterialsuchascompactedmurram,softtuff,stiffclayorsimilarmaterialswhichintheopini onofthe
Architectcanreasonably,beremovedbypick,traxcavatororsimilar,meanswillbedeemedtobeincludedinthep ricesof normalexcavation.

I.HARDCORE FILLING

Hardcoreforfillingunderfloorsetc.,shallbegoodhardstone,ballastorquarrywaste(notmagadiorsimilar softstone)tothe
approvaloftheArchitectbrokentopassnotgreaterthana150mmringortobe75%ofthefinishedthicknessofthel ayersb eing
compactedwhicheveristhelesserandgradedtocontainsufficientsmallerpiecestofillallvoidssothatitcanbetho roughly
compacted.Thefillingistobelaidinlayerseachofaconsolidatedthicknessnotexceeding225mmandwellwater

edand
compactedbyhandofmechanicaltampers.Thetopsurfaceofthehardcoreshallbelevelledorgradedtofallsasre quiredand
blindedwitha75mmlayerofsimilarmaterialfinelycrushedandwellrolledandwateredimmediatelybefore concreteislaid.

L.FILLING OBTAINED FROM THE EXCAVATIONS

Fillingobtainedfromsurplusexcavatedmaterialsistobefreefromallweeds,roots,vegetableorotherunsuit ablematerialsandistobefilledinlayerseachofnotmorethan225mmfinishedthickness.Eachlayertobewellwa teredandconsolidatedbeforethe subsequentlayerisfilledin.

M.MATERIALS FOUND IN THE EXCAVATIONS

Nosand,aggregateorothermaterialsfoundintheexcavationsistobeusedintheworkswithoutthewrittenpermis sionofthe Architect.

N.INSECTICIDE / ANTI-TERMITE TREATMENT

Thetopsurfaceofallfillingshallbetreatedwithanapprovedchemicaltreatment,appliedinaccordancewiththe manufacturers printedinstructions.
Theapprovedspecialisttreatmentshallincludeatenyearguaranteeagainsttermites.

O.PROTECTION OF PIPES, CABLESETC.

Beforecommencingworkswhichincludeexcavationsorgroundlevellingbymanualormechanicalexcavat ionthecontractorshallathisexpenseascertaininwritingfromthePostOffice,K.P.&L.Co.Ltd.,Engineer'sDep artment(water&sewerssection)and all
otherpublicbodies,companiesandpersonswhomaybeaffected,thepositionsanddepthsoftheirrespective ducts,cablesmainsorpipesandappurtenances.Heshallthereuponsearchforandlocatesuchservices.

Thecontractorshallathisownexpenseeffectuallyprop,protect,underpin,alter,divert,restoreandmakegoodas maybenecessaryallpipes,cablesorducts,polesorwiresandtheirappurtenancedisturbedordamagedduring theprogressoftheworks,orinconsequencethereof.

Exceptthatsuchservicesasrequiredtoberemovedoralteredbyvirtueofthelayoutofthepermanentworkand notthemannerinwhichtheworkiscarriedout,shallbesoremovedoralteredattheexpenseoftheEmployer.T hecontractorshallbeliableforthe
costofrepairstoanyservicesdamagedasaresultofcarryingouttheworksandshallfurtherbeliableforanyda magewhichmaybeshownduringtheperiodofmaintenance,tohavearisenthroughtheexecutionofthesewo rks.

Theratesforexcavation,includingexcavationinrock,mustincludefortrimming,levellingandpreparingbotto msandallfacesto
receiveconcrete,etc.,andforandextraexcavationrequiredforplankingandstrutting.Pricesshallincludeforexc avati nginany
materialencounteredunlessspecificallyotherwisedescribed,handling,etc.,ofextrabulkafterexcavating, orbeforeconsolidating,anyextraexcavationrequiredforformworkorplankingandstrutting,circularwork, grubbingupanyolddrains,roots,etc.,thatmaybeencountered,fortrimmingsidesandlevellingandrammingb ottoms,formingsteppingsandtrimmingexcavationorfillingof embankmentsandbattersasrequired.

Inhispricefortheitem,keepexcavationsfreefromallwater,thecontractorshallallowandmakeprovisionfor keepingthewholeoftheworkthoroughlydrainedandclearofwaterbelowthelowestlevelofanypartofthemsol ongasmayberequiredandif
considerednecessarybytheArchitect,continuouslydayandnightbypetrolorhandpumpsorothermechanic alappliances,pipes,chutes,dams,manholes,sumps,diversionsoranyothermeansnecessaryforthepurpos e.Waterpumpedfromthetrenchesshallbeallowedtorundowntheroadchannelsbutshallbeconveyedtothe nearestsurfacewatersewer,ditchorriverthroughtroughs,chutesorpipes.

P.RATES OF DISPOSAL

Ratesofdisposalofexcavatedmaterialaretoincludefortheselectionofspoilasitarisesandforalldoublehandlin gandre-excavationfromspoilheapsnotspecificallyorderedbytheArchitect.

Q.POLYTHENE SHEETING

Polythenesheetingshallbe1000gaugeorasdescribedobtainedfromanapprovedmanufacturer.Jointsinshee tingshallbe
treblefoldedwith150mmfoldandtapedat300mmintervalswith50mmwideblackplasticadhesivetapeasman ufacturedby
sellotapelimited.Thesheetingshallnotbelaidloosewithsufficientwrinklestopermitshrinkageupto15%.

R.GRASSEDAREAS

Areastobegrassedshallbeclearedofalldebrisandrootsandduguptoadepthof300mm.Whereoutcropsofroc kormurram occur,thesewillbecoveredwithsuitablesoiltoadepthof150mm.

PARTFOUR - CONCRETE WORK SPECIFICATIONS

CONCRETE WORK

A.BENDING SCHEDULES

TheEngineerwillissuebarbendingschedulesinaccordancewithBS4466.TheContractorshouldcheckthese againstthedrawingsbeforeanycuttingbendingorconstructioninvolvingthescheduleisstarted.Anydiscre pancyshouldbereportedtotheEngineerimmediatelyforhisclarification.Thecontractorshallberesponsib leforanydelaysoradditionalworkcausedsolelybyhisfailuretocheckttheschedules.

B.APPROVALS

WellbeforeconstructioncommencestheContractorshallsupplytotheEngineerforhisapprovaldetailsof hisproposedlayoutsofconcretingplantandonsiteworkshop;detailsofformworksystemsandtheconstru ctiondevices,e.g.,cranes,chutes,scaffolding,whichheproposestouseforthestructuralwork.Theinform ationistobesufficientlydetailedtoenabletheEngineertoapproveorotherwise.

TheContractorshouldnotethatfurtherapprovalsarerequiredbytheSpecificationbeforeconstructionstarts.T hecontractoris
whollyresponsibleforobtainingtheseapprovalsandnoclaimfordelayswillbeentertainedduetothecontr actorsfailuretoobtainsuchapprovalsinadequatetime.

MATERIALS

C.CEMENT

Cement,unlessotherwisespecified,shallbeordinaryPortlandCementcomplyingwithBS12.Thecontractor shallobtaina
manufacturer'scertificateoftestinaccordancewiththeappropriatestandardforeachconsignmentofcem entdeliveredtothesite andshallimmediatelyforwardcopiesofthesametotheEngineerforhisretention.

Notwithstandingthemanufacturer'scertificatetheEngineermayrequirethatanycementdeliveredtothesite besampledand tested.Anybatchsotestedwhichfailstocomplywiththisspecificationwillbe rejected.

Allcementshallbedeliveredtothesiteintheoriginalsealedbagsofthemanufacturerorinapprovedbulkcon tainers.

Cement,unlessdeliveredinbulk,shallbestoredinaweatherproofshed,thefloorofwhichshallberaisedatle ast150mmabovethegroundtoallowfreeaircirculation.Cementdeliveredinbulkshallbestoredinaweath erproofsilo.Allcementshallatalltimesbeprotectedfromdeterioration.

Eachconsignmentofcementshallbekeptseparate,identifiedandusedinorderofdelivery.Notwotypesofc ementshallbeused incombination.

AnycementwhichuponinspectionisconsideredbytheEngineertohavedeterioratedinanywaywillbereje cted.

D.AGGREGATES OF CONCRETE

Aggregatesforconcreteshall,unlessotherwisespecified,beaggregatesfromnaturalsourcescomplying withBS882.Additionally,
theflakinessindexwhendeterminedbythesievemethoddescribedinBS812shallnotexceed35foranysizeofc oncreteaggregate.Fineaggregatewithinorfinerthanzone4ofBS882shallnotbeused.

WhentestedforsoundnessinaccordancewithASTMTestC88-
73thelossofweightafter5cyclesshallnotexceed5percentforanyaggregate.

AggregatewhichispotentiallyreactivewhentestedinaccordancewithASTMTestC289-71forthealkaliaggregatereactionshallnotbeused.Thestandardforacceptancebeingthattestshallplottothelefto fthesolidwhichisshowninfigure2oftheteststandard.

Wellbeforeanyconcretingwork,theContractorshallforwardtotheEngineerforapprovaldetailsofhisproposedsourceofsupply ofaggregategivingtheaggregategroupclassificationandtypicalphysicalpropertiesasrequiredbyBS882.

TheContractorshallprovidetheEngineerwithacertificateforhisretentionshowingthatallaggregateregularlycomplywiththe requirementsofhisSpecification.

TheEngineermayrequirethatanyaggregatebetestedforsoundnessinaccordancewithASTMTestC88-73beforegiving approvaltoanyproposedsourceofsupply.TheEngineermayrequirethatanyaggregatebetestedforpotentialreactivityin accordancewithASTMTestC289-71.

Notwithstandinganycertificateofcompliance,theEngineermayatanytimerequirethatanyaggregatedelivered tothesitebe sampledandtested.Anyaggregatesotestedwhichfailstocomplywiththisspecificationwillberejected.

CoarseaggregateshallbedeliveredreadyscreenedorscreenedonsiteseparatenominalsinglesizeswithinthelimitsgiveninBS882.

Aggregatesofdifferentsizesoftypesshallbestoredindifferenthoppersordifferentstockpilesorapproved welldrainedpavedareaswhichshallbeseparatedfromeachother.

Stockpilesshallbeprotectedagainstcontaminationfromanysource.

AnyaggregatewhichhasbecomecontaminatedorwhichdoesnotconformwiththeaboverequirementsmayberejectedbytheEngineer.

E.WATER FOR USE WITH CEMENT

Waterforuseinmixingwithcementorforcuringconcreteshallbefromanyapprovedsource,clean,freshandfreefromorganic andotherdeleteriousmatter.

TheEngineermayrequirethatanywaterbesampledandtestedbythemethodgiveninBS3148.Waterfailingthecriteriagivenintheappendixto BS3148willberejected.

Waterforuseinmixingwithcementshallneitherbehotterthan25degreescentigrade(77degreesfahrenheit)norcolderthan5 degreescentigrade(41degreesFahrenheit)atthetimeofmixing.

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F.STEEL ROD REINFORCEMENT

Steelrodreinforcementshallconsistof:

(a)MildsteelbarcomplyingwithBS4449orKS02-22

(b)HotrolledhighyieldbarscomplyingwithBS4449.

(c)ColdworkedhighyieldbarscomplyingwithBS4461asdescribedinthedrawing.

Wherecoldworkedhighyieldbarsaretobeusedtheseshallbe thermal mechanically twisted and NOTsquaretwistedbarsformedbyatorsioncontrolledprocess.

Thecontractorshallobtainamanufacturer'scertificateoftestinaccordancewiththeappropriatestandardfore

achsteelbatchrelatingtoreinforcementdeliveredtositeandshallimmediatelyforwardcopiesofthesamet otheEngineerforhisretention.

Wherehotrolledhighyielddeformedbararetobeusedtheresultsofbondteststo ASTM234-71,usingconcreteofthesame qualityasthattobeusedintheworks,shallbeforwardedtotheEngineer.

Notwithstandingthemanufacturer'scertificate,theEngineermayrequirethatanyreinforcementdeliveredt othesitebesampledandtested.Anyreinforcementsosampledandtestedwhichfailstocomplywiththisspe cificationwillberejected.

Allreinforcementshallbestoredincleanconditionsinanorderlymannertothesatisfactionof theEngineer suchthatthebatchtowhicheachpiecebelongscanbereadilyidentified.

GSTEEL FABRIC REINFORCEMENT

Steelfabricreinforcementshallbeelectricallycrossweldedsteelmeshreinforcementcomplyingwith BS 4483andofthesizeandweightspecifiedandmadeofwiretoB.S. 4482.

HTYING WIRE

Tyingwireforfixingreinforcementshallbeeither:

(a)No.16gaugesoftannealedironwire,or

(b)No.18gaugestainlesssteelwire.

ISPACERS

Spacersblockrequiredforensuringthatthereinforcementiscorrectlypositionedshallbeassmallaspossib leconsistentwiththeirpurpose,ofashapeacceptancetotheEngineer,anddesignedsothattheywillnotover turnwhentheconcreteisplaced.Unlessotherwiseapprovedtheyshallbemadeofconcretewith10mmmax imumaggregatesizeandmixproportionstoproducethesamestrengthastheadjacentconcrete.

Wireshallbecastintheblockforthepurposeoftypingittothereinforcement.Spacerblockofconcreteshallnot beuseduntilat least7daysold.

JADMIXTURES

Noadmixturesorcementscontainingadditivesshallbeusedinconcreteunlessspecifiedorapprovedbytheeng ineer.Such approvalwillnotbegivenunlessintheEngineer'sopinionspecificbenefittothedensityorqualityofthecon cretewillresult.

KWALL TIES

WallTiesbetweenconcreteandadjoiningblockorblockwallingshallbe"Abbey"slotsandanchorsassupp liedbyAbbeyBuildingsuppliesLtdorsimilarapproved.

LJOINT FILLERS

Jointfillersunlessotherwisestatedshallbe"flexcell"asmanufacturedbyExpanditeLtd,orsimilarapproveda ndplacedin accordancewiththemanufacturer'sinstructions.

MJOINT SEALANTS

Jointsealantsshallbeasdescribedinthedrawingsandapprovedbytheengineer.Sealantshallbeusedstrictly inaccordancewiththemanufacturer'sinstructions.

NHOLLOW CLAY POTS

PotsshallbeburntclayblocksconformingtoBS3921orsimilarapproved.Theyshallbetruetoshapeandfreefrom cracksor distortion.

OWATER STOPS

Waterstopsunlessotherwisestatedshallbe.Sikawaterbar.AsmanufacturedbySikaInternationalorsimilar approvedandplacedandjointedinaccordancewiththemanufacturer'sinstructions.

WORKMANSHIP

PFIXING STEEL REINFORCEMENT

Reinforcementshallbebentaccuratelyinaccordancewith BS4466totheshapeanddimensionsshowninthesch edules.All reinforcementshallbebentattemperaturesintherangeof5and100degreescentigrade.

Coldworkedoranyhighyieldbarsshallnotbestraightenedorbentagainoncehavingbeenbent.Whenitisneces sarytobend mildsteelreinforcementalreadycastintheconcretetheinternaldiameterofsuchbendsshallbenotlessthan twicethediameterof the bar.

Noweldingofreinforcementshallbecarriedoutwithouttheapprovaloftheengineer.Allreinforcementsh allatthetimeofconcretingbefree frommud,oilmortardroppings,looserust,paintgrease,millscaleorotherdeleteriousstill"blue"fromthe millshallnotbeused.

Allreinforcementshallbefixedinthepositionshownonthedrawingsbytheadequateuseofspacers,tyingwire s,chairs,stoolsetc.,and shallbesomaintainedduringtheconcretingoperations.

Lapsinreinforcementshallbewhereindicatedonthedrawingsorapprovedbytheengineer.Unlessotherwis eindicatedtheminimumlaplengthforrodreinforcementshallbe40diametersandformeshreinforcement twocompletemeshes.

Asteelfixershallbeinattendanceatalltimeswhenconcretingisinprogresstocorrectanyerrors,omissionsorm ovementinthereinforcement.

Inseveretestconditionsreinforcementshallbeshadedfromdirectsunlightandhoseddownwithcleanwate rpriortoconcretingtokeepthe reinforcementbelow25degreescentigrade(77degreesFahrenheit).

(a)NominalConcreteCovertoReinforcement

Unlessotherwisedirectedthenominalconcretecovertosteelreinforcingbars(includinglinksanddistribu tion)inanyfaceshallbe:-

Foundationsagainstearthface 75mm
Foundationagainstblinding 50mm
Columns(mainbars) 40mm
Slabsandstairs 20mm
Wall(mainbars) 20mm

Thetoleranceonplacingofbarsachievenominalcover!5mm

QFORMWORK

Formworkshallincludealltemporaryorpermanentformsrequiredforformingtheconcrete,togetherwith alltemporaryconstructionrequiredfortheirsupport.

Allformworkshallbesoconstructedthatthereshallbenolossofmaterialfromtheconcrete.Afterhardenin gtheconcreteshallbe
inthepositionandofthesample,dimensions,andsurfacefinishdescribedinthisspecificationorontheDra wings.

Whereinternalmetaltiesarepermittedtheyortheirremovablepartsshallbeextractedwithoutdamagetotheco ncreteandthe
remainingholesfilledwithmortar.Nopermanentlyembeddedmetalpartshallhavelesscoverthanthatindi catedforadjacentsteelreinforcement.

Whenholesaretobeprovidedinformworkforweepholesandthelikethey shallbeneatlytrimmedtofitthepi peandcaulkedwiththeapprovedmaterialtoformagrouttightjoint.

Whenconcreteistobedepositedtoasteeperslopethan15degreestothehorizontaltopformsshallbeusedtoena bletheconcretetobeproperlycompacted.TheEngineermayrequiredetailsand/orcalculationsofanyprop osedformworktobesubmitted
forapprovalpriortoworkstarting.Suchapprovalifgivenshallnotinanywayrelievethecontractorofhisrespon sibilit iesforthe safetyoradequacyofsuchforitspurposes.

Theinsidesurfacesofforms,exceptforpermanentformwork,orunlessagreedbytheEngineer,shallbecoa tedwithanapprovedmaterialtopreventadhesionoftheconcrete.Suchapprovedmaterialshallbeappliedst rictlyandshallnotcomeintocontactwithreinforcementorothercast-initems.

Immediatelybeforeconcretingallformsshallbethoroughlycleanedout.Inthecaseofdeepsectionsanope ningshallbeleftatthe basetoenablesuchcleaningtobeadequatelycompleted.

Inthecaseofbeams,slabsoflikemembersthe formworkshallbesoarrangedthatthesidesoredgesmaybere movedwithoutdisturbancetothesoffitorproppingsystem.Theerection,easingandstrikingoftheformwork shallbedoneunderthepersonalsupervisionofa competentforeman.

Formworkshallbestruckatsuchatimeandinsuchamannerastocausenodamagetothestructure.Thecontracto rshallinformthe
Engineerbeforeheintendstostrikeanyformwork.Thetimeatwhichtheformworkisstruckshallbethecontract or'sresponsibilitybutthe
minimumperiodsbetweenthecompletionofanyconcretingbayandtheremovalofformsshallbeasfollow s:

Verticalformwork	24hours
Soffitstobeams	21days
Soffitstoslabs	14days
Cantilevers	28days

Theperiodsgivenabovearebasedontheremovalofallpropsandformworkusingordinaryportlandcementun deraverageweather
conditionsordifferentcementmaycausetheaboveperiodstobeincreased.Shouldthecontractorwishtomake useofreduce dstriking
timesthenhemustsatisfytheengineerthatthestrengthoftheconcreteatsuchtimeandthestructuralsystemi sadequatetowithstandthedeadandimposed loads applied to it.Beforemakinguseofreducedstrikingtimesthe Engineer's agreement must be obtainedinwriting.

Wherethestructureisofmultistoreyconstructionpropswithheadtreesandbracesshallbeprovidedtodistri

butetheimposedloadbelowthe floorbeingcast.Thiswillnormallybe2storeyheightbelowthefloorbeingcastunlessotherwisestated.

Wheresawnformworkfinishisspecifiedorinallcaseswherenoalternativefinishisspecifiedthesurfaceoftheconcreteshallbenotworse thenthatobtainedbytheuseofproperlydesignedmouldsofclosedjointedsawnboards.Smallsurfaceblemishescausedbyentrappedair willbepermittedbutthesurfaceshouldbefreeofvoids,honeycombsorotherdefects.

Where"fairfaced"finishisspecifiedtheirregularitiesofthefinishshallbenogreaterthanthoseobtainedfromtheuseofwroughtthickened squareedgeboardsarrangedinauniformpattern.Theconcretesurfaceshallbesmooth,freefromfins,lippings,boardmarksorother irregularities,andevenwithsharptruearises.Onlyveryminorblemishesorvoidsshalloccurandthereshallbenostainingordiscolouration.

R.CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS

Constructionjointswillbepermittedonlyatthepositionsshownonthe Drawingsandasinstructedonthesitebytheengineer.

Thesejointswillingeneralbespacedtoallowamaximumplanareaforanybayof100sq.m. ofmaximumlengthof12minanyone dimension.

Verticalconstructionjointsshallbeproperlymadetoformaverticalgrouttightjoint.Whereareinforcement passesthroughtheface ofthe joint the stopping off board shall be drilled so that the barspassthrough,ortheboardshallbemadeinsectionswithhalfroundindentationinthejointfacesforeachbar.Undernocircumstancesshall concretewhenbeingdepositedbeallowedto,tailoff.Constructionjointsformedwithexpandedmetalorsimilarwillnotbepermittedforreinforcedconcretework.

S.CONCRETE MIXES-DESIGNS MIX

Mixesforeachclassofconcretespecifiedorshownonthedrawingsshallbedesignedbythecontractortoachievethespecified minimumcubestrengthcombinedwithhighdensityandadequateworkabilityforthepurpose.Inordertoallowforunavoidable variationthedesignstrengthshouldexceedthespecifiedworkscubestrengthbytwicetheexpectedstandarddeviation.Inthe absenceofpreviousinformationastandarddeviationof7MN/M2shouldbeassumed.

Detailsofanyproposedmixdesignshallbeforwardedtothe Engineernotlessthan60daysbeforethatclassofconcreteisrequired tobeusedontheworkforhisapprovalinprinciple.Thedetailsshallincludeatleastthefollowinginformation:-

(a)Sourcenatureandgradingofcoarseandfineaggregate.
(b)Sourceofcement
(c)Nominalmaximumsizeofaggregate
(d)Cementcontent
(e)Aggregate/Cementratio
(f)Water/Cementratio
(g)Designdensity
(h)Designslumporcompactingfactor
(i)Designstrength

Classesofconcretewillbereferredtobytheminimum28daysworkcubestrengthandthemaximumsizeofaggregate.ClassesofconcreteshallmeetthecriterialshowninTableI.Themaximumwater/cementratioisherein defined as the ratio of the weight of the "free" water to the weight of the cement. The "free" water is that quality of water available for cement. An

ywaterrequiredtobe absorbedbyaggregateisexcluded.

Theworkabilityoftheconcreteshallbetheminimumconsistentwithproducingadense,wellcompactedmass.Dueregardshallbepaidtosizeandshapeofthesectiontogetherwithanycongestionofreinforcement.

AftertheEngineerhasapprovedadesignmixinprinciplethecontractorshallprepareatrialmixonsiteusingtheplantand
materialsintendedfortheworks.Eachbatchofconcreteshallbesampledandthefollowingprepared,inaccordancewithBS1881:

(a)Nine150mmcubes,threefortestat7days,threefortestat14daysandthreefortestat
28days;and
(b) Threeslumptestsorwherethedesignslumpislessthan25mmthen

(c)Threecompactingfactortests.

NostructuralconcreteshallbeplacedintheworksuntiltheEngineerhasapprovedthepreliminarytests.Thereafter,theapprovedmixproportionsshallbeadheredtothroughouttheworkandmayonlybevariedwiththeprior approvaloftheEngineer.

T.CONCRETE MIXES-NOMINAL MIXES

MixesforeachclassofconcretespecifiedofshownontheDrawingsshallbeusedbythecontractor.Theyshallbemixedto achievehighdensitycombinedwithadequateworkabilityforthepurpose.

DetailsofanyproposedmixshallbeforwardedtotheEngineernotlessthan5daysbeforethatclassoftheconcreteisrequiredtobeusedonthe worksfor hisapprovalinprinciple.

Classesofconcretewillbereferredtobytheirnominalmixproportions.Classesofconcreteshallmeetthecriteriashowin TableII.

Theworkabilityoftheconcreteshallbetheminimumconsistentwithproducingadense,well-compactedmass.Dueregardshallbe
paidtothesizeandshapeofthesectiontogetherwithanycongestionofreinforcement.TheEngineermayathisdiscretionrequirepreliminarytestsofconcretequalityfornominalmixesunlesssatisfactoryevidenceofstrengthisproducedfromreliablesources.
Whererequired,thesetestsshallbeinaccordancewithBS1881.

U.CONCRETE MIXES-GENERAL

Thestandardofacceptanceofanypreliminarytestswillbesimilartothestandardfornormalworkscubes,slumporcompacting
factor,exceptthattheminimumcubestrengthsrequiredshallbethosegiven“minimumPreliminarycubestrengthat28days”inTableIorII.

ForallstructuralconcretethefollowingrepresentativesamplesshallbetakenandtestedinaccordancewithBS1881.
Oneeachdayonwhichlessthan50cu.mofconcreteisbeingpoured:

(a)six150mmcubes-threefortestat7daysandthreefor testat28 days; and

(b)twoslumptests;or

(c)twocompactingfactortests

Onanydaywhengreaterqualitiesofconcretearebeingpouredthensixadditionalcubetestsandtwoadditionalslumporcompactingfactortestsshallbecarriedoutforeach50cu.mor partthereof.

Allcubesshallbemarkedwiththedateofcastingandareferencenumber.Foreachcubearecordshallbekept ofthepositioninwhichthebatchofconcretefromwhichitwassampledwasplaced.Allcubesshallbetested byanapprovedtestingauthority.

Theconcretecubestestedat7daysareintendedtobeindicativeonlyandthetargetworksstrengthsat7daysg iveninTableIarenotnormallymandatory.Itshouldbenotedhowever,thatitisunlikelythatcubesfailingth e7daystargetwillsubsequentlypassthe
28dayscubestrength.Theconcretecubestested28dayssshallbetakentorepresenttheconcreteplacedinthewor ks.Thestandardofacceptanceforcubestrengthtestsshallbeasfollows:

Thecubestrengthshallbecalculatedfromthemaximumloadsustainedbythecubeatfailure.Theappropriatest rength requirementsasgiveninTableI,shallbeconsideredtobesatisfiedif

(a)Noneofthestrengthofthethreecubesisbelowthespecifiedcubestrength,orif

(b)Theaveragestrengthofthethreecubesisnotlessthanthespecifiedcubestrength

andthe differencebetweenthegreatestandtheleaststrengthsisnotmorethan20percentofthat average.

V.READY MIXED CONCRETE

Readymixedconcreteshallbeusedonlywiththeapprovaloftheengineer.Whensuchapprovalisgivenitshallb esuppliedin accordancewithBS1926exceptwherethisconflictswiththisspecificationshallprevail.

X.PLACING AND COMPACTING CONCRETE

Allconcreteshallbevibratedunlessotherwisespecified.Thevibrationshallbecarriedoutbyexperiencedoper atorsandwith immersiontypevibratorstotheEngineer'ssatisfaction.

Placingofconcreteshallbecarriedoutinlayersnotexceeding60mmdeepandinsequencefromoneendofth eformtotheother.
Concreteinfoundationandotherundergroundworkshallbeprotectedfromcontaminationwithfalleneart horrockduringandafterplacing.

17

Anyconcretewhichshowssignsofintitalsettingbeforeorduringplacingshallnotbeused,itshallbere movedatthecontractor'sexpense.Sufficientvibratorsshallbeprovidedtocorrespondwiththerateof depositionofconcrete.Thevibrationshallbe continuousthroughouttheplacingoftheconcrete.Standbyvibratorsshallbeonsiteduringallconcr eteplacing.

Vibrationmustnotbeallowedtodisturbanyrecentlyplacedconcretethathasbeguntoset.Anywate raccumulatingonthesurfaceofnewlyplacedconcreteshallberemovedbyapprovedmeansandnof urtherconcreteshallbeplacedthereon untilsuchwaterisremoved.

Suitablemeansshallbeprovidedtoensurethatthetemperatureoftheconcreteonplacingdoesnotex ceed30degreescentigrade(86degreesFahrenheit).Concreteshallnotbeplacedaroundreinforce mentoragainstsurfaceswhichareattemperaturesabove30degreescentigrade(86degreesFahrenh eit).Allsurfacesshallbethoroughlydampedimmediatelypriortoplacingfresh concretetopreventexcessiveabsorptionofwater.

Y.UNFORMED FINISHES FOR CONCRETE

Whereaconcretesurfaceisspecifiedforreceivingafurtherappliedfinishorinallcaseswherenootherfi nishisspecifiedtheconcreteshallbeuniformlylevelledandscreededtoproducearidgedsurface.No furtherworkshallbeappliedtothesurface.

Whereaconcretesurfaceisspecifiedasexposedwithnofurtherappliedfinishtheconcreteshallbeunifo rmlylevelledand screededtoproduceaplainsurface.Aftertheconcretehashardenedsufficiently,thesurfaceshallbehan dormachinefloated sufficientlyonlytoproduceauniformsurfacefreefromscreedmarks.

Z.CURING AND PROTECTING CONCRETE

Immediatelyaftercompactingandfor7daysthereafterconcreteshallbeprotectedagainstharmful effectsofweatherincludingrain, rapidtemperatureschanges,andfromdryingout.Themethodsofprotectionusedshallbesubjecttot heapprovaloftheEngineer.Themethodofcuringusedshallpreventlossofmoisturefromtheconcr ete.

Duringthecuringperiodhorizontalsurfacesshallbeprotectedbythefollowingorotherapproved means:

(a) Coveringwithdamphessiancanvassacksorsimilarabsorbentmaterialskept constantly dampandwhollycoveringtheexposedconcretesurface.

(b)Coveringwithanimpermeablematerialraisedapproximately50mmoverthesurfacesotopreve ntlossofmoisture

(c)Anapprovedmembranecuringcompound.

Duringthecuringperiodothersurfacesshallbeprotectedbythefollowingorotherapprove dmeans:

(a)Formworkinclosecontactwiththeconcretebutkeptcoolatalltimes.

(b) Directandcontinuousapplicationofwaterpreferablyintheformofmistsoasnot to damagethesurface.

(c)Coveringas(a)to(c)above

Allconcretefacesoredges,particularlythosewhichareexposedwithoutrenderinginthefinal structure,shallbeadequately protectedfromdamageanddiscolourationatalltimes.

Concretestructuresshallnotbeloadeduntiltheconcreteisatleast21daysoldor28daysinth ecaseofcantilevers.Withtheprior

approvaloftheEngineerthestructuremaybeloadedafterthistimebutinnocasewillloadinggreaterthanthefinaldesignloadingbepermitted.

AA.PRECAST CONCRETE

Thematerialsforprecastworkshallbesimilartothematerialsforinsituwork.Theworkmanshipforprecastworkshallcomplywith CP116exceptwherethisconflictswiththisspecificationwhenthespecificationshallprevail.

Thecontractorshallprepare,foreachtypeofprecastunit,adrawingindicatinghisproposedformworkconstruction,casting methods,de-mouldingandhandlingprocedurefortheEngineer'sapproval.

Mouldsandformworkshallbesoconstructedthatthedimensionsofthefinishedconcretemembersare withinthespecified permissibletolerancegivenclause407ofCP116:part 2:1969.

Whereprecastconcreteisdescribedas"fairfaced"themouldshallbeofmetal,oraretohavemetalor hardboardlinings,orareto beotherapprovedmouldswhichwillproduceasmooth,densefairfacetothefinishedconcreteandfreefromallshuttermarks, holes,pitings,etc.

Themethodoflifting,positionofliftingpointsandcuringtimebeforeliftingshallbeagreedwiththe Engineerbeforecastingofanyunits.

Extremecareshouldbetakenwhenhandlingprecastunitsandanyunitsdamagedduringthetransporting and/orpositioningshallbereplacedatthecontractor'sexpense.

AB.CONCRETE FOR WATER RETAINING STRUCTURES

Concreteanditsconstituentsforwaterretainingstructures,inadditiontothegeneralandparticularprovisionsinthisspecificationshallcomplywiththefollowingrequirementsinthissection.Inadditiontotherequirementsofclause4.5aggregatesforconcreteinwaterretainingstructuresshallhavealowdryingshrinkageandabsorption,asmeasuredinaccordancewithBS812notgreaterthan3percent.TheEngineermaybeforeapprovalisgiventoanaggregateoratanytimethereafterrequirethattheaggregatebetestedforabsorptioninaccordancewithBS812.Anyaggregatefailingtocomplywiththis specificationwillberejected.

Inadditiontotherequirementsofclause4.20concreteforthewaterretainingstructuresshallhavea maximumcementcontentof400kg/m3.

Blindingconcreteunderwaterretainingstructuresshallbeamaximumof75mmthickandshallbein class15/40concrete.

Class15/40concreteshallcomplywiththefollowingrequirements: -

Minimumworkscubestrengthat28days15MN/M2

Maximumsizeofaggregate40mm
Mixproportions1cement:2.5fineaggregate:
5courseaggregate

Thisisanominalmixandnocubeswillberequiredtobetaken.

Forwaterretainingstructurestheprovisionsofclause4.19paragrapharemodified.Theconstructionjointswillingeneralbe spacedtoallowamaximumplanareaforanybayof40sq.mormaximumlengthsof7.5minanyonedimension.

Forwaterretainingstructurestheprovisionsofclause4.19paragraphfivearemodified.Atleast96hourshallbeleftbetween completionofconcretingonebayandthestartofconcretinganyadjacentbay.

Akickerofminimumheight150mmshallbecastintegrallywiththebaseslabforallwaterretainings tructures.

.

(a)PrecastConcrete

General

UnlessotherwiseapprovedbytheEngineer,allprecastconcreteconstructionshallbecarriedouton theSiteandshallconformtorequirementsgivenelsewhereinthesepreambles.

Themaximumsizeofcoarseaggregateconcreteshallnotexceed20mmexceptforthicknesslesstha n75mmwhereitshallnotexceed10mm.

Thecompactingofprecastconcreteshallconformwithrequirementsgivenelsewhereintheseprea mblesexceptforthin slabswhereuseofimmersiontypevibratorsisnotpracticable.The

Concreteintheseslabsmaybeconsolidatingonavibratingtableorbyanyothermethodsapprovedb ytheEngineer.

(b)PrecastConcreteCladdingUnits

Theseshallbecasttothegeneraldetailsshownonthedrawings.TheContractorshallsubmitworkin g/shopdrawingsfor
eachtypeofthecladdingpanelstotheEngineerforapprovalbeforehecommencescastingoperatio ns

Thepanelsshallbecastinspecialyardsandshallbecuredadequately
beforebeinghoistedintopositioninthestructure,takingcarethatnopartsarebrokenintheprocess. Theunitsshallthenbejoinedtogetherwithinsituconcreteandflexibilityconnectedtothetopandbo ttombeamstoallowforlimitedmovementofthecombinedunit.

PARTFIVE

WALLING SPECIFICATIONS

MATERIALS

A.CEMENT

Cementusedformakingmortarshallbeasdescribedinconcretework.

B.LIME

Thelimeformakingmortarshallbeobtainedfromanapprovedsourceandshallcomplywith BS890 ClassAfornon-hydrauliclime.

Thelimetoberuntoputtyinanapprovedlinedpitorcontainer.Thewatertobefirstrunintothepitorcontainerandthelimetobe addeduntilitiscompletelysubmerged,stirredvigorouslyuntilalllumpsaredisintegratedandshall bekeptconstantlycoveredwithwaterandregularlystirredforatleastfourweeks.Theresultingmilk-limethentobethroughafinesieveandrunintoapitorothercontainerandkeptcleanandmoistfornotless thantwoweeksbeforebeingusedintheworksandmoistfornotlessthantwo weeksbeforebeingused intheworks.

C.SAND

Sandusedformakingmortarshallbecleanwellgradedsiliceoussandofgoodsharphardqualityequ altosampleswhichshallbe depositedwithandapprovedbytheArchitect.Itshallbefreefromlumpsofstone,earth,loam,dust,s alt,organicmatterandother deleterioussubstances,passedthroughafinesieveandwashedwithcleanwaterifsodirectedbythe Architect.

D.WATER

..

H.STONE

AllstoneshallcomplywiththerequirementsofCP121.202formasonryandrubblewallsrespectivelye xceptwhereamendedor extendedbythefollowingclauses.

Unlessotherwisenoted,allmasonrywallsshallbecoursesquaredrubblewallingwithmortarjoints. Thesizeofstonesforrubble wallingshallbesuchthatthelengthofstonedoesnotexceedthreetimesitsheight.Forcoursedsquar edrubblewallsblockshallnotexceed300mminheightandshallbenotlessthan150mminheight.

Wheresneckedrubblewallsarespecified;thesnecksshallnotbelessthan100mmsquareontheexpose dface.Stoneformasonryshallhaveaminimumcompressivestrengthof10N/mm2.(stoneshallnot berequiredtobetestedtofailure).Thedensityofstoneformasonryshallbenotlessthan230kg/m3.T hedryingshrinkageofstoneshallnotexceed0.05%.

Samplesofstoneprovidedfortestingshallbetestedforthefollowinginaccordancewiththemethod sgiveninBs2028,1364andthetestresultsshallcomplywiththerequirementsofthisspecification.

(a)Compressivestrength
(b)Density
(c)Dryingshrinkage

Thecolourandtextureofstoneshallbeuniformandconsistent.Priortodeliveringanystonetositeth econtractorshallsupplythe
Architectwithasampleofstoneinorderthathemayapprovethecolourandtexture.Thecontractorshall en surethatsufficient
suitablestoneisavailableforthewholeoftheprojectpriortoorderingthestone.

Wherecaststoneincludingdescribedasartificialstone,reconstructedstone,etc.,isspecifiedthestones hallcomplywiththe
requirementsofBS1217.Masonryshallbeofstone,havingnoirregularfacesandonlythebackfacei fnotvisibleshallbeleftasfromthesaw.

Priortoorderingdrystonethecontractorshalldemonstratethatthestoneisdurable.Thismaybedoneby supplyingdet ailsof
buildingconstructedwithstonefromthesamequarryandwhichhasbeenexposedtothesameenviro nmentconditionforatleasttenyears.Themaximumprojectionfromthefaceofstoneforrubblewall sshallbe20mmbeyondthespecifiedfaceofthewall.

Thecontractorshallprovidesixsamplesofstonemeasuring150mmx150mmfortestingpriortodeliver inganystonetosite.Asworkproceedsthecontractorshallprovidesixsamples150x150x150mmfor testingfromevery300m2ofwork.Allstoneshallbe
stackedonpreparedryareasfreeofclinker,ashesandsulphatebearingstrata.

I.WALL REINFORCEMENT

Wheredescribedwallsandpartitionsshallbereinforcedwitha25mmwidestripofNo.20S.W.Ghoopir onbuiltintoalternate
horizontaljointsinthewallcentre.Thereinforcementshallbelappedandhookedatrunningjoints,angl esandintersectionsand carriedatleast115mmintoabuttingwallsatjunctions.

J.WALL TIES

Tobe3mmdiametergalvanizedmildsteelwiretwistedbutterflywallties

K.DAMP - PROOF COURSES

Thebituminousfeltsheetingfordamp-
proofcoursesshallbehessianbasedbituminousfeltcomplyingwithBS743TYPE4A
weighingnotlessthan3.85Kgspersquaremetre.Thesheetingistobelapped150mmatrunningjoin tsandthefullwidthofwalls atangles.

WORKMANSHIP

L.CEMENT MORTAR

Mortardescribedascementmortar1:4shallbecomposedof1cubicmetre(1498Kgs)ofPortlandCe mentand4cubicmetresofsand.Othermixessuchas1:3,1:5etc.shallbesimilarlyconstrued.

M.MIXING MORTAR

Theconstituentmaterialsshallbemeasuredseparatelywhendryinspeciallypreparedgaugeboxes ofsizestogivetheproportionsspecifiedwithoutconsolidationofthecontentsbyrammingandshak ing.Themortarshallbemixedinanapprovedpowerdriven
mixerfornotlessthantwominutesperbatchandusingtheminimumquantityofwaternecessarytoo btainaworkingconsistency.

Themixershallbeusedascloseaspracticabletotheworksandmortarshallbeusedwithin30minutes ofmixing.Nopartiallyor wholysetmortarwillbeallowedtobeusedorre-mixed.

N.GENERAL CONSTRUCTION

(a)Setting out

Thecontractorshallprovidepropersettingoutrodsandsetoutallworkonsameforcourse,openings,heightsetc.,and shallbuildthewalls,piersetc.,tothewidths,depthsandheightsindicatedontheDrawingsandasdirectedbytheArchitect.

(b)Buildingin Wood Frames

Openingsfordoors,ventilatorsetc.,aretobesetoutandleftunbuiltuntilthewoodenframeshavebeenfixedinposition.

(c)BuildinginMetal windowsanddoors

Openingsformetalframestobewideenoughfortheframestofitwithoutbeingforcedintoposition. Buildthelugsintothejointsofthewallingandfillintothespacebetweenthewallingandframeswith cementmortarwelltampedintothechannelofthe framesand point all roundexternally.

Allframesmustbesetplumbandlevelandfreefromtwist.

(d)WallstoReceivePlaster&SimilarFinishes

Allfacesofwallstobeplasteredetc.,tohaveallprojectionsdressedoffandjointsrakedoutaskey.

O.BUILDING WALLING

(a)LayingandJointing

Allblocksshallbewellwettedbeforebeinglaidandthetopofwallingwhereleftoffshallbewellwettedbefore commencing.Wallstobekeptwetthreedaysafterbuilding.Allwallsthroughouttheworksshallbecarriedupevenlyin200mmcoursesexceptwherecoursesoflessdepthrequiredtobringwallingupto leveloffloors,windowsandthelikeandwhereotherwisedescribed,nopartbeingallowedtobecarriedupmorethanonemetrehigheratonetimethananyotherpartandinsuchcasesthejoiningshall bemadeinlongstepssoastopreventcracksarisingandallwallsshallbelevelledroundateachstage. Notmorethan3metresheightofwallshallbelaidinanyoneday.

(b)Bonding

Theblocksshallbeproperlybondedtogetherandinsuchamannerthatnoverticaljointinanyonecourseshallbewithin115mmofasimilarinthecoursesimmediatelyaboveorbelow.Allwallingof300mm thicknessorlessshallbebuiltin singlethicknessofblocks.Wallingexceeding300mminthicknessshallbebuiltwiththroughbondersnotmorethan 1070mmapartineachcourseasdirectedbytheArchitect.

Alternatecoursesofwallingatallanglesandintersectionsshallbecarriedthroughthefullthickness oftheadjoiningwall.
Allperpends,revealsandotheranglesofthewallingshallbebuiltstrictlytrueandsquare.

(c)Tolerances

Allcoursesofwallsshallbelevelwithamaximumdeviationof+/-3mminanyonemetrelengthandamaximumoverall deviationon10mmforlengthsofwallexceeding3metres.Wallsshallbeplumbwithamaximumdeviationof+/-3mminanymetreheightofwallwithamaximumdeviationof+/-10mminthetotalheightofthewalloranystorey.

Allcornersofwallswhichareshownasbeingatrightanglesshallbesquarewithamaximumdeviatio

nof3in1000.All wallsshouldbestraightwithamaximumdeviationof+/-3mminanyonemetrelengthandamaximumoveralldeviationof10mminanylengthexceeding3metres.

Allbedandverticaljointsshallbeanaverageof10mmthickwithamaximumdeviationof+/-3mmofblockwork,andstone rubblewalls.Jointsforstonemasonrywallsshallbe6mm+/-1mmthick.

(d)Curing

Allwallsshallbemaintainedinadampconditionforatleast24hoursafterlaying.Wallsunderconstructionshallbe
dampenedbyapplyingwaterwithabrushandnohosingdirectlyontothewallshallbepermitted.Whenworkceasesonanysectionofwallpolytheneorhessianshallbedrapedoverthewall,foratleast24hours.Ifhessianisused,itshallbemaintainedcontinuouslywet.

(e)Cavities

Cavitywallsshallbeoftheoverallthicknessshownonthedrawings.

Cavitiesabovegroundlevelbetweenleavesofblockormasonryshallbefreeofmortardroppingsorther debris.The Contractorshalltakeproperprecautionstopreventmortarordebrisenteringthecavity.

Cavitybelowgroundlevelshallbefilledwithmortarforcavitiesupto75mmwideandforcavitiesover75mmwidefillingshallbeconcretemix1:3:6.Cavitiesshallbefilledsuchthatthereismaximumofthreetimesthethicknessofthethinner
leafofthewallfilledwithwetmortarorconcreteunlessthewalliscontinuouslysupportedforthedepth.

(f)Backfilling

Earthbackfillingagainstwallsshallbecarriedoursuchthatthelevelofthebackfillisalwaysequaloneachsideofthewall.Whenawallhasfillingmaterialononesideonlytoafillwidthofmorethanthreetimesthewallthickness,thewallshallbecontinuouslysupportedduringbackfilling.

Backfillingshallnotbecarriedoutuntilatleastsevendayshaveelapsedsincethelayingoftheblocksorstone.

P.POINTING

Pointingofwallsshallbecarriedoutastheworkproceedswhereverpossible.Whencoloureddmortarisspecifiedforpointingonlythepointingshallbecarriedoutafterworkhasbeencompleted.

Existingwallsshallbepreparedforpointingbyrakingoutallloosefriablematerialtoaminimumdepthof15mmtoformasquare
recess.Thejointsshallthenbewettedandnewmortarshallbeforcedintojointsandfinishedasdirected.

PARTSIX

ROOFING & RAIN WATER PIPESSPECIFICATIONS

A.GALVANIZED CORRUGATED IRONSHEETS

Galvanizedorpre-paintedcorrugatedmildsteelsheetsforroofingandcladdingshallbeofthegaugeandprofilerequired,and obtainedfromanapprovedmanufacturer.Theyshallbefixedwithapprovedcrookbolts,washers,etc.,to‘Z’purlins.

B.TIMBER ROOF TRUSSES

Alltimbertobeusedshallbeasdescribedincarpentryand Joineryhereafter.

Roofconstructionistoincludeforallnecessarytimbers,dragonties,ridges,hips,purlins,valleys,eaves,timbers,etc.,andforanyeavessoffits,fascias,gangboardsasspecifiedorshownontheDrawings.Generallytrussesaretobesetverticalandlevel,spikedtowallplatesandsecuredwiththewallties.

Notimbersusedforties,raftersorpurlinsshallbeover5.0metresinlength.Alljointsshallbescarfed andboundwithcontinuous20mmhoopironbinding,pitchedat35mmcentresscarfsinpurlinsshallocc urattrussesbutintiesandrafterstheyshalloccurapproximatelycentralbetweenjoints.Thepricesfo rrooftrussesshallincludeforalltheforegoingandnails,bolts,etc.,necessaryto maketherequiredjoints.

C.ALUMINIUM FLASHINGS

Aluminiumflashingsshallbeformedoutof22gaugesuperpurityaluminiumwithnaturalmillfinish toBS1470.Whereflashingsarebuiltintojointsortuckedintogroovestheminimumdepthistobe25mmandtheyaretobesecuredbyfoldedaluminiumwedgesat450mmcentresandpointedincement mortar(1:3).

D.PVC RAINWATERPIPES

PVCrainwaterpipesandfittingsaretocomplywithBS4576withsolventweldedorrubberringsealjoints.

Pipesaretobecaseintoconcreteortobefixedtothestructurewith PVCholderbatsbuilt-inorpluggedandscrewedatmaximum2 metrecentres.

Bends,swannecks,dischargechutesandfittingsgenerallyaretobefixedwherenecessary tofacilitatetheflowofwater.

RainwateroutletsshallbePVCsuitablefortherooffinishinwhichtheyoccurwithdomicalPVCgrating.

E.PROTECTION

Thecontractoristotakeallnecessaryprecautionstoprotectthefinishedworkandmustensurenodamageoccurstotheroofing untilcompletionoftheworks.

F.COMPLETIONOF THEWORKS

Oncompletionoftheworks,thecontractorshallclearaway,ensurethatrainwateroutletsareclearandg enerallyleavetheroof areasinacleanandwatertightconditionstothesatisfactionoftheArchitect.

PARTSEVEN

CARPENTRY & JOINERY SPECIFICATIONS

CARPENTRY& JOINERY

A.GENERALLY

Allwoodworkshallbecarriedoutinaccordancewiththedrawingandtheprincipalsoffirstclassjoinery construction.Unlessspecificallystatedotherwise,sizesshownondrawingsarefinishedsizesandth econtractormustallowforwrotfaces.

MATERIALS

B.QUALITIES OF TIMBER

(a)ThequalitiesoftimberstatedhereinafterareinaccordancewiththelatestKenya GovernmentGradingRules.
(b) AlltimberdescribedasprimeGradeistobefirstGrade(Grade1)
(c)AlltimberdescribedasselectedGradeistobesecondGrade(Grade11)
(d)AllhardwoodistobeprimeGrade(Grade1)
(e)Alltimberforpermanentuseinthebuildingshallbeforeusebeapproved forqualityinaccordancewiththeforegoingspecificationforitsrespectivegrade.Anytimbern otsoapprovedbythe Architectshallberemovedfromthesiteforthwith.

C.INSECT DAMAGE

Alltimber,whethergradedorungraded,andincludingshuttering,scaffoldingandthelikes hallbefreeofliveborerbeetleorotherinsectattachedwhenbroughtuponthesite.Thecontractorshall beresponsibleuptotheendofthemaintenanceperiodforexecutingathisowncostallworknecessaryt oeradicateinsectattackoftimberwhichbecomesevidentincludingthereplacementoftimbersattac ked,orsuspectedofbeingattacked,notwithstandingthatthetimberconcernedmayhavebeeninspecte dand passedasfitforuse.

D.SEASONING OF TIMBER

Allcarpentrytimbersaretimbersaretobeseasonedtoanaveragemoisturecontentofnotmore20%. Alljoinerytimbersar etobe seasonedtoanaveragemoisturecontentofnotmorethan15%.Thecontractoristomakeavailableonsit eametreoftesting moisturecontentofalltimberdelivered.

E.PREPARATION AND PROTECTION OF TIMBER

(i) Alltimbernecessaryfortheworksistobepurchasedimmediatelythecontractis signed,andwhendeliveredistobeopenstackedforsuchfurtherseasoningasmaybeneces sary.Preparationofthetimberistobecommencedsimultaneouslywiththecommenceme ntoftheworksgenerally.

(ii) Alltimberandassembledwoodworkistobeprotectedfromtheweatherandstoredinsuch awayastopreventattackbydecayfungi,termitesorotherinsects.

F.PRESSURE IMPREGNATED TIMBER

(i)Alltimberdescribedaspressureimpregnatedshallbeimpregnatedundervacuum and

pressurewithcelcure.orTanalith.Woodpreservativewithanaverageabsorptionofnotless than6.7kgs.ofdrysaltper cubicmetre.Incaseofresistantspecieswherethisretentioncannotbeobtainedthetimbershall betreatedtorefusal point.Alltreatedtimbershallnotbeexposedtowetconditionsforatleast14daysaftertreatmenthasbeencarriedout.

Allcutends,drillingorfabricationsonthesiteproducingnewsurfacesshallbethoroughlybrushedorsoakedwithcelcureB.saltsappliedinaccordancewiththemanufacturer'sinstructions.

Anyothermethodof timberimpregnationswillonlybeallowedattheArchitect'sapproval.

G.HARDWOOD

Allhardwoodwillcomplywiththerequirementof BS1186part1BS4047.Itshallshowastraightandregulargrainthroughout.

Hardwoodshallbefreefromwoolytexture,softheart,sapwood,splits,shakes,allevidenceofinsectoffungiattackandrotandall faultscausedbycompressionfailure.Thereshallbenowaneyedges.Hardwoodshallbefreefromknotsonexposedfaces.Any hardwoodshowingvisibleimperfectionswillberejected.

PreservativesshallnotbeusedwithouttheArchitect'spermission.Whereindicatedonthedrawings,internalhardwoodswill be treatedwithclearsealantsasspecifiedelsewhere.

H.SOFTWOOD

SoftwoodtimberforcarcassingworkshallbeeitherpodocarpusorcypresstotheapprovaloftheArchitectandshallbedimensionsspecifiedonthedrawings.

TimbershallbeaccordancewiththeGroupslistedinthisclause.

AllsoftwoodshallcomplywiththerequirementsofBS1186part1.Timbershallbefreefromwoolytexture,softheart,sapwood, splits,shakes,pithshowingonthesurface,slopinggrainexceedingoneineightchecks,knotsexceeding25mmofdiameter,looseknotorknotholesandanyevidenceofinsectorfungiattack.Thereshallbenowaneyedges.

Whereindicatedonthedrawings,thesoftwoodwillbetreatedwithclearsealerorpaintedwithglosspaint.Allsoftwoodistobe pressureimpregnatedagainstinsectattackbeforedeliverytosite.Anyendscutaftertreatmentshall begiventwoliberalcoatsofpreservative.

J.PLYWOOD

AllplywoodshallcomplywiththerequirementsofBS1455,beobtainedfromamanufacturertobeapprovedbytheArchitectandbeofthe thickness shown on the drawings. PlywoodshallbeExteriorGradeexceptwhereotherwisestated.Pliesshallbebondedtogetherwithadhesivescomplyingwiththerequirementsof BS1203gradeWBP.Plywoodshallbefreefromendjoints(includingjointsinveneers)overlapsincoreveneers,deadknots,patchesandplugs,opendefects,depressionsduetodefectsincure,insectattack(exceptisolatedpinwormholes throughfaceveneersonly),fungalattackandfromdiscolourationdifferingfromthatnormallyassociatedwithspecies.

Faceveneersshallbehardanddurableandshallbecapableofbeingfinishedtoasmoothsurface.Faceveneers shallcloselymatchthegeneraljoinerytimber supplied.

K.CHIPBOARD

ChipboardshallbemediumdensitywoodparticleboardcomplyingwithBS2604part2,producedinfactoriesbyanapproved process.

L.BLOCKBOARD

BlockboardshallbeofapprovedlocalorimportedmanufacturetoBS3444gluedthroughoutandsoftwoodorhardwoodfacedas hereinafterspecifiedandequaltoasampletobedepositedwiththeArchitectforapprovalandwhich whensoapprovedshallformthestandardfortheworks.

M.TIMBER DOORS

Generally,therequirementforflushdoorsisthattheyhaveaminimumthicknessof40mm.Theyshallbefacedbothsidesandthereshallbehardwoodlippingstoalledges.Hollowcoreandsemi-solidtypesshallcontainadequate provisionwithinthe coreforironmongery (e.g. lockblocks etc).

Allhollowandsemi-soliddoorsshallbefacedwithWBPbonded Exterior grade plywood.Exceptwhereindicateddoorsshallhavehardwoodveneeredfaces.

Visionpanels whererequiredshallbe150mmwide900mmdeep.

FlushdoorsshallbeobtainedfromasuppliertobeapprovedbytheArchitect.Flushdoorsshallcomplywiththerequirementsof BS459parts1,2and3.Alledgesshallbelippedwithhardwoodtonguedin toedgeofthedoor.

Fireresistantflushdoorsaretobeconstructedinaccordancewith BS459part3.

Thecoreofsolidcoreflushdoorsshallbeconstructedoflongitudinallaminationsofprecisionplaned timber,buttjoinedandgluedwithresinbasedadhesiveunderhydraulicpressure,thewholeformingarigidfireresistantraft.

Wheredoorsareindicatedasfireresistanttheyshallbeconstructedsoastoexceedtherequirementsstatedwhentestedin accordancewithBS476part(1972)section7.

N.HARDWOOD VENEERS

(a)Veneerfacingsshallbeselectedtotheapproval oftheArchitect.
(b)Noglassorsyntheticfibrestitchingwillbepermittedforjointingveneerleaves together.
(c)Veneershallbefreefromsplits,dote,glue,stainsinsectorfungiattackandrot.
(d)Fillingorinlayingofanykindwillnotaccepted.
(e)Allwoodveneersshallbebondedtothecorematerialinsuchawaythatnolifting and
blisteringshalloccur.

PCARPENTRY WORK

(a) Allcarpentryshallbeexecutedwithworkmanshipofthebest quality.Scantlingsandboardshallbeaccuratelysawnandshallbeuniforminwidthandthickness throughoutandshallbeaslongaspossible andpracticableinordertoeliminatejoints

(b)Allworkshallbeleftwithaswansurfaceexceptwherespecifiedtobewrot.

(b) Allworkshallbeaccuratelysetoutandinstrictaccordancewiththedrawings,andshall beframedtogetherandsecurelyfixedinthebestpossiblemannerwithproperlymadejoints.Pr ovideallbraids,nails, screwsetc.,asnecessaryandasdirectedandapproved.

(c) Actualdimensionsofscantlingforcarpentryshallnotvaryfromthespecifieddimensions by

(d) morethan+3mmor-1mm.Sizesandthicknessofwrotcarpentrytimberarenominal,thatis tosayavariationof3mmfromthespecifiedsizeswillbeallowedfromeachwrotsurfaceunl essthethicknessorsizeiddescribedasfinishedinwhichcasenovariationfromthestatedthi cknessorsizewillbepermitted.

Q.**JOINERY WORK**

Alljoineryworkshallbewrotunlessotherwisedescribed.

(a) Sizesandthicknessofjoineryarenominalthatistosayavariationof3mmfromthespecifie dsizeswillbeallowedfromeachwrotsurfaceunlessthethicknessorsizeisdescribedasfini shedinwhichcasenovariationfromthestatedthicknessorsizewillbepermitted.

(b) NojoinerytobeputinhanduntilthedetailshavebeensuppliedorapprovedbytheArchitect andinallcasesthedetailsaretobeworkedto.

(c) Alljoineryshallbeexecutedwithworkmanshipofthebestqualityinstrictaccordancewith thedetaileddrawings,mouldingshallbeaccuratelyandtrulyrunonthesolidandallworkpl aned,sandpaperedandfinishedtotheapprovaloftheArchitect.Allarrisestobeslightlyrou nded.Allframedworkshallbecutout,andframed togetherassoonafterthecommencementofthebuildingasispracticablebutshouldnotbe wedgedupuntilthebuildingisreadyforfixingthesameandanyportionsthatwarp,getinwi nding,developshakesorotherdefectsshallbereplaced withnew.In-doorframesetc.,theheartfaceofthetimbershallbefixedawayfromthewall.Assoonasreq uiredforfixing inthebuildingtheframingshallbegluedtogetherwithglueasdescribedandproperlywedg edorpinnedetc.,asdirected.

(d) Allbeads,filletsandsmallmembersshallbefixedwithroundorovalbraidsornailswellpun chedinandstopped.Alllargermembersshallbefixedwithscrews,thescrewsletinandpellett edoverwithwood pelletstomatchthegrain.

(e) Cupsandscrewsforfixingbeadsandfilletsshallbespaced150mmapartand25mmfroma ngles.

(f) Alljoineryimmediatelyupondeliverytothesiteistobesortedandprotectedfromtheweat her.

(g) Alljoineryistobeprimedbeforefixingbutnoworkistobeprimeduntilithasbeenapproved bytheArchitect.

(h) Allfixedjoinerywhichisliabletobecomebruisedordamagedinanyway,shallbe properlycasedandprotectedbythecontractoruntilcompletionofthework.

(i) Whennaturalfinishisspecified,thetimberinadjacentpiecesshallbematchedandunifor morsymmetricalincolourandgrain.

R.SOFTWOOD

Fixingshallbebymeansofnon-rustingscrewswithcountersunkheadstoproprietaryplugsorground.Nailswillnotbepermitted.

Sectionsshallbeneatlyandaccuratelycutsoastoavoidsplittingofthewood.

S.HARDWOODS

Hardwoodsareasdescribed.

Injointedpanelseachpieceshallbeofthesamespecies.Joineryforoilingshallhaveallsurfacesofth esamespeciesandsame characterofgrain.

Fixingshallbebymeansofbrassscrewswithcountersunkheadstoproprietaryplugsorgrounds.Where workisfacescrewed
headsofscrewsshallfinishnotlessthan6mmbelowthesurfaceandbecoveredwithroundteakpelletsof appropriatethickness.

Pelletsshallbechosenandfixedsoastomatchcolourandpatternofgrainsofarasispractical.Nailingwil lnotbepermitted.

Sectionsshallbeneatlyandaccuratelycutwithfinetoothedsaws.

T.PLYWOOD

Plywoodoftherequiredthicknessshallbeused.TheContractorwillnotbeallowedtomakeupthick nessbygluingtogethersheetsofthinnerplywood.

Wherecuttingisrequireditshallbeneatlyandaccuratelyperformedwithfinetoothedsawssoastoa voidsplittingthefaceveneers andintermediateplies.

U.CHIPBOARD

Wherecuttingisnecessaryitshallbeneatlyandaccuratelyperformedwithfinetoothedsawssoastoavoi dsplittingthefa ce
veneers.Whererawedgesarisefromcuttingtheseshallbefacedwithamatchinghardwoodfilletcutpin nedandgluedtomatchfactoryproducededges.

V.BLOCKBOARD

Wherecuttingisnecessaryitshallbeneatlyandaccuratelyperformedwithfinetoothedsawssoastoavoi dsplittingthefa ce
veneers.Whererawedgesarisefromcuttingtheseshallbefacedwithamatchinghardwoodcutpinn edandgluedtomatchfactoryproducededges.

W.LAMINATED PLASTIC VENEER

Laminatedplasticveneersaretobefixedwithanapprovedadhesive,carebeingtakentoeliminateal lairfrombeneaththelaminateonfixing.Thelaminateistobefreefromchippedorcrackedportionsa ndworksodisfiguredistobemovedandreplaced.Whentheadhesiveissetthelaminateistobeneatly beveledoffalongallriseswithaplane.

Whereplasticlaminateisfixedtodoorsorshelvesetc.,withoutalaminatetotheouteredge,araisedli ppingistobeprovidedandthelaminatefinishedflushagainstthelipping.

X.FIXING DOORS AND FRAMES

Doorsshallbeproperlyfittedtogiveauniformclearanceofnotmorethan3mmallroundandthehing esshallbeletintodoors.

Doorsframesshallbeproperlyframedatangles.Doorstopsshallbehousedintogroovesinframes. Architravesshallbeprovidedtoconcealfinishes.Framesshallbefixedtogroundsorplugs.Fixingsh allbebymeansofnon-
rustingscrewswithcountersunkheads.Forhardwoodframesscrewheadsshallbefinishednotlesst han6mmbelowsurfaceofthewoodandshallbecoveredwithmatchingroundhardwoodpelletsofa ppropriatethickness.Pelletsshallbechosenandfixedsoastomatchcoloursandpatternofgrainsofa rasispractical.Nailingwillnotbepermitted.

Exceptwhereindicateddoorsshallbekeptcleanforclearpolyurethanevarnish.

Doorframesshallbetreatedtomatchdoors.

Glazingshallbewiredglass6mmthickwithedgeswrappedinwashleatherandsecuredwithhardwoodglazingbeadsize10mmx15mmmitredatanglessecuredwithbrassscrewsandcups.

Y.CONSTRUCTION OF DOORS

(a)Flushdoorsspecifiedassolidconstructionshallhavea100%solidcoreofverticallaminateCedarorequalandapproved.

(b)Flushdoorsspecifiedassemi-soldconstructionshallbeconstructedwithtimberstilesandrails,infilledwithhorizontalintermediaterailsspacedequallyapartandtenonedintostiles.

(c)Unlessotherwisespecified,doorsscheduledtoreceiveaclearorveneeredfinishshallbe lippedonalledges.

(d)Wherepanelsoverdoorsarespecified,suchpanelsshallbeconstructedinthesamewayandwitht hesamematerialsasthedoorsaboveinwhichtheyaresituated,andthepanelsshallmatchthedoorsin everyrespect.
(e)Fordoorsspecifiedasplywoodfaced,theplywoodshallnotbelessthan3mmthick,complyingw iththerequirementsofBS1455,WBPtype.FaceveneersshallbeGrade1forpainteddoorsineveryr espect.

(f)Alldoorsshallbeprovidedwithlockblocksofminimumsize300mmx75mm.

(g)Glassbeadingstripsshallbeapprovedwashleatherselfadhesivetapeturnedupoverbothsidesof theglassandglazingsurfacesandturnedtothestraightline.

(h)Allscrewsshallbecountersunk,andscrewedandpelletedinun-paintedwork.

(i)Timberpelletsshallbegluedandtappedintothehole,makingsurethegrainslineup,andarecaref ullytrimmedbackflushwithjoinerytogiveaclear,smoothoverallsurface.

Z.FITTINGS AND FIXTURES

Thefittings,etc.,aretobeaccuratelyconstructedinaccordancewiththedetaileddrawings.Thedoor s,dra wers,etc.,arealltofit
andopenandclosesmoothlyandallworknexttowalls,floorsandceilingsistobesoundlyfixedandscrib edtofitsnuglyagainst same.

AA.COMPLETIONOF WORKS

Protectionofalljoineryandironmongerymustbemaintaineduntilcompletionofthecontractasaw hole.Alljoineryandglassisto bethoroughlycleanedbeforethebuildingishandedover.

AB.DEFECTIVE WORK

Allworkjudgedtobedefectivemust be removed and replaced as directed by the Architect.

IRONMONGERY

AC.GENERALLY

(a) Ironmongeryshallbefixedwithsuitablescrewstomatchandpricesshallinclude

forthis

(b)Alllocksandironmongeryshallbefixedbeforethewoodworkispainted,handlesshallberemov edbeforethepaintingcommencescarefullystoredandrefixedaftercompletionofpainting .

(b) Alllocks,springsandotheritemsofironmongerywithmoveablepartsshallbe properly tested,cleanedandadjustedwherenecessarytoensureproperworkingorderatthecompletion oftheworksandleftin perfectworkingorderbythecontractor.

(e) Thekeysofalllocksshallhavelabelsattachedwithdoorreferencesmarkedonbeforehandl ingtotheArchitect.

(f) AlllocksshallbeprovidedwithamasterkeysystemandpricesshallincludeforthisasrequiredbytheclientandasinstructedbytheArchitect.Theclient'srequirementsaretobeob tainedbythecontractorbeforeordering.

PARTEIGHT

STRUCTURAL STEELWORK AND OTHER METAL WORK SPECIFICATIONS

A.STEEL QUALITY

StructuralsteelshallcomplywiththerequirementsofB.S.4360andshallbenewandunused.Itshall befreeofimperfections,distortion,rust,scalesofotherdeteriorationorcontaminationbygrease,pa intandsimilaritems.

B.TESTING

TheEngineermay,wherehesodesirescallmanufacturer'sworktestcertificatesinrespectofallstee l,whichtestsshallhavebeen performedinaccordancewithB.S.18.TheEngineermayalsocarryoutsuchfurthertestsashemayc onsidernecessary.

C.SECTIONS

Thedimensionsandpropertiesofhotrolledstructuralsteelsectionsandhollowsectionsshallbeina ccordancewithB.S.2,part1and2,or B.S.4848 for metric sized sections.

D.MINIMUM THICKNESS

Allsteelworksectionsotherthangaugemetalsections,includingcleats,gussetplates,etc.shallben otlessthan8mmthickunlessspecificallyindicatedontheDrawings.

E.FORGING

AllsteelforforgingandallforgingsshallcomplywiththerequirementsofB.S.29,andshallbesubje cttoinspectionandapprovaloftheEngineer.

F.CASTING

Allmaterialusedinthemanufactureofcastingsandallcastingsshallcomplywiththerequirements ofB.S.309,1452and3100andshallbesubjecttoinspectionandapprovaloftheEngineer.

G.GAUGE METAL SECTIONS

Sectionsshallbemanufacturedfromcontinuouslyhotdippedgalvanisedsteelcoiltob.S.2989usin gsteeltoB.S.1449,part1Aand1B,classificationCR4withaguaranteedminimumyieldstressof28 0N/mm2.

Thesectionsshallbecoldformedtothebasicshapesgiveninb.S2994withthedesignanddetailscon formingtoAddendumNo.1toB.S.449(PD4064).

Sectionshallbesawnandholesmaybepunchedsoastoproduceaneatroundholewithnodistortion. Holesandcutendsshall bepaintedwithzincrichpaintassoonaspossibleaftercutting.

H."Z" PURLINS

"Z"purlinsshallbefabricatedinthelongestpracticablelengthswithstaggeredjoints.Allconnectio nsshallhaveaminimumof four bolts.Sagrodsandapextiesshallbeprovidedwhereindicated.

STRUCTURAL STEELWORK AND OTHER METAL WORK SPECIFICATIONS

I.TUBULAR SECTIONS

Fortubularconstruction,dueallowanceistobemadeforsealingtheendsofalltubesandhollowsquareorrectangularsectionswithweldingorweldedplates.Whereendmakeconnectionstoothermembers,theyshallbeweldedontrueandsquare.

Shopjointsrequiredintubularmembersshallbefullpenetrationbutweldsontosplitbackingrings.

J.STORAGE

Steelshallbestoredatleast150mmabovethegroundandprotectedagainstrustandcorrosion.

K.FABRICATION

StructuralsteelworkshallbefabricatedinaccordancewithB.S.449.

L.SHOP DRAWINGS

Thecontractorshallpreparefullydetailedworkingdrawingsofthestructuralsteelworkandobtaintheengineer'sapprovalbefore commencinganyfabrication.Thedrawingtobesubmittedatleastoneweekbeforeitisplannedtostartfabrication.

M.EDGE PREPARATION

Thelongitudinaledgesofallplatesandcoverplatesformingplategirdersorbuilt-upgirdersandcolumnsandalledgesofgusset platesover12mmthickshallbemachined.Edgeswhicharesubsequentlywhollyincorporatedinweldmaybemachineflamecut.Theabuttingendsofthepartsofallcompressionmembersincludingthecapsandbasesofstanchions,built-upcolumnsand stiffenerstransmittingloadthroughdirectcontactshallbemachinedafterthemembershavebeenfabricatedsothatalltheparts shallbeinclosecontactwhenthejointismade.Theedgesoftheothermembersmaybemachineflamecut,sawn,shearedorcroppedbuthandflamecuttingwillnotbepermitted.Allburrsshallberemovedbygrinding,andshearedandcroppededgesshallbedressed.

N.STRAIGHTENING

Allplates,barsandrolledsectionsshallbecarefullytrued,straightenedandtakenoutofwindingbypressurebeforetheyaredrilled.
Heatingorhammeringrolledsectionsandplateswillnotbepermitted.

O.TEMPLATES

Thetemplatesthroughouttheworkshallbemildsteel.Incaseswhereactualmembershavebeenusedastemplatesfordrilling similarpieces,theengineerwilldecidewhethertheyarefittobeusedinthefinishedstructure.

P.HOLES

Allholesinthesteelworkshallbedrilledoutandnotpunched.Wheneverholesaredrilledinoneoperationthroughtwoormore separatepartsthepartsshallbeseparatedafterdrillingandtheburrsremovedbygrinding.Allslottedholesshallbefinishedwithsidesoftheholesstraightandparallel.

Q.JOINTS

Nojointsshallbemadeinanyplate,barorrolledsectionsexceptwhereshownontheDrawingsordescribedinthespecification.

R.ASSEMBLING ANDMARKING

Allsteelworkshallbeinspectedinthefabricator'syardbytheEngineerandwheredirectedthesteelworkshallbeassembledto checktheaccuracyandinterchangeabilityofthework.Beforedespatchfromthefabricator'syardallsteelworkshallbecleaneddownandclearlymarkedinpaintorstencilledandstampedtofacilitatesortingatthesite.Themarkingsshallbeinconformitywiththeapprovedworkinganderectiondrawings.

S.WELDING GENERALLY

NoweldswillbepermittedinanypartofthepermanentworkexceptwhereshownordescribedontheapprovedworkingDrawings.

Allweldingofsteelshallbeexecutedinaccordancewiththeprovisionsof B.S.5135andtheworkmanshipshallbeofthehighest qualityinallrespectsthroughout.Allweldsshallbeoftheappropriatedimensions,theyshallbesound,freefromporosity,slag inclusion,undercuttingandotherdefects,andshallbeofcleanandregularappearancethroughout,andtheexecutionshallbesuchastoensurethatthepartsconnectedareproperlyalignedandpositioned,freefromdistortionandsofixedtogetherastoproduceahomogeneoussectionofthecorrectdimensions.Asmuchoftheweldingasispracticableshallbeexecutedbymeansofautomaticorsemi-automaticprocessesandmanualweldingshallbekepttoaminimum.

Allwelderssshallhavecompletedthetestsdescribedinpart6orB.S.449andmayberequiredtocarryoutanyofthosetestsinthepresenceoftheEngineer.

T.ELECTRODES

Allcoveredelectrodesforthemanualmetalareweldingofgradesofsteelto B.S4360shallcomplywiththerequirementsofB.S639andB.S.1719:part1.Allelectrodewiresandfluxesforthesubmergedarcweldingofgradesofsteelto B.S.4360shallcomplywiththerequirementsofB.S4164.

Allelectrodesshallbeofatype,sizeandqualityappropriatetotheclassofworkforwhichtheyareintendedandshallbesuppliedbyapprovedmanufacturersandshallbeoftheheaviestgaugeconsistentwithobtainingadequatepenetration.Eachbatchof electrodesshallbeaccompaniedbythemanufacturer'scertificatesstatingthedateofmanufacture,togetherwithcertificatesgivingtheresultsoftheinitialtestandofthemostrecentperiodicchecktests.

Allelectrodesshallbestoredintheiroriginalunbrokenbundlesorpackagesinawarmdryandwellventilatedplacetowhichthe Engineershallhaveaccess.

Allelectrodesforweldingshallbeusedstrictlyinaccordancewithmanufacturer'sinstructionsandshallbesochosenthatthepropertiesofthedepositedmetalareinnowayinferiortothoseoftheparentmetal.Undernocircumstancesshallelectrodesbeusedinadampconditionandanyelectrodeswhichhavepartsofthefluxcoveringbrokenawayordamagedinanyrespect whatsoevershallbediscarded.

U.WELDING TRIALS

WheneversodirectedbytheEngineerandpriortothecommencementoffabrication,weldingandflamecuttingproceduretrials shallbecarriedoutontypicalexamplesofthevarioustypesandcategoriesofweldedmembersandjoints usingrepresentative samplesofthematerialstobeemployedinthework.Thesetrialsshalldemonstratetothesatisfaction oftheEngineerthesuitability andadequacyofthemethodsandproceduresto be adopted inthefabrication.

ThesamplesofmaterialtobeusedintheaforesaidtrialsshallbeselectedandmarkedbytheEngineerwh

enthematerialsare
inspectedattherollingmillsandthevarioustypesandcategoriesofmembersandjointsshallbeweld
edinamannersimulatingthemostunfavourableconditionsthatwillbeexperiencedduringfabrication
orassembly.After
completionofweldingthevariousexamplesshallbesectionedforsubsequentexaminationandtest
ing.

AnyapprovalbytheEngineeroftheweldingmethodsandproceduresshallinnowaylimitorrestrictther
ightandauthorityofthe
Engineertosubsequentlyrejectanyweldsorweldedjointsthatinhisopinionfallbelowthestandardapp
ropriatetotheclassof work.

V.WELD TESTING

Thecontractor,hissubcontractorand/orhisfabricatorshallberesponsibleforthepreparationofallwel
dedtestpiecesasand
whenrequiredbytheEngineerandfortheprovision,maintenanceandefficiencyofallapparatusan
dequipmentnecessarytotheconductingofsuchtestsinaccordancewiththeprocedurelaiddownin
B.S.709.

Non-
destructivetestingofweldsoncompletedmemberandjointsshallbecarriedoutbytheEngineerduringt
hecourseof
fabricationasrequiredandanylengthofweldoranyweldedjointsexhibitinganydefectsshallberej
ectedandallsuchdefectsshallbecutoutandreplacedwithsoundwork.Theentirecostofmakinggood
orreplacinganysuchrejectionshallbebornebythecontractor.

Thecontractor,hissub-
contractorand/orhisfabricator,shallberesponsibleforallpreparationsnecessaryforthecarryingouto
f non-
destructivetestingofweldsoncompletedmembersandcompletedmembersandjointstothesatisfa
ctionoftheEngineerandshallprovideallassistancerequiredforconductingsuchtests
.**W.WELDING PLANT**

Allplantusedforshopandsiteweldingshallbecapableofmaintainingatthefusionfacethevoltageandc
urrentspecifiedbythemanufactureroftheelectrodesandthecontractor,hissub-
contractorand/orhisfabricatorshallprovidethenecessaryinstrumentsformeasuringthevoltagea
ndcurrentasandwhenrequiredbytheengineer.

X.BOLTS

BlackboltsandnutsshallbeinaccordancewithB.S.4190andshallhavetheirbearingfacesmachine
d.ClosetoleranceboltsandnutsshallbeinaccordancewithB.S3692andshallhavetheirbearingfac
esmachined,beturnedontheshankandshallbescrewedwithunifiedcoarsethreadstoB.S.1580.Flat
andtapersteelwashersshallbeinaccordancewithB.S4320.Washersshallbe
providedunderthenutsofallblackboltsandclosetoleranceboltssothatthenut,whenscreweduptight,d
oesnotbearonthe shankofthe bolt.

Taperwashersofcorrectangleoftapershallbeprovidedunderallbolt-
headsandnutsthatarerequiredtobearonbevelledsurfaces.

Y.HIGH STRENGTH FRICTIONGRIP BOLTS

Highstrengthfrictiongrip(H.S.F.)bolts,nutsandwashersshallbeofeitherhighstrengthloadindicatin
gboltsandnutsofan
approvedpatternorshallbeprovidedwithloadindicatorsofanapprovedpatternundertheheadsofthe
bolts.Thedimensio nof
highstrengthfrictiongripboltsandnutsshallbeinaccordancewithB.S.4395exceptonlyforthedim
ensionsoftheloadindicatingwashersshallbesuppliedbymanufacturersapprovedbytheEngineer
.

Nonloadindicatingboltsorwashersmaybeusedwithpriorapprovaloftheengineer.Thepart-

turnmethodoftighteningshallbeusedwiththesebolts.

Allboltsshallhavecleardistinctivemarkstoidentifythem.Theboltsandwashersshallbeelectro-zincplatedorzinccoated sheradizingandthenutscadmiumplatedbythemanufacturertoensurethatthenutsdonotceaseunder tension.

USE OF HIGH STRENGTH FRICTIONGRIP BOLTS

TheuseofhighStrengthfrictionGripBolts shallbeinaccordancewithB.S.4604.

A.SURFACES

Surfacesofplatesinjointsshallbefreeofpaintoranyotherappliedfinish(exceptgalvanising),oil,dirt,rust,loosescale,burrsor otherdefectswhichwouldpreventsolidseatingofthepartsorwouldinterferewiththedevelopment offrictionbetweenthem.

B.MINIMUM PLY THICKNESS

GeneralGradeBolts-
nooouterply,andwhereverpossiblenoinnerply,shallbesmallerinthicknessthanhalftheboltdiameter10mmwhicheveristheless.

HighGrade Bolts - no outer ply, and wherever possible no innerply, shallbelessthan 10mm.

C.SPACING OF BOLTS

ThisshallbeasshownontheDrawingsorotherwiseinaccordancewithB.S.449.Thetooltobeusedfortighteningshouldbetakenintoaccountwhenarrangingthedispositionofboltsinajoint.

D.ASSEMBLY OF JOINT

Holesshallbelinedupwithdraftpinsuntilboltsintheremainingholesarefullytightened.Drivingofboltswillnotbepermitted.Theendsoftheboltsandnutsshallbeclearandlightlylubricated.Nolubricantshallcomeintocontactwiththeplyfaces.Eachboltandnutshallhaveaflatroundwasherandtaperwasherasnecessary.Loadindicatingwashersshallbefittedwiththeprotrusions againstthebolthead oragainstaspecialnutfacewasherwhenfittedatthenutend.

E.TIGHTENING

TighteningshallbeinastaggeredpatternagreedwiththeEngineerbeforehand,workingfromthecentreofjointoutwards.Each bolttighteningoperationshallbecarriedoutspeedilyuntiltherequiredgapundertheloadindicatingwasherisreached.Thisshallbemeasuredusingafeelergauge.

Appropriateallowanceshallbemadeinthegapforthelocationoftheindicatingwasherrelativetothebolt.Tighteningmaybe carriedoutusingmanualorpowerwrenchesbutnottorquewrenchesandmustbecarriedoutuntilthebolt reachestheminimum specifiedtension.

Fulldetailsmustbeobtainedfromthemanufacturerregardingdetailsoftheinstallation,tightening anduseofloadindicatingwasher toconfirmthecorrecttensionhasbeendevelopedinthebolts.

F.BOLT FAILURE

Ifafterfinaltighteninganutorboltisslackenedoffforanyreason,orbecomesslack,thenut,boltandwasher mustbed iscarded andnotusedagain.

G.PAINTING

Thegapundertheloadindicatingdeviceshallbefilledwithpaint.

H.PART TURN TIGHTENING

Incertaincircumstancesthepartturnmethodmaybepermitted.Thesequence tightenin boltsinagroupshallbeagreedbeforehandwiththeEngineer.Theboltsshallbetightenedinitiallywit hastandardpodgerspannertobringthejointsurfacesintoclose
contact.Thismustbecheckedbeforethetighteningprocessiscompleted.

Apermanentmarkshallbecutonthenutandprotrudingendoftheboltusingacoldchiselandthenutfinall ytightenedwithan
impactwrenchtoturnitrelativetotheboltandspecifiedamounttoproducetherequiredminimumte nsion.

I.SHOULDERED BOLTS ANDNUTS

ShoulderedboltsandnutsshallbeblackboltsandnutsinaccordancewithB.S.2078andshallbescrewed withunifiedcoarse
threadstoB.S.1580andshallbeofthedimensionsshownontheDrawings.Shoulderedboltsshallbepr ovidedatallexpansion andotherslidingjointsandshallbesuppliedwithallnecessarywashers.

J.ANCHOR BOLTS ANDNUTS

AnchorboltsandnutsforsettinginconcreteshallbeasshownontheDrawingsorasapprovedbytheE ngineerandshallbefixedinaccordancewiththemanufacturer'stechnicalinformationsheetsgivingf ullparticularsoftheboltsincludingthemechanical
propertiesofthebolts,thesafeworkingloadsandmethodsoffixingandusage.

K.PACKING FOR SHIPMENT

Allcleats,gussets,stiffeners,bracketsandotherprojectingmaterialarisingoutoffabricationshallb eprotectedfromdamagewhilebeingtransportedinsuchamannerastopreventdistortion.Allmachine surfacesshallbesuitablyprotected.Allstraightbars,
exceptsmallpieces,shallbeshippedinbundlesofconvenientsizeandshallbetemporarilyboltedto getherorboundwithannealedsteelwire.

Allbolts,nuts,washers,screws,smallpiecesandothersmallarticlesshallbeadequatelypackedincrate orothersuitable
containers.Eachpiece,packing,bundleandcrateshallbeclearlymarkedwithitsweightandwiththe appropriateshippingmarksbeforedespatchfromthefabricator'syard.

L.ERECTION OFSTRUCTURAL STEELWORK

Theerectionofallstructuralsteelworkatthesiteshallbeinaccordancewiththeprovisionof B.S.449.W henliftingandfitting
steelworkintopositioncareshallbetakenthatthemembersarenottwisted,bentordamaged.

Suitableslings,blocks,tackles,shearlegs,derrick,cranesandothertypesofliftingappliancesa ndequipmentshallbeprovidedand
everycareandprecautionshallbetakentoensurethesafetyofallpersonsengagedinsuchwork.

Theerectionofthesteelworkshallbecarriedoutinsuchamannerasnottosubjectanyofthememberstoo verstressing,or
reversalofloading,whichthemembersarenotdesignedtosupport.Duringerectionthesteelworkshall besecurelybraced,
proppedorotherwisetemporarilysupporteduntilsuchtimeasthesteelworkislined,levelledandbrace dandboltedinitsfinal position.

M.BEDDING OF BASEPLATES

Steelstanchionswithbaseplatesshallbesupportedonsteelshimsorwedgestoobtainthecorrectline andlevelofthestanchionsandtheholdingdownboltstightenedbyhand.Priortobeddingthebasepl ates,thespaceundertheplatesshallbecleanedout.

Thebaseplatesshallbebeddedusingcement/sand1:2mortarwithsufficientwatertomakethemortarflowunderpressureorbyvibrationorbyroddinguntilthewholespaceunderthebaseiscompletelyfilled.Thesteelshimsorwedgesshallbeleftin.Afterhardeningofthemortartheholdingdownboltsshallbetightenedbyspannerasrequired.

N.CONCRETING IN OF MEMBERS

Whereanyportionofasteelmemberisdesignedtobecastintoconcrete,thesurfacesincontactwithconcreteshallbethoroughlycleanedofpaintorotheradherentmatter.
Whenmembersaretobeconcretein,whethersuppliedwithtemporarypositioningboltsorotherwise,theyshallbelinedand levelledandplumbedandfirmlysupportedbeforeconcretingin.

Ifbaseplatesareshownonthedrawings,theseshallbegroutedinasabovepriorto

concreting.

P.NAILS, SCREWS ANDBOLTS

Nails,screwsandboltsshallbeofbestqualitymildsteeloflengthsandweightsapprovedbytheArchitect.Nailsshallbeto B.S.1202andboltstoB.S.916.

Boltsshallprojectatleasttwothreadsthroughnutsandallboltspassingthroughtimbershallhavewashersunderheadsandnuts.

Q.FIXING METAL WINDOWS, DOORS, ETC

Thecontractor'spricesforfixingmetalwindows,doors,etc.,shallincludeforassemblingandfixing,including screwingtowood
framesandcuttingmorticesforlugsinconcreteorwallingandrunningwithcementmortar(1:4),beddingframesinsimilarmortarandpointinginmastic,beddingsills,transomes,mullionsinmastic,making goodplasteraroundbothsides,andfixing,oilingandadjustingallfittingsandframes.

R.METAL WINDOWS

Metalwindowsshallbesteelstandardsectionwindowssuppliedandinstalledbythecontractororanapprovedspecialist,sub-contractor.Inthecaseofaspecialistsub-
contractor,thecontractorshallprovideanygeneralorspecialattendanceasmaybe
requiredbythesub-contractor.

PARTNINE

FINISHES SPECIFICATIONS

GENERAL

A.OTHER SPECIFICATIONS

Allotherspecificationsofthiscontractwhereapplicableareedeemedtoapplyequallytothefinishin gsspecifications.

BSAMPLES

Thecontractorshallprepareathisowncostsampleareasofthepaving,plasteringandrenderingasdirect eduntilthequality,
textureandfinishrequiredisobtainedandapprovedbytheArchitectafterwhichallworkexecuteds hallconformwiththerespectiveapprovedsamples.

CFINISHED THICKNESSES

Thethicknessesoffloorfinishesquotedinthissectionofthespecificationshallbetheminimumrequ irements.

Suspendedfloorsshallhaveaconstantstructuralthicknessandhaveleveltopsurfaces.Thefinished floorsurfacewillequallyhaveconstantlevelandanyadjustmentneededtoachievethiseffectwitht hevaryingfloorfinishmaterialsistobemadeinthescreedsbeneaththe same.

Slabsbearingonthegroundmaybecasttovaryinglevels,andbeofconstantthicknesswithvaryingform ationlevels,orhave
varyingthicknessesattheoptionofthecontractor.Thisstipulationinnowayrelievesthecontractorofth erequirementsofthe specificationsforthestructuralwork.

DMATERIALS GENERALLY

Allmaterialsshallbeofhighquality,obtainedfrommanufacturer'stobeapprovedbytheArchitect. Cement,sandandwatershallbeasdescribedunderconcreteworkandBlockwork.

EBONDING

Bondingcompounds,etc.,foruseinapplyingplasterandsimilarfinishesdirecttosurfaceswithoutt heuseofbackingsorscreedsareonlytobeusedifapprovedbythearchitectandaretobeusedstrictlyi naccordancewiththemanufacturer'sprintedinstructions.

F.CHASES, OPENINGS ANDHOLES

Allchases,holesandthelikewhichwerenotformedintheconcreteorwallingshallbecut,andallserv icepipesshallbefixedandallholesandchasesfilledwithmortarbeforepavingandplasterworkiscom menced.Innocircumstanceswillthecontractorbe
permittedtocutchases,holesandthelikeinfinishespavingsorplasterwork..

INSITU FINISHINGS

GGENERALLY

Thetermplasteringreferstotheoperationinternallyandrenderingtothesameoperationexternallybutf oreaseofreferencethe
termplasteringhasgenerallybeenusedinthisspecificationtodescribebothoperations.

HMIXES

Themethodsofmeasuringandmixingplastershallbeaslaiddownunderconcreteworkandtheproporti onsandminimumthicknessoffinishedplastershallbeinaccordancewiththefollowing:-

ItemofworkMixMinimumThicknessandfinish

InternalPlaster1partcement16mmfinishtowallsand
ceilings.
¼partlimewoodfloatfinishunlessotherwise
4partssandspecified.

ExternalRender1partcement12mmfinishintwocoats
4partssand

TyroleanfinishDitto6mmfinishedthicknessintwo
coats
on10mmplasteredbacking

Toobtaingreaterplasticityasmallquantityoflimemaybeaddedtothemixesforexternalplastering attheArchitect'sdiscretionbut inanycasethisisnottoexceed¼partlimeto1 partcement.

Withregardtothelimemortarsgaugedwithcement,ofthecementtosmallquantitiesofthelime/sandmi xshallpreferablytake
placeinamechanicalmixerandmixingshallcontinueforsuchtimeaswillensureuniformdistributiono rmaterialsanduniform
colourandconsistency.Itisimportanttonotethatthequalityofwaterusedshallbecarefullycontrolled. Plastermaybemixed eitherinamechanicalmixingmachineorbyhand.

Handmixedplastershallfirstbemixedinthedrystatebeingturnedoveratleastthreetimes.Therequi redamountofwatershouldthenbeaddedandthemixagainturnedoverthreetimesoruntilsuchtimea sthemassisuniformincolourandhomogeneous.

Theplastershallbecompletelyusedwithinthirtyminutesofmixingandhardenedplastershallnotb eremixedbutremovedfromthesite.

IPREPARATIONOFSURFACESFORPLASTERETC.

Irregularitiesinthesurfacestobeplasteredorrenderedshallbefilledwithmortar,withoutlime,twe ntyfourhoursbeforeplastering
iscommenced.Jointsinblockworketc.,aretobewelrakedoutbeforeplasteringtoformagoodkey.S moothconcretesurfacestobeplasteredshallbetreatedwithanapprovedproprietarybondingagent orhackedtoprovideanadequatekeyfortheplaster.
Allsurfacestobeplasteredorrenderedshallbecleanandfreefromdust,loosemortarandalltracesof salts.Allsurfacesshallbethoroughlysprayedwithwaterandallfreewaterallowedtodisappearbef oreplasterisapplied.

Asfaraspracticalplasteringshallnotbecommenceduntilallmechanicalandelectricalservices,co nduits,pipesandfixtureshavebeeninstalled.

Beforeplasteringiscommencedalljunctionsbetweendifferingmaterialsshallbereinforced.Thisshall applywherewallsjoin
columnsandbeams,particularlywhereflushandsimilarsituationswherecracksarelikelytodevelopa ndasdirectedbythe
Architect.Thereinforcementshallconsistofastripofgalvanisedwiremesh.Expamentorequalapp roved15cmwidewhichshallbeplugged,nailedorstapledasrequiredatintervalsnotexceeding45 mmatbothedges.Thesurfacestowhichsuchmeshshallbeappliedshallbepaintedwithonecoatbitu minouspaintpriortofixingthemesh.

JAPPLICATION OF PLASTER AND RENDER

Afterpreparationofthesurfacesakeycoatofcementslurryshallbeappliedtothewettedsurfacetob eplastered.Whenthiscoatisdrytheplastercoatshallbeapplied,bymeansofatrowelbetweenscreedsl aid,ruledandplumbedasnecessary.Thiscoat
whichshallbetotherequiredthicknessshallbeallowedtobesohardandthencuredasdescribed.Surfac esaretobefinished withawoodorsteelfloattoasmoothflatsurfacefreefromallmarks.

Tyroleanfinishshallbeappliedwithanapprovedmachinetogiveafinishofeventextureandthickne ss.Thesprayedfinishshallbeappliedintwoseparatecoatsallowingtimefordryingbetweencoats.

Applicationinonecontinuousoperationtobuildupathicklayerwillnotbepermitted.Thetotalfinis hedthicknessofthetwosprayedcoatsshallbenotlessthan6mm..thesprayedfinishshallnotbeapplied untilallrepairsandmakinggoodtotheundercoatare
completed.anyplasterwhichadherestopipes,doors,windowsandthelikeshallbecarefullyremoved beforeithasset.Curing
shalltakeplaceaftertheapplicationofthesecondcoat.ThepressedfinishasdirectedbytheArchitec t.Wherecolouredtyroleanisrequiredthisshallbeobtainedbytheadditiontothemixofanyapprove dcolourpigment.

Allplasteringandrenderingshallbeexecutedinaneatworkmanlikemanner.Allfacesexceptcircul arworkshallbetrueandflatandanglesshallbestraightandlevelorplumb.Plasteringshallbeneatlyma degoodaroundpipesorfittings.Anglesshallberoundedto6mmradius.

Alltools,implements,vesselsandsurfacesshallbeatalltimeskeptscrupulouslycleanandstrictprecaut ionsshallbetakento
preventtheplasterorothermaterialsfrombeingcontaminatedbypiecesofpartiallysetmaterialwhich wouldtendtoretardor acceleratethesettingtime.

KCURING OF PLASTER

Eachcoatofplasteristobemaintainedinamoistconditionforatleastthreedaysafterithasdeveloped enoughstrengthnottobe damagedbywater.

Theyshallbesecurelyplugged,nailedorstapledasrequiredatintervalsnotexceeding450mmatbot hedges.

CANGLE BEADS

WhererequiredbytheArchitect,salientexternalanglesofplasteredwallsshallbeprotectedwithga lvanisedmildsteelanglebeads complyingwithBS1246Fig.7profileC3.

Theyshallbesecurelyplugged,nailedorstapledasrequiredatintervalsnotexceeding450mmatbot hedges.

APLASTERSTOPS

Whereshownondetails,plasterworkshallbestoppedagainst“expamet”glavanizedsteelplasterstopreference565whichshallbesecurelynailedtowallinthepositionsindicatedonthedrawings.

BCEMENT AND SAND SCREEDS

Screedshallbemixedandformedasdescribed.

CGRANOLITHIC PAVING

Thegranolithicpavingshallbelaidbyaspecialistfloorlayerandconstructedasfollows:-

CuringcompoundsifspecifiedorapprovedbytheArchitectshallbeusedinstrictaccordancewiththemanufacturer’sinstructions.

Surfacehardeningsolutionsofsodiumsilicateifpurchasedasliquidshallbeofthegradesoldforthispurpose.Fourteendaysaftercuringthesurfaceshallbesprayedwiththreecoatsofsodiumsilicatesolutionandspreadevenlywithamoporsoftbrush.

Unabsorbedsilicateleftonthesurfaceafterthelastapplicationistobewashedoff.

Solutionisto1:4byvolumeforfirstcoat,1:3forsecond,1:2forthird,appliedat24hourintervals.

Thebaseconcretestructuralfloorshallbefinishedwithatampedsurface.Shortlybeforethegranolithictoppingistobelaidthe
surfaceofthebaseconcreteistobethoroughlypreparedtoprovideagoodbond.Thebaseconcreteshallbehackedbyhandormechanicallysothatitslaitanceiscompletelyremovedtoexposecleancoarseaggregate.Alltracesofdustformedasaresultof
hackingetc.,shallberemoved.Thebaseconcreteshallbethoroughlywettedpriortolaying.Anyexcesswatershallberemovedpriortothegrouting.

Thepreparedsurfaceofthebaseconcreteshallbecoveredwithagroutconsistingofonepartcementandonepartsandmixedtotheconsistencyofthickcreamanditshallbescrubbedintothesurfacewithastiffbroom.

Thegranolithictoppingshallbemixedinthefollowingproportionsbyweight:-

1partcement,1partfineaggregateand2partscoarseaggregate.

Thewatercontentofthegranolithictoppingshallbekeptaslowaspossibleconsistentwithobtainingfullcompactionofthetoppingiththeplantavailableinordertoavoidsegregationofexcessivelaitanceandinnocircumstancesmustwater/cementratioexceed0.42byweight.

Thegranolithictoppingshallbemixedforaperiodofnotlessthan11/2minutesafterallthematerialshavebeenplacedinthemixerdrum.Noconcreteshallberemovedfromthedrumsothatsomewaterwillenterthedrumbeforethecementandaggregates.

Eachbatchshallbedischargedcompletelybeforethenextbatchisintroduced.Noextrawaterorothermaterialshallbeaddedto themixafterithasleftthemixer.

Ifelectricalconduit,trunkingoranyotheritemsarerequiredtobeburiedwithinthegranolithictoppingandthethicknessisreducedatanypointthecontractoristoensurethatstepsaretakentoeliminatethepossibilityofcrackinginthegranolithictoppingbymeans
ofgalvanisedwiremeshreinforcementintheflooringorotherapprovedmethod.Theextentofburiedconduits,etc.,shouldbe
ascertainedpriortotenderingandallowanceforcomplyingwiththisrequirementwillbedeemedtobeincludedintheratesforgranolithicflooring.

Thegranolithictopingshallbelaidinareasnotexceeding14M2.Thelengthofanybayshouldnotexceed1½timesthewidthof
thatbay.Jointsshallbemadeinthegranolithictoppingoveralljointsinthebaseconcreteandoverallsupportingbeamsforsuspendedfloors.

D INSITU TERRAZZO WORK

Theterrazzopavingsandscreedsunderaretobelaidandpolishedcompletebyanapprovedspecialistfirm.

Wherethescreedistobebondedtotheconcretestructuralsub-floor,thelattershallbefinishedwithatampedsurfaceandleft cleanandfreefromdustandgrease.

Beforelayingthescreedthesurfaceshallbecoveredwithagroutofonepartsandandonepartcement brushedinwithstiffbroom.
Thescreedistobelaidbeforethegrouthasset.

Allscreedsunderin-situandprecastterrazzopavingaretobelaidbytheapprovedspecialistfirm.Thescreedsshallconsistofonepartordinary Portlandcementtothreepartssharpwashedsand.Thismixmaybevariedbyagreementontheresponsibilityoftheapprovedspecialistfirm.

Thescreedistobereinforcedwith22gaugegalvanisedsteelwirenettingwithmeshnotexceeding1” laiddirectonthesub-floorofbaysexceeding1squaremetre.

Thescreedbackingin-situskirtingsistobesuchastoadherefirmlytothevariousmaterialsofthewalls.

Thethicknessofin-situterrazzofinishesareminimalandtheymaybeincreasedifthespecialistconsidersitnecessarywith correspondingreductionstothescreedthicknessesprovidingtheoverallthicknessofthefinishedfl ooringismaintainedandwithout
adjustmenttothepricequoted.Thefollowingthicknessesareassumedinmeasuringtheterrazzo:-

	Finish	Bedding	Screed	Total
In-situpaving	25-			40
In-situmargins	25-			40
In-situskirtings	8-			12

Ifelectricalconduit,trunkingorotheritemsarerequiredtobeburiedwithinthedepthofthescreedandflooringandthetotal
thicknessisreducedatanypointtheflooringspecialististoensurethatstepsaretakentoeliminatethepossibilityofcrackinginthe
screedandconsequentdamagetofloorfinishbymeansofgalvanisedwiremeshreinforcementinthescreedandflooringorotherapprovedmethod.Theextentofburiedconduit,etc.,shouldbeascertainedpriortotenderingandallowanceforcomplyingwiththisrequirementwillbedeemedtobeincludedintheratesforterrazzopavingsandscreedsunder.

Thein-situterrazzopavingistoconsistoftwopartsofwhitemarblechippingstoonepartofwhitePortlandCementtoB.S.1014.
Themarblechippingstobefine(graded3mmto6mminequalproportions)roundedglanularcleanandfreefromdustand impurities.

In-situterrazzopavingshouldbelaidonthescreedassoonaspracticableandnotmorethanthreedaysaftert helayingofthe screed.Afterlayingthesurfacesaretobekeptmoistuntilreadyforpolishing.

Thein-situterrazzopavingshouldbelaidinpanelsseparatedbydividingstripsinthepositionsshownonthedrawings.Dividingstripsaretobewhiteplasticthefulldepthofthepavingandscreedandbeddedintothescreedwiththetipedgestrulylevelledwiththefinishpolishedfloorlevel.Thethicknessofthedividingstripsistobe5mm.

Polishingofin-
situterrazzopavingistobecarriedoutbyamechanicalpolisherwithgradedabrasivesandanynecessar
ywater.

Makinggoodofanydefectsduringpolishingistobedonewithcementgroutmatchingincolourthat
usedintheterrazzopaving.

Thefinishofin-
situterrazzopavingsistobesmoothandimperforableandistobeapprovedbytheArchitect.

Theterrazzopavingsistobewashedcleanoncompletionandcoveredwithathickbedofsawdustorothe
rapprovedprotective
layer.Thisshouldbemaintainedandrenewedasnecessaryandclearedawayoncompletion.

Layin-
situskirtingstomatchpavingorofapprovedcolourandfinishcovedatjunctionwithpavingoffloorfinis
hto20mmradius.
Executeallrequiredanglesandstoppedorfairreturnedends.

Verticaldividingstripstomatchthoseusedinpavingarerequiredatnotmorethanthreefeetintervals.A
divingstripisrequiredbetweenpavingandskirtingatthecommencementofthecoving.

Facingofdivingstripnearesttowalltobe200mmfromfaceofskirting.

Ahorizontaldivingstripisrequiredattopskirtingfinishedflushwithwallfinishover.

Wherein-
situterrazzoskirtingsarerequiredunderdoorframes,etc.,apencilroundjunctionistobemadethres
holdpavinginlieuofcovingasshownondrawings.

In-
situmarginsshallhavedividingstripstomatchthoseusedinpavings.Theyshallbepositionedatjunctio
nswithpavingand
skirtingandtransverselyatnotmorethanthreefeetintervalstocontinueverticalstripinskirting.

Allinternalanglesandcovesaretoberubbedbyhandwithcarborundumblocktobepolishedfinishmatc
hingthefinishofthepavingtotheArchitect'sapproval.

EGLAZED WALL TILES

GlazedwalltilesshallbeinaccordancewithB.S1281andshallbe150mmx150mmx6mmtilesfromthe
standardcolourrange withcusionedges.WalltilingshallbecarriedoutinaccordancewithC.
P.212.

FPRECAST CONCRETE PAVING SLAB

TobeallinaccordancewithB.S.368.Theslabsaretobeofthesizesgivenhereinandbedded,jointeda
ndpointedincementlimemortar.(1:2:9).

GRATES

Theratesfortile,slabandblockfinishingsshallincludeforroundededgetilesandangles,cuttingan
dfittinguptoboundariesandaroundpipes,brackets,etc.,andwaste;forworkinnarrowwidths,smal
landisolatedareasandforallotherincidentallabours.

PARTTEN

GLAZING

AGENERAL

Glassusedinglazingandformirrorsshallbebestqualityclearglassfreefromvisibledefectssoastoa fforduninterruptedvisionorreflectionasappropriate,andwithoutobviousdistortion.

BSTANDARDS

Glassforglazingandmirrorsshallbeofapprovedmanufactureandistocomplywith B.S.952inallrespe ctsfreefromflaws, bubbles,specksandotherimperfections.

CCLEAR SHEET GLASS ETC.

Theclearsheetglassshallbeordinaryglazing(OG)quality.

DPLATE GLASS

TobeoftypedescribedandasapprovedbytheArchitect.

EOBSCURED GLASS

TobeoftypedescribedandasapprovedbytheArchitect.

IPutty

(a)Theputtyforglazingtowoodsashesistobelinseedoilputtyallas B.S.544.

(b)Theputtyforglazingtometalwindowsistobegoldsizemetal windowputtyspeciallydesignedfortropicaluse,orpatentmasticputtyifapprovedbytheArchitect .

(c)Allputtyshallbedeliveredonsiteintheoriginalmanufacturer'ssealedcansordrumsanduseddir ecttherefrom,withthe additiononlyofpurelinseedoilifnecessary.Nomineralorotheroilsmaybeusedintheputtyexceptg enuinelinseedoil.

AMIRRORS

Mirrorsshallbepolishedfloatglasssilverinquality,protectedatbackwithelectro- copperbackingcoatedwithshellacvarnishand paint.Themirrorsaretobefixedwithchromiumplateddomeheadedmirrorscrewswithplasticorrubbe rdistancepiecesand washersunlessotherwisestatedandratesshallincludeforthis.

WORKMANSHIP

BGENERAL

Glazingofalltypesandinalllocationsshallbecarefullyexecutedbyartisansskilledinthistypeofworka ndinconformancewith recommendationsofC.P.152.Glazingshallbecarefullyfittedsothatitisnotsubjecttopressureandstr essimposedbybeingan overtightfitwithintheframing.

CMEASUREMENTS

Eachelement(door,windowetc.)toreceiveglassshallbeaccuratelymeasuredtoensureaperfectfit subsequently.

DSINGLE GLAZING

Singleglazingshallbeexecutedwithglassofthevarioustypesdescribedherein.Ordinary(non–safety)glassmaybepre-cutor cuton site.

EWIRED GLASS

Wiredglassshallbecutsothatthewiresembeddedaretrulyverticalandhorizontal(i.eatrightangles tothecutedges).

FSAFETY GLASS

Safetyglassshallbefactorycutbeforedeliveryto site.Sitecuttingwillnotbepermitted.

GSTORAGE AND HANDLING

Glassshallbedeliveredtositeinstoutcontainersandclearlymarked.Thecontainersshallincorporateslingattachment pointsfor liftingbridles.Glassshallbestoredundercoversothatthepanesaretrulyvertical.

HPROTECTION

Afterfixingglassshallbeboldlymarkedwithpaperorwhitewashsothatitisclearlyvisible.Inpositions wheredamagedueto constructiontrafficoractivityislikelytooccurstoutscreenscomposedofhardboardorfibreboardonbattensshallbearrangedto protecttheglass.

ADAMAGE

ShouldanyglassdeliveredtositebefoundtobedamageditshallnotbeincorporatedintotheworkswithouttheexpresspermissionoftheArchitect.Shouldglazinginstalledbedamagedforanyreasonitshallberemovedandreplacedfreeofchargetothe satisfactionoftheArchitect.ShouldanyadjacentworksbedamagedthisshallequallybereinstatedfreeofchargetothesatisfactionoftheArchitect.

BDEFECTWORK

Allglassshallbecheckedbeforeinstallationtoensurethatdefectiveglassisnotinstalled.Notwithstandingthis,ifintheopinionof theArchitect,anyinstalledglazingisdefectiveitshallberemovedandreplacedfreeofchargetothesatisfactionoftheArchitect.

CGLAZINGTOWOOD

Glazingshallbesecuredtowoodframingwithhardwoodbeads.Edgesshallbewrappedinwashleather sothatthewashleatherfinishesjustbelowthesurfaceofthebead.Noadhesivesshallbeused.

DGLAZING TO METAL

Glazingshallbesecuredtometal framingwithclipinbutylrubbergaskets.

EGLASS THICKNESS

Glassthicknessshallconformtotherecommendationsof C.P.152andthemanufacturer'srecommendationsforsizesofpanes relativetothepositioninthebuildingandtheeffectsofwindpressure(bothnegativeandpositive).

PARTELEVEN

SPECIFICATIONSPAINTING&DECORATING

PAINTINGANDDECORATING

MATERIALS

AMANUFACTURERS

Exceptwherestatedallmaterialsshallbeobtainedfromapprovedmanufacturers.Thecontractorsh
allstatethenameandaddressofthemanufacturerwhosematerialsheproposestouse.Onceapproval
hasbeengiventhecontractorshallnotobtainmaterials
fromothersourceswithoutthepriorwrittenagreementoftheArchitect.

BGENERAL

Eachsucceedingcoatofpriming,undercoatingandfinishing(pigment)orclearcoatingshallbesuff
icientlydifferentincolourastobereadilydistinguishable.

Allprimersandpaintsinonesystemuponaparticularsurfaceshallbeobtainedfromthesamemanuf
acturer.

Themixingofpaints,etc,ofdifferencebrandsbeforeorduringapplicationwillnotbepermitted.

CEMULSION PAINTS

Emulsionpaintsshallbematttosatinfinishvinylemulsionpaint.Thefirst(mist)coatshallbethinnedina
ccordancewiththe manufacturer'sinstructions.

DGLOSS PAINT

Glosspaintshallbehardglossfinishoilpaint.

ELEAD BASEDPAINT

Theuseofleadbasedpaintswillnotbepermitted.

FCLEAR FINISHES

Clearfinishesinternallyshallbeclearpolyurethanevarnish(onepack).

GPRIMERS AND UNDERCOATS

Unlessotherwisespecified,primersandundercoatsshallbethetyperecommendedbythemanufacture
ofthefinishingcoats
specifiedforaparticularsurface.Primerforexternalbaremetalworksurfacesshallcomplywith B.
S2523.

HKNOTTING

ShellacknottingshallcomplywithB.S1336

AWHITE SPIRIT

ThewhitespiritshallcomplywithB.S. 245.

BTIMBER STAIN

Timberstainshallbeoilbasedpigmentedstain.Theapplicationofthismaterialsshallbestrictlyinaccordancewiththemanufacturerswritteninstructions.Tintanddegreeofapplicationshallbetotheapprovaloftheархitect.

CSTOPPING

Thestoppingshallbeasfollows:-

(a)plasterworkshallbeplasterbasedfiller.
(b)Concreteandbrickworkshallbesimilarmaterialtothebackgroundand

finished
inasimilartexture.
(c)Internalwoodwork,plywoodandblockboardshallbeputtycomplyingwith
B.S.544.

(d)ExternalwoodworkshallbewhiteleadpastecomplyingwithB.S2029.

(e)Internalclearwoodfinishes:thestoppingshallbethatrecommendedbytheclear
lacquermanufacturer.

DFILLERS

Thefillersforinternaljoineryshallbethetyperecommendedbythepaintmanufacturerforusewithhistypeofpaintorlacquer.

Stopperandfillersshallbetintedtomatchtheundercoat,andshallbecompatiblewithbothundercoatsandprimers.

Allmaterialsshallbeusedstrictlyinaccordancewithmanufacturer'sinstructions.

ETEXTURED COATING

Texturedcoatingistobeofproprietarymanufactureapprovedbythearchitectandofanapprovedcolour.

TechnicalinformationconcerningthecoatingistobesubmittedtotheArchitectbeforeordering,butheminimumqualitiesofthecoatingaretoasfollows:-

(a)Suitableforapplicationinternallyandexternally,plastered,rendered,concrete,blockstone,brick,asbestosandtimber surfaces.

(b)Minimumdurabilityof10yearseveninexposedconditions

(c)Maintenancefree

(d)Built-inmouldresistantfungicide.

WORKMANSHIP

AGENERAL

Workmanshipgenerallyshallbecarriedoutinaccordancewith B.S.C.P231,unlessotherwisespecified.Beforepaintingis commencedfloorsshallbesweptandwashedover;surfacestobepaintedshallbecleanedbeforeapplyingpaintasspecified,andallprecautionstakentokeepdowndustwhilstworkisinprogress.Nopaintshallbeappliedto surfacesstructurallyorsuperficiallydampandallsurfacesmustbeascertainedtobefreefromcondensation,efflorescence,etc.., beforetheapplicationofeachcoat.Nopaintingshallbecarriedoutexternallyduringhumid,rainy,damp,foggyorfreezing conditions,orconditionswheresurfaceshaveattainedexcessivelyhightemperaturesorduringduststorms.Nonewprimedor undercoatedwoodworkandmetalworkshallbeleftinanexposedorunsuitablesituationforanundueperiodbeforecompletingtheprocess.

Nodilutionofpaintmaterialsshallbeallowedexceptstrictlyasdetailedbythemanufacturer'sowndirection,eitherontheconta iners,ortheirliterature,andwithspecialpermissionoftheArchitect.Forexternalworkdilutionofpaintswillnotbeallowedwhatsoever.Forinternalwork,wherepermittedbytheArchitect,undercoatsmaybethinnedbytheadditionofnotmorethan5% thinners.Glossfinishshallnotbethinnedatall.

Metalfittingssuchsasironmongeryetc.,notrequiredtobepaintedshallfirstbefittedandthenremoved beforethepreparatory processesarecommenced.Whenallpainingiscompletedthefittingsshallbecleanedasnecessaryandrefixedinposition.

BBRUSHWORK

Unlessotherwisespecified,allprimersandpaintsshallbebrushapplied.Writtenpermissionmustbeobtainedfromthe Architect'sifanalternativemethodofapplicationistobeused.

CSTOPPING AND FILLING

Unlessotherwisespecifiedbythemanufacturerallprimersandundercoatsshallbestoppedflushandrubbeddowntoasmooth surfacewithanabrasivepaperandalldustremovedbeforeeachsucceedingcoatisapplied.Careshallbetakentoprevent burnishingofthesurface.

DSTIRRING

Unlessotherwisespecifiedbythepaintmanufacturerallpaintmaterialsshallbethoroughlymixedand/orstirredbeforeandduringuse,andsuitablystrainedasandwhennecessary.

EINSPECTION

Noprimingcoatsshallbeappliedtilthesurfaceshavebeeninspectedandthepreparatoryworkhasbeenapprovedbythe Architect.Noundercoatsoffinishingcoatsshallbeappliedtilthepreviouscoathasbeensimilarlyinspectedandapproved.

A.PAINT APPLICATION

Eachcoatofpaintshallbesoappliedastoproduceafilmofuniformthickness.Allpaintshallbeappliedinaccordancewiththemanufacturer'sinstructions.Specialattentionshallbegiventoensurethatallsurfacesincludingedges,corners,crevices,welds andrivetsreceiveafilmthicknessequivalenttothatofadjacentpaintedsurfaces.

BDRYING

Allcoatsshallbethoroughlydriedbeforesucceedingcoatsareapplied.Allowaminimumof24hour

sbetweenapplicationonanyonesurface,unlessotherwisespecifiedbythemanufacturer.

CUPRIMED WOODWORKS

Unprimedwoodworkscheduledtobepaintedshallberubbeddownwithabrasivepaperanddustedoff. Careshallbetakento prevent'burnishing'ofthesurface.Allknotsandresinousareasshallbecoatedwithtwocoatsofknotting.Pitchonlarge,open unseasonedknotsandallotherbeadsorstreaksofpitchshallbescrappedoff,orifstillsoft,shallberemovedwithwhitespirit beforeapplyingtheknotting.

Applyonecoatofprimingtoallsurface,twocoatstoallendgrain,tobesubsequentlypainted.Backsofallwoodframesincontact withconcrete,brickwork,blockwork,andmetalworkorsimilarmaterialsshallbeprimedbeforefixing.Afterprimingalljoints,holes,cracksshallbestoppedandfilled,rubbeddownanddustedoff.

DPRIMEDWOODWORK

Woodworkdeliveredprimedshallbelightlyrubbeddownwithabrasivepaper,anddustedoff.Touchupbareareaswithasimilarprimingincludingopengrainedends.Aftertouchprimingalljointsholes,cracksandopengrainedendsshallbestoppedandfilled,rubbeddownanddustedoff.

EPLYWOOD AND BLOCKBOARD

Edgesofexteriorplywoodandblockboardshallbesealedwithtwocoatsofaluminiumprimerandthebackstreatedwithalead primer.

FCLEAR FINISHED WOODWORK

Allwoodworkscheduledtoreceiveaclearfinishshallbewellsandedwiththegrainremovingalldirtetc.,togiveassmootha surfaceaspossible.Resinoustimbershallbeswabbeddownwithwhitespiritanddriedthoroughly.

Splitorendgrainshallbefilledwithsuitablefillerrecommendedbytheclearlacquermanufacturerinaccordancewiththeir instructions,andoftheappropriateshade.

GBARE METALWORK

Baremetalworkshallbethoroughlycleanedoffalldirt,grease,rustandscalebymeansofchipping,scrappingandwirebrushing;particularattentionsshouldbegiventothecleaningofwelded,brazedandsolderedjoints.Washdownwithwhitespiritandwipe drywithcleanrags.ApplyacoatofmetalprimerimmediatelythecleanedsurfaceshavebeenapprovedbytheArchitect.

AGALVANIZED METALWORK

Galvanizedmetalworkscheduledforpaintingshallbethoroughlycleanedofdirt,greasedustedandwasheddownwithwhitespiritandwipeddrywithcleanrags.Anyminorareasofrustshallberemovedbywirebrushingandspotprimedwithazincrichprimer.
Applyatleastonecoatofcalciumplumbateprimeratallsurfacessubsequentlytobepainted.

BPRIMED METALWORK

Iftheprimingcoatofpre-primedmetalworkhassuffereddamageintransit,orduringerectiononsite,theaffectedareasshallbecleanedoffbywirebrushingabradinganddustingoff,thebaredpatchestouchedupwithaprimerofasimilartypetothatalreadyapplied.

CCOPPER

Copperscheduledforpaintingshallbelightlyabradedwithemerycloth,washedwithwhitespiritandwipeddrywithcleanrags.
Applyacoatofeachprimerimmediatelythecleanedsurfaceshavebeenapproved.

DBRICKWORK, CONCRETEETC.

Allbrickwork,blockwork,concrete,renderedandplastersurfacesscheduledtobepaintedshallbebrusheddown,allholesand cracksfilled,allprojectionssuchasplasterormortarsplashesetc.,removedtoleaveasuitabledustfreesurface.Alltracesof mouldoilshallberemovedfromconcretesurfacesbyscrubbingwithwater,detergentandrinsingwithcleanwater.Allthese surfacesshallbethoroughlydrybeforeanyprimerorpaintsareapplied.Applyacoatofalkaliresistingprimerwheresurfacesaretobefinishedwithoilpaintsoralkydtypeemulsion.

Asbestoscementsurfacesscheduledforpaintingshallbebrusheddowntoremovepowderydeposits,andacoatofalkaliresistingprimerappliedwheresuchsurfacesaretobefinishedwithoilpaintsoralkyedresintypeemulsion.

ECOLOURS

Thecolourwill,beselectedbytheArchitectfromthepaintmanufacturer'sstandardcolourrange.

FTOXIC WASH

Concrete,blockwork,plasterandtimbersurfaceswhicharetobepaintedshallbewasheddownpriortopaintingwithatoxicwashappliedbybrushorspray.Asecondwashshallbeappliedtwodaysafterthefirstwash.Thesurfacesshallbethenallowedtodryoutcompletelybeforeapplicationofpaint.

GPROTECTION

Propercaremustbetakentoprotectsurfaceswhilestillwetbyuseofscreensand'wetpaint'signswherenecessary.

ADAMAGE

Caremustbetakenwhenpreparingsurfaces,orpaintingetc.,nottostainordamageotherwork.Dustsheetsandcoverstothe satisfactionoftheArchitectsshallbeusedtoprotectadjacentwork.Anysuchstainsordamageshallberemovedandmadegoodat theContractor's expense.

BCLEANLINESS

Allbrushes,tools,pails,kettlesandequipmentshallbecleanandfreefromforeignmatter.Theyshallbethoroughlycleanedafteruseandbeforebeingusedfordifferentcolours,typesofclassesofmaterial.Paintingshallnotbecarriedoutinthevicinityofotheroperationsthatmaycausedust.Wasteliquids,oilsoakedragetc.,shallberemovedfromthebuildingeachday.Wasteliquidsshallnotbethrowndownanysanitaryfittingsordrains.

CPERFORMANCE

If,whiletheworkisinprogress,thepaintappearstobefaulty,suchasconsistencyofcolour,dryingtime,orqualityoffinish,the workshallbestoppedatonceandthemanufacturerconsulted.

Themanufacturer'softhematerialsshallbegiveneveryfacilityforinspectingtheworkduringprogressinordertoascertainthatthematerialsarebeingusedinaccordancetotheirdirections,andtotakesamplesoftheirproductsfromthesiteiftheysodesirefor tests.

Thefinishingcoatsofthevariouspaintsorsurfacefinishingsshallbefreefromsags,brushmarks,runs,wrinkling,dust,bareor 'starvedpatches,variationsincolourandtexture,andotherblemishes.

Whentheworkhasbeencompleted,thefinishedsurfacesshallnotbeinferiorinquality,colourandfinishtothesamplesapprovedbytheArchitect,andimperfectionsinmanufactureshallnotbeapparentthroughthesefinishedsurfaces.

IntheeventthattheArchitectisnotsatisfiedthatthequalityoffinishdoesnotcomplywiththerequiredstandardsand/orthe

samplepanelthecontractorwillberequiredtorepaintathisownexpense,suchworktothesatisfactionof theArchitect.Ifinthe opinionoftheArchitectitisnecessarytoremovecompletelytheunsatisfactorypaintworkthisshall alsobedoneunderthedirectionoftheArchitect at the expense ofthe contractor.

DPackaging,DeliveryandStorage

Allpaintsandsurfacecoatingsshallbedeliveredinsoundsealedcontainers,labelledclearlybytheman ufacturers,thelabelordecoratedcontainermuststatethefollowing:-

(a)Thetypeofproduct
(b)Thebrandnameandcolour
(c)Theuseforwhichitisintended
(d)Themanufacturer'sbatchnumber
(e)TheB.Snumberifapplicable
(f)Alllabelsshallbeprinted–containersbearingtypewrittenlabelswillnotbeacceptable

Materialsshallbestoredundercoverinaccordancewiththemanufacturer'sinstructions,andwithl ocalfireandsafetyregulations.

Thestoreitselfmustbemaintainedattemperatureofnotlessthan50degreesf(10degreesC)andmustno tbesubjectedto extremechangesoftemperature.

AVINYL EMULSION PAINT

Surfacestobepaintedshallreceiveonemistcoatfollowedbytwofullcoatsofvinylemulsio npaint.Applicationmaybebymeansof rollersorbrushes.

BGLOSS FINISH PAINT

Surfacestobepaintedshallbeprimedthenpaintedwithtwoundercoatsfollowedbyonecoatglossfi nishpaint.

CCLEAR POLYURETHANEVARNISH

Surfacetobeclearvarnishedshallbetreatedwithtwocoatspolyurethanevarnish

DTEXTURED COATING

Themanufacturer'sinstructionsconcerningapplicationofthecoatingaretobestrictlyfollowedun derthedirectionoftheArchitect.

Allsurfacestoreceivetexturedcoatingsaretobecleananddrywithsurfacesscrappedandbrushedbefor eapplicationofthecoating.

ApplicationofthecoatingistobewithtexturedrollerorfibrebrushasdirectedbytheArchitectwitha minimumspreadingcapacityof1kilogrammepersquaremetre.Undernocircumstancesisthecoat ingtobethinned.

PARTTWELVE

SPECIFICATIONS DRAINAGE

GENERAL

A.REGULATIONS ETC.

Thewholeofthedrainageistobeexecutedbyaregisteredplumberanddrainlayerinstrictaccordancewiththe Regulations of localAuthoritiesandtothesatisfactionoftheArchitect.

B.CEMENT, SAND ETC

Thedescriptionofmaterialandworkmanshipcontainedintheforegoingsectionsshallapplyequallyhereto.

MATERIALS

C.PITCH FIBRE PIPES

Allpitchfibrepipesandfittingsforexternalservicesshallbemanufacturedinaccordancewiththerequirementsof B.S2760.Pipes shallbeconnectedbymeansofpurposemadetaperedjointsmanufacturedinaccordancewithB.S2760.

D.PRECAST CONCRETE PIPES

Precastconcretepipesforsurfacewaterandsewageshallcomplywiththerequirementsof B.S.556class1.

Whereflexiblespigotandsockettypeofflexiblerebatedtypejointsarespecified,rubbergasketscomplyingwiththerequirementsof B.S2494shallbeusedexceptwhereoilproductsarelikelytobepresent,inwhichcasegasketsshallcomplywiththe requirements of B.S3514.

Whereordinaryspigotandsockettypeordinaryrebatedtypejointsarespecified,thejointsshallbemadewithacementmortarmix.

Porousconcretepipesshallcomplywiththerequirements of B.S1194.

EASBESTORS CEMENT PIPES

Asbestoscementsewerage pipesandfittingsshallcomplywiththerequirements of B.S3656withasbestoscementsleevejoints withrubberringscomplyingwiththerequirement of B.S2494classC.

F.CAST IRONPIPES

Castirondrainpipesforbuildingdrainageshallcomplywiththerequirements of B.S437.Fittingsforcastironpipesshallcomplywiththerequirements of B.S78orB.S2035.Pipesandfittingswillbecoatedinternallyandexternallywithanapprovedbituminouscomposition,exceptthosepartstobeencasedinconcretewhichshallbecoatedinternallyonlyintheconcretearea.

ACLAY PIPES

Claypipesandfittingsforsewerageorsurfacewatershallcomplywiththerequirementsof B.S65andB. S540withType1 socketsandsuppliedcompletewiththemanufacturer'sflexiblejoint.

Claypipesforuseintheconstructionoffrenchdrainsshallbe Britishsurfacewaterpipesglazedorunglazedmanufacturein accordancewithB.S65andB.S540withType2socketsorplainendedandsuppliedwithsleevecouplings.Type1socketedandsleevecoupledpipesshallbeperforated.

BP.V.C DRAINPIPES

P.V.Cdrainpipesandfittingsshallcomplywiththerequirements of B.S4660:1973.

CPRECASTCONCRETE MANHOLES

Concretemanholeringsectionsshallbeunreinforcedogeejointedcomplyingwiththerequirementsof B.S.556.Shaftand chambersslabsshallbeeithermildsteelreinforcedheavyorlightdutytype,asspecified.

DPRECAST CONCRETE OPENCHANNELS

Precastconcreteinvertandsideblocksshallbeofdenseprecastconcretefreefromcracksandspalls. Theconreteusedshallbenominal1:2:4mix.

Precastconcreteinvertandsideblocksshallbecastinsteelmoulds.Allarrisesshallbetruewelldefined.

EGULLIES

Precastconcretegulliesshallbeunreinforcedandshallcomplywiththerequirements of B.S556.

Glazedwaregulliesshallcomplywiththerequirements of B.S539.Castirongulliesshallbeofapproved manufactureandshall conformwiththedimensionsandweightspecified.

Gulleygratingsandframesshallcomplywiththerequirements of B.S497.

FMANHOLECOVERS AND FRAMES

Manholecoversandframesshallbeofcastironinaccordance withtherequirements of B.S497.

GMANHOLES LADDERS

Manholeladdersandfixingsshallbeofgalvanisedmildsteel.Thesteelshallbemildsteelgrade43in accordancewithB.S4360andshallbegalvanisedaftermanufacturerhasbeencompleted.

HMANHOLE SAFETYCHAINS

Manholesafetychainsshallbeof10mmgalvanisedmildsteelshortlinkchainandwillcomplywitht herequirements of B.S.590.
Oneendofthechainshallsecurelyattachedto16mmdiametergalvanisedmildsteeleyeboltandtheoth erendshallhavea galvanisedhookofattachingtoasimilareyebolt.

AMANHOLE STEP IRONS

ManholestepironsshallcomplywiththerequirementsofB.S1247.Forbrickorblockmanholes,stepironsshallbeofgalvanisedmalleablecastirongeneralpurposepatternwith230mmlongtailscomplyingwiththerequirementsofB.S556.

BFILTER BACKFILL MATERIAL

Filterbackfillmaterialforfieldorfrenchdrainsshallconsistofhardcleanrock,crushedslagorgravelhavingagradingwithinthelimitsgivenbelowforType'D'or'E'.Theaggregatecrushingvalueofthematerialasdeterminedbythetests inB.S8.2shallnotexceed30%.Thematerialpassing420micromsieveshallbenon-plasticwhentestedinaccordancewithB.S1377.

SieveSized	PercentagebypassingWeight Type 0	TypeE
63mm		-100
37.5mm	10085–100	
20mm		-0- 20
10mm		45-1000- 5
3.35mm	25- 80-	
600microns	8- 45	
75microns	0- 10	

WORKMANSHIP

CUNDERGROUND PIPELINES

Thecontractorshallconstructthepipelinesusingthedesignsofpipe,bed,haunchandsurrounddetailsonthedrawings.

'Rigidpipes'shallmeanpipesofcastorspunironconcrete,asbestoscement,clayorsimilarmaterials.

'Flexiblepipes'shallmeanpipesofsteelPVCorotherplastic,pitchfibre,ductileironorsimilarmaterials.

'Rigidjoints'shallmeanjointsmadebyboltingtogetherflangesintergralwiththebarrelsofthepipes,byweldingtogetherthebarrels ofthepipesbycaulkingsocketswithnon-deformablematerials,suchascementmortar,runleadorbysimilartechniques.

'Flexiblejoints'shallmeanjointsmadewithfactorymadejointingmaterials,loosecollars,rubberringsetc.,andwhichallowsome degreeofflexing,howeversmall,betweenadjacentpipes.

ATRENCH EXCAVATION

Trenchesforpipesotherthanthoseformingpartofafieldorfrenchdrainshallbeexcavatedtoasufficientdepthandwidth,subjecttothefollowingrestrictions,toenablethepipe,joints,bed,haunchandsurroundtobeaccommodated.

Fromthebottomofthetrenchtoalevel300mmabovethecrownofthepipetrenchwidthsshallnotbelessthantheminimumnorgreaterthanthemaximumfiguresshowntheTableA.

Batteringthesidesoftrenchesshallonlybepermittedabovethislevelwhereapproved.

Theminimumwidthoftrenchshallbeusedformeasurementpurposes.

TableA-pipeTrenchwidths

NominalInternaDiameter(mm)	Min.TrenchWidth(mm)	Max.TrenchWidth(mm)
100	430	630
150	500	700
200	550	750
225	580	780
300	680	880
375	950	1150
400	1000	1200
450	1030	1230
525	1120	1320
600	1240	1440
675	1330	1530
750	1400	1600
825	1490	1690
900	1920	2120
1250	2100	2300
1200	2290	2490
Above1200Outsidedia.	Of Outsidedia.	
Above1200Pipesplus800mmofpipesplus		1000 mm

Allsheetingandsupportsaretobeoutwiththeminimumwidthstated.

Thecontractorshallprovidewhateveradditionalpipeprotectionisdirectedshouldthespecifiedmaximumwidthbeexceededduetohismethodofworking.

Thecontractorshallfillupwithwellcompactedgranularbeddingmaterialwith1:2:4mixconcretewhereorderedbytheArchitect, anyexcessivedepthortrencharisingfromhismethodofworking.

Wherethetrenchformationisinginroundthat,intheopinionoftheArchitect,istoosofttoaffordprope

rsupporttothepipes,either

(i)Thetrenchshallbeexcavateddowntosolidgroundandtheextrashallberefilledwithleanmixconcrete,granularbeddingmaterial,gravelorbrokenstone,astheArchitectdirects,wellcompactedtoformevenbedor:

(ii)Thepipeshallbesupportedbyfacines,pilesorsuchothermeansastheArchitectmaydirect.

Thecontractorshallavoidundulydisturbingthefinishedtrenchformationandshallmakegooddisturbedareasandexcavatea ny
wetorpuddledmaterialwhichmightresultfromhisfailuretodoso.Voidsshallbemadegoodasthepreviousclause.

Wheredirectedtrenchesclosetoexistingstructuresbeopenedinshortlengthsandrefilledorpartlyfilledwithleanmixconcreteor otherapprovedmaterial.

Thematerialexcavatedinformingpipelinesshallifunsuitableberuntospoilandreplacedwithsuitable materialsassodefined.
Suitablematerialshallbesetasideforuseasbackfill.Unsuitablematerialshallcompriseallmaterials uchasmaterialfrombogs,
marshes,swamppeat,logs,stumps,perishablematerial,clayshavingaliquidlimitexceeding80oraplasticitycontentgreaterthan30%ofthedryweight.

Allsurplusexcavatedmaterialshallbedisposedoftospoilhipsprovidedbythecontractor.

APIPELAYING – GENERAL

Onarrivalatthesite,pipesshallbecarefullyinspectedfordamageends,cracksorotherdefectsandanyfoundtobefaultyshallbe
markedandsetasideforadecisionfromtheArchitectastotheiracceptability.

Pipeswithdamagedendsshallbeeithercompletelyreplacedorhavetheendstotheextent,andtrimmed, asdirectedbytheArchitect.

Thecontractorshallensurethatallpipesareproperlyhauledbothbyhisstaffandbyanycartagecontractoremployedbyhi m.

Duringtransport,pipesshallnotbeallowedtorestonnarrowcrossmembersofvehiclesoranythingelsethatmightgive
concentratedloadsduetotheweightofthepipeorbumpingofthevehiclebutmustbeproperlysupported onsoftmaterial.
Sufficientlabourandequipmentmustbehandedbeforeunloadingiscommencedandundernocircumstancesmustanypipesbedroppedorthrownfromavehicle.
TheArchitectshallhavetherighttorejectconsignmentsorstocksofpipingfromwhichfailedpipeshavebeendrawn,ororder
themtobepressuretestedoutsidethepipelinesatthecontractor'sexpenseeventhoughnodefectsareapparent,itthereisreasontobelievethatmishandlinghastakenplace.

Flatbraidedwireslingsorbandslingsshallbeusedforslingingallpipesexceptexternallycoatedpipesandplasticpipesforwhichonlyspecialbandslingsnotlessthan300mmwideshallbeused.Chain orropeslings,hooksorotherdevicesworkingonscissorsorgrabprinciplesmustnotbeused.

Subjecttotherequirementsofinspectionbeforeacceptanceprotectivebolsters,capsordiscsontheendsofflanges,specialsorfittingsshallnotberemoveduntilthepipes,specialorfittingsareabouttobeloweredintothetrench.

Beforeapipeisloweredintothetrenchitshallbethoroughlyexaminedtoensurethattheinternalcoatingorliningandtheoutercoatingorsheathingareundamaged.Wherenecessarytheinteriorsorpipes,specialsandfittingsshallbecarefullybrushedclean.

Anydamagedpartsofthecoatingsorliningshall,beforeapipeisused,bemadegoodasdirected.Pipe

layingshallnotcommenceuntilthebottomofthetrenchandthepipebedhavebeenapproved.Flexible pipes,rigidlyjointed,maybejoinedonthegr ound surfacebeforeloweringintothetrench.Alljointsshallbesupportedbyslingsasthepipesarelowereda ndthepipe-linemustnot bedeformedtoagreaterextentthanrecommendedbythe manufacturer.

Pipesmustbebroughttothecorrectalignmentandinclination,concentricwiththepipesalreadylaid .

Allpipeslessthan600mmindiameterwithflexiblejointsmustbeaccuratelymarkedpriortolayingt oensurethatthecorrectgapisleftinthejoint.Anindeliblemarkshallbemadeonthespigotendontopoft hepipebarreltothedepthofthesocketlessthe detailedorspecifiedjointgap.Aftercorrectjointingthemarkshouldbeflushwiththefaceofthesock et.

PVCpipesmustbestoredandhandledcarefullyandmustbeinaccordancewiththemanufacturer'sr ecommendations.

AWITHDRAWAL OF SUPPORTS

Duringtheplacingofbedding,haunching,surroundingoranchoringmaterial,temporarysidesupport sandsheetingshallbe removedexceptwheredirectedtobeleftinandthefullwidthofthetrenchwillbeinfilledwithbeddingha unching,surroundingor anchoringmaterials.

BBEDDING AND PROTECTINGPIPES – GENERAL

Bedding,hauching,surroundingandanchoringpipesshallbetothearrangementanddimensionssh ownonthedrawings.Acavityofadequatesizeshallbeexcavatedinthesidesandbottomofthetrenchor leftinthepipesbedateachjointandateachsling position.

Thebottomofthetrenchorsurfaceofthebedshallbefinishedtoasmoothevensurfaceatthecorrectle velstopermitthebarrelofthepipetobesolidlyandevenlybeddedthroughoutitswholelengthbetwe enjointandslingholes.

Thepreparationofthetrenchbottomorsurfaceofthebedshallbecompletedforatleastonefullpipel engthinadvanceofthepipe laying,exceptwhereinexceptionalcircumstancesanotherarrangementisapproved.Nobedding materialshallbeplaceintrenches containingwater.

Wheregranularbeddingistobeused,stones,bricksorsimilarmaterialsshallnotbeusedbeloworag ainstthepipetolocatethem inpositioninthetrenchortolevelthepipes.Sufficientinfillmaterialsshallbeplacedaroundthebarrelso fpipestoprevent movement.

Wheredirected,puddleclaydams500mmthickshallbeconstructedaroundthepipeandacrossthetrenc hashaunchingand surroundingproceeds.Thedamsshallbeatintervalsnotexceeding30metresorasdirectedandtheir heightshallbedetermi nedbythe Architect.

Wheredirectedbytherequirementsfortestingpipelinesthemethodofhaunchingandsurrounding pipesshallbemodifiedtoleave pipejointsexposed.Wherethereisahighgroundwatertableallpipesshallbesurroundedinanappro vedfreedrainagematerial.

ACONCRETE BEDDING, HAUNCHING, SURROUNDING ANDANCHORING

Concreteforbedding,haunchingorsurroundingpipesshallbe1:2:4nominalmixconcreteandnob ackfillingofthetrenchshallbedoneuntiltheconcretehas reached a strength of15N.mm2.

Beforeplacingconcrete,pipesshallbesupportedneareachjointonaprecastconcreteblockoronengine eringbrickswitha
paddingoftwolayersofhessianbaseddampproofcourseormaterialofsimilaryieldbetweenthebarrel ofthepipeandthesupportingblock.Thesurfaceofthesupportshallbeperfectlysmoothforatlease75 mmby75mmunderthepipe,andthesizeof theblocksshallbeasdirected.

Concretingofbedding,haunchingorsurroundingshallnotbedoneuntilthepipeshavebeenjointed andinspected.Theconcreteshallbevibratedintoplaceunderthepipeandconcreteshallbeinfullco ntactwiththeundersideofthepipethroughoutitslength.

Theconcreteshallbeplacedinoneoperationandshallbewellworkedformahomogeneousmass.Ther eshallbenohorizontalconstructionjointintheconcretebelowthelevelofthehalfpipe.Thepipeshallb ecarefullyanchoredagainstflotation.Concretebeds,haunchesandsurroundsofpipeswithrigidjoint sshallbeformedinlengthsnotexceeding10.0metreswhichshallbe
separatedbyasoftwoodjointfilter25mmthick.

Concretebedding,haunchingpipesshallbediscontinuousatflexiblepipejoints.Shapedformwork madefromfibreboardorotherequallycompressiblematerialofthethicknessstatedinthecontracta ndofsizeandshapeequaltothenextsectionoftheconcreteprotectiontothepipesshallbeusedandleft atthepipejointasshownonthedrawings.Theformworkshallbeneatlycutand
properlysupportedbytemporarystrutandrailswherenecessary.

PVCpipesshallbewrappedinpolythenesheetorroofingfeltabout2mmthickbeforebeinghaunche doranchoredinconcrete.
Nominal1:2:4mixconcreteshallbeplacedatallbends,tees,junctions,changesofdirectionandgra dientstopreventmovementsofpipelinesduetothrustfromwaterpressure,insuchpositionsandqua ntitiesasdirected.

Concretepipeanchoragesandthrustblocksintrenchshallbeplacedagainstundisturbedground.An ylooseordisturbedmat erial shallberemovedimmediatelybeforetheconcreteisplaced.

ConcreteanchoragestoPVCpipesshallbeplacedtosupporthalfthecircumferenceofthepipe.Thepipe mustnotbeencase.Wherecompliancewiththerequirementwouldresultinconcreteabovethepipe, theanchorageconcreteshallbeplacedbeneath
thepipeandthepipewillberestrainedbystrapsasshownonthedrawings.

APLUG

Immediatelyafterlaying,theopenendofapipeshallbesealedwithwoodenplugorapprovedstopperof appropriatesizeto preventtheentryofmaterialwhichmightcontaminatethepipelines,damagethel inings,obstructthewaterwayoreffecttheworkingofvalves,meteretc.Plugsshallbeunperforateda ndshallbeshapedtofitexactlysothatwaterfromthetrenchexcavation sshall notbeallowed to gain access to the pipeline.

Theplugsinsewersmay,withtheArchitectsapproval,beprovidedwithsmallholesfordrainagepurpos es,butwaterfromthe
trenchexcavationwhichisheavilychargedwithsiltshallnotbeallowedtogainaccesstothepipe.

Whereworkisinterruptedforaperiod,theplugleftinpositionshallberegularlyinspectedfortheirfixin gtoensurethattherehas
beennotamperingbyunauthorisedpersons.Wheneveranyplugisremoved,theimmediatelengtho fpipeshallbeexaminedfordirtorobstructionsandshallbecleanedasrequired.

Adequateprecautionsmustbetakenbywayofbackfillingorothermeanstoanchoreachpipesecurelyto preventflotationof the
pipelineintheeventofthetrenchbeingflooded.Noequipment,clothingorapparelmustbeleftorsor tedinsidepipelines.

BJOINTING PIPES

Jointsshallbemadestrictlyinaccordancewiththemanufacturer'sinstructions.Thecontractorshallmakeuseofthetechnicaladvisoryservicesofferedbymanufacturersforinstructingpipejointersinthemethodsofassemblingjoints.Wheremanufacturersrecommendtheuseofspecialjointingtackles,thecontractorshallusetheseforthe assemblyofalljointstopipes.Socketsshallbelaidlookingupwhillunlessotherwiseapproved.

Beforemakinganyjoints,alljointingsurfacesshallbethoroughlycleanedanddriedandmaintainedinsuchconditionuntilthejointshavebeencompletelymadeorassembled.Notwithstandinganyflexibilityprovidedinthepipejoints,pipesmustbesecurelypositionedtopreventavoidablemovement during andafter the making of thejoint.

Thespacebetweentheendofthespigotandtheshoulderofthesocketofflexiblyjointedpipeswhenjointedshallbeas
recommendedbythemanufacturerororderedbythearchitect.Afterflexibilityjointedpipes,otherthan

PVCpipeshavebeenjointedthegapsbetweenthebarrelofthepipesandtheinternalfaceofthesocketshallbesealedwithpuddleclay,uncaulkedropeyarnorotherapprovedmaterial.Theropeyarnorothermaterialmusthavebeentreatedsoasnottosupportbacterialgrowth.

Whereloosecollarsareusedtojoinpipescutforclosers,specialtoolsshallbeemployedtokeeptheinsideofthepipes
flushandthecollarconcentricwiththepipewhilethejointisbeingmade.Pipesprovidedwithspigotandsocketjointsoftheselfcentering,instantaneousjointtupe,suchastherubberringpushfitjoint,shallbelaidandjointedstrictlyinaccordancewiththemakers
instructions.Generallythejointringshallbecleanedandinspectedforcutsanddefect,andsocketspigotexaminedtoensurefreerecommendedlubricantwillbeused.

ACASTIRON JOINT FITTINGS

Castirondetachablejointcollarsandflangesshallbetestedbystrikinglightlywithaspannerimmediatelybeforetheyareplaced
andiftheyfailtoringtrueshallbesetasideandnotincorporatedintheworkuntilprovensound.Theflangesshallbecorrectly
positionedandthecomponentpartsincludinganyinsertionringcleanedanddried.

Insertionringsshallbefittedsmoothlytotheflangewithoutfoldsorwrinkles.Thefaceandboltholesshallbebroughtfairlytogetherandthejointsshallbemadebygraduallyandevenlytighteningboltsondiametricallyopposedpositions.Onlystandardlength
spannersshallbeusedtotightenthebolts.Theprotectivecoating,ifany,oftheflangeshallbemadegoodwhenthejointis
completed.BoltsthreadsshallbewrappedwithPTFFtapewheredirectedbeforeuse.

Nowashersshallbeusedonflangedpipeworktobelaidbelowground.Boltsshallbeasspecifiedandshallbethecorrectlength,leavingamaximumoftwothreadsexposed.

BCEMENT MORTAR JOINTS

Thespigotsandsocketsofconcretepipesshallbethoroughlymoistenedbeforecementmortarjointsaremade.Inmakingogeejointtoconcretepipesathicklayerofcementshallbeappliedtothebuttingfaces,thepipebeinglaidshallbewelldrivenagainsttheother,andthejointedfinishedoffinside,flushwithpipewall.Theoutsideofthejointshallbepointedupwitha75mmwidex
25mmthickmortarfilletallroundandcentralaboutthejoint.Inmakingyarnandmortarjointsforconcreteandclaypipes,thespigot
ofthelastpipelaiduntilitbearsonthebackfaceofthesocketandshallbecentredinthesocket.Twoturnsoftarredyarnshall
thenbefirmlycaulkedintothebackofthesocketwithapropercaulkingtool.Mortarconsistingof2partsofsandto1partof
cementshallthenbepressedfirmlyintothejointtofillthesocketcompletedandshallbeneatlybevelledoffat45degreesfromtheoutsideedgeofthesocket.Jointsmadewithcementmortarshallremainexposedforatleast3hourstoallowfortheinitialsetofthecement.Alljointsshallbe

examinedandapprovedbeforetherefillingofthetrenchiscommenced

CBACKFILLING TRENCHES

Ifthecontractorallowsmaterialtobecomeunsuitable,whichwhenexcavatedwassuitableforre-use,anditisunsuitablewhen requiredforbackfilling,heshallrunittospoilandmakegoodbyreplacingwithsuitablematerial.

Whererequiredtomeetthespecificationfortestingpipelines,trenchesshallbepartiallybackfilledtoprovideanchorage,butjointsshallbeleftexposed.

Backfillingshallwheneverpracticablebeundertakenimmediatelythespecifiedoperationsprecedingithavebeencompleted.No backfillmaterialshallbeplacedintrenchcontainingwater.

Intrenchesinroads,vergesandwhereshownonthedrawingsabove300mmoverthecrownofthepipebackfill,materialshallbe depositedinlayerseachnotexceeding225mmthicknessandeachcompactedto100%withamoisturecontentbetweenwiththemoisturecontentbetween0.8and1.05.M.C.Powerrammersorvibratingplatecompactorsshallbeusedtocompactthebackfilling fromonemetreabovethecrownlevelofthepipetothesurface.

Intrenchesinfieldsoropencountrybackfillmaterialabove300mmoverthecrownofthepipemaybeplacedbymachinesprovidedthemethodofoperationensurethatthematerialsslidesorrollsintopositionanddoesnotdropfromaheight.

Thebackfillmaterialmustnotincludeanystonesorboulderofdimensionsexceeding150mminanyposition.Sufficientspaceshallbelefttoreceivetheoriginalthicknessofsolid,turforothermaterialsremovedfromthesurface.Thesurfacesshallberestoredbyreplacingthematerialsintheirproperorderandform,andbycompactingthentosuchalevelasshallensurethataftersettlementiscompletethesurfacelevelofrefilledtrenchesshallbewithin30mmofthatoftheadjacentundisturbedground.

Wheredirected,trenchesshallbebackfilledwithleanmixconcretemadewith1kgcementto12kgaggregate.Theaggregatewillbeas,clinker,gravel,stoneorotherhardmaterial,approvedbythearchitect,andfreefromsulphates,dustandotherdeleterious material.

AFIELD OR FRENCHDRAINS

Trenchesfordrainsupto150mmindiametershallbeexcavatedtoawidthofatleastfourtimesthenormaldiameterofthepipe; above150mmdiameterthewidthshallbethediameterplus450mm.

Whereshownonthedrawingspipesfordrainsshallbebeddedona75mmthicknessofleanmixconcretewhichshallalsobebroughtupuntilatleastone-thirdofthedepthofthepipeissupportedandinthecaseofperforatedpipes,nolineofoperationsistherebyblocked.Non-circularpipesshallbebeddedasshownonthedrawings.Socketedpipesshallbelaidwithaspaceofabout12mmbetweenthespigotandtheinnerendofthesocket.Ogeejointedporousconcreteandperforatedclaypipeswithrebatedjointsshallbedryjointed.Perforatedpitchfibrepipesmaybejointedwithanyofthejointsspecifiedin B.S.2760.

Trenchesfordrainsshallbebackfilledwithmaterialsapprovedbythearchitect.

Thepipes,thefiltermaterialsandthesurfaceoverdrainsshallatalltimesbekeptfreeof obstructions.

BOPEN SURFACE WATERCHANNELS

Excavationshallbecarriedoutgenerallyasdescribedforpipework.Theinvertshallbefinishedtoatruelineandfallandsidesshall betrimmedtotheslopesindicated.

Invertblocksandsidesslabsshallbelaidona100mmthickbedofsuitableapprovedgranularmaterialformedandwellcompacted.

Theyshallbejointedbythicklycoveringthejointfacewithmortaranddrivingthenextunitfirmlyagainstthatpreviouslylaid.The excessmortarsqueezedoutofthejointshallbeneatlytrowelledoff.Channelsendsshallbesaturatedwithwaterandnewlycompletedjointsshallbeprotectedandcuredasforconcretepipes.

CMANHOLE INSITU CONCRETE

Manholesofinsituconcretewillbeformedasforblockworkmanholes,theblockworkbeingreplacedbynsitumass1:2:4nominal mixconcrete.

Precastconcretemanholesforsewersofupto1200mmdiametershallbeconstructedasdetailedondrawingsusingprecast concretecomponent.

Manholecoverslabsmaybecastinsituusingreinforcednominal1:2:4mixconcreteprecastusingreinforcednominal1:1½:3mix concrete.

Unreinforcedprecastconcretechamberringsshallbesurroundedwithaminimumthicknessof150mmnominal1:3:6mixmass concreteasdetailedonthedrawings.

Stepirons230mmlongshallbesetintotheexternalconcretesurroundtothemanholeandtheslotsthroughthechamberringsfilledwithcementmortar.

ACHAMBERS

Chambersforaccesstovalvesandfittingsonpressurepipelinesforwaterorsewage,unlessotherwisedirectedshallbeconstructedinconcreteblockwork.

BSEPTIC TANKS

Septictanksshallbeconstructedtothedimensionsandgeneralarrangementdetailedonthedrawingsandinthecontract.Tankswithblockworkshallbeconstructedasformanholes.

CTESTING FOR SEPTIC TANKS

Septictanksandotherchambersshallbetestedbyfilingwithwateraftercompletionofbackfilling.

Thefirst1.0metreofdepthmaybefilledasquicklyasthesupplypermits.Betweenthisandtopwaterlevelthe rateoffillingmust notexceed1.0metrein24hours.Afterfillingtotopwaterlevelnofurtherwatershallbeintroducedfor2days.Attheendofthis periodthetanksshallbetoppeduptotopwaterlevelandallowedtostandfor24hours.Thetestshallbeconsideredsatisfactoryif thefallinwaterlevelin24hoursdoesnotexceed15mm.

Intheeventofafallexceedingtheabovetankwillbeemptiedandanydefectsmadegoodpriortoretestasbefore,allatthe contractor'sexpense.

DCONNECTION TO SEWER

Allconnectionstosewersaretobemadewithanglejunctionssetatthecorrectangletominimizetheuseofbends.Allanglesshallnotexceed45degrees.

Theopenendsofallhouseconnectionsandotherpipesnotrequiredforimmediateuseshallbesealedupwithpurposemade stopperssecuredinposition.Theendsofconnectionsandalljunctionpositionswillbeclearlymarkedbypostsandpaintedboards ofatypeandsizetobeapprovedbytheArchitectandtheboardshallbeplainlymarkedwiththeletter'S'andthesizeand depth belowkerblevelorgroundlevel.Alengthof4.5mmgalvanisedironwireshallbefixedtothefaceoft

helastpipeandthemarkingpost.

Everycareshallbetakentopreventthemarkingboardsbeingdisturbedandthecontractorshalltaker esponsibilityfortheirsafety.
Theinformationshallalsobepaintedonthekerbsinanapprovedmannerwhenallworksarecompletean dthecontractorshall
recordthepositionofallbranchesfixingdistancesfromthemanholeimmediatelydownstreamofth ebranch.

ATESTING SEWER

Whereverpossible,testingshallbecarriedoutfrommanholetomanhole.Shortbranchdrainsconne ctedtomainsewerbetweenmanholesshallbetestedasonesystemwiththemainsewer.Longbranch esshallbetestedseparately.

Pipesnotexceeding750mmnominaldiametershallbetestedinoneofthefollowingways:-

i.WATER TEST

Atestpressureof1.2metresheadofwaterabovethesoffitofthesewershallbeappliedatthehighend butnotmorethan6metresatthelowendbymeansofastand-
pipe.Steeplygradedsewersshallbetestedinstageswheretheabovemaximumheadshallbeexceed edifthewholesectionistestedinstageswheretheabovemaximumheadshallbeexceededifthewhol esectionistestedatonce.Aperiodofonehourshallbeallowedforabsorption.Thelossofwateroverape riodof30minutesshallbemeasuredby
addingwaterfromameasuringvesselatregularintervalsof10minutesandnotingthequantityrequired tomaintaintheoriginal
waterlevelinthestandpipe.Theaveragequantityofwateraddedforsewersupto300mmnominalbo remustnotexceed0.06litreperhourper100linearmetrespermmofnominalboreofsewer.Forsewe rsexceeding300mmnominalboretheaveragequantityofwateraddedmustnotexceed0.12litreper hourper100linearmetrespermmofnominalboreofthesewer.

ii.AIR TEST

Thelengthofsewerundertestshallbeeffectivelypluggedandairpumpedinbysuitablemeanse.g.a handpump,untilapressureof100mmheadofwaterisindicatedinaU-
tubeconnectedtothesystem.Theairpressuremustnotfalltolessthan75mmheadofwaterduringap eriodof5minutes,withoutfurtherpumping,afteraperiodof2minutesforrequisitestabilization.

Sewerswillbetested:

i. afterlayingandplacingconcreteifanybutbeforebackfillingoverjointsand afterbackfillinghas
beencompleted.

Sewersconstructedofsteel,spunironorothermaterialsdesignedforhighpressuresh allbetestedinaccordancewiththeprovisionsofclause33.00below.Pipesexceedin g750mm nominaldiametershallbetestedasrequiredbythecontract.

Whererequiredbythecontractthesewershallbetestedforobstructionbytheinsert ionandpullingthroughoftwin-coupledrubber
plungesofthesamediameterasthesewer.

Sewershallbetestedforinfiltrationafterbackfilling.Allinletstothesystemshallb eeffectivelyclosedandtheresidualflowshallbedeemedtobeinfiltration.Thefoll owinglimitsofinfiltrationmustbeexceeded:-

ii. forsewersnotexceeding750mmnominalinternaldiameter,0.08litreperhourper 100
linearmetrespermmofnominalboreofthesewer.

iii. forsewerexceeding750mmnominalinternaldiameter0.16litreperhourper100linear metrespermmofnominalboreofthesewer.
Infiltrationtomanholemustnotexceed5litresperhourpermanhole

AMANHOLES AND CHAMBERS

ManholesandchambersshallbeconstructedinaccordancewiththedrawingsandspecificationsandinthepositionsasdetailedonthedrawingsordirectedbytheArchitect.

Pipesinandoutofmanholesaretobeasshortaspracticableandshallbebuiltinmonolithicallywiththemanholeandthemanholemadewatertight.Whereline,levelandpipediameterpermitandwhereapprovedbythearchitect,thepipelinemaybelaidbrokenthroughthemanholepositionsubjecttothepipejointsexternaltothemanholenotexceeding600mmfromtheinnerfaceofthe manholewall.

Thedepthofthemainchannelmustnotbelessthanthediameterofthelargestpipe.Wherepipeshavebeenlaidunbroken throughthemanholepositionthecrownofthepipeshallbebrokenouttothehalfdiameteroverthefullengthofthemanholeandthebenchingcompletedasdirectedbyarchitect.

Branchbendsshallbecurvedinthedirectionofflowandwillbetrowelledsmoothwithasteelfloatfinish.Spacesbetweenbranchbendsshallbecompletelyfilledwithconcreteandthefacesabovethemainandbranchchannelinvertsshallbetrowelledsmoothwithasteelfloatfinish.

Basesandbenchingshallbeformedin1:2:4nominalmixconcretetrowelledsmoothwithasteelfloatfinish

Manholesinsidebuildingsandelsewhereasshowninthecontractshallhavecastironpipeswithaccessopeningsandboltedcover plateswiththerequisitebranchesinlieuofopenchannelsandbranchbends.Thebottomofthemanholeshallbebroughtupin concretetotheundersideofthecastironcoverplateoftheaccesspipeandbenchedupatslopeof1:12andtrowelledsmooth.

Manholecoversandframesshallbefixedinthepositionshown,theframeshallbesolidlybeddedincementmortarsothat generallythecoverwheninpositionarefairandevenwiththeadjacentsurfacesexceptwheredirectedbythearchitectwhentheyshallbekept75mmabovetheadjacentsurfaces.Whereshownordirectedframesshallbebeddedononeortwocoursesof blockworkincementmortar.

Stepironsarenotrequiredwherethedepthtobenchingislessthan900mmandthediameterofthelargestpipeislessthan 450mm.Channelsmorethan450mmindepthshallhaveoneormorestepironsinarecess,ortoeholesandhandrailorpost withineasyreach,asdetailed.Amanholeshaft(excludingthe1-2coursesofblockworkunderthecastironcover)shallnotbeconstructedunlessthecompletelengthshallexceed1.0metres.

Wheredepthfromgroundleveltotopofbenchingexceeds4.5metresaladdermaybeusedinsteadofastepironwheredirected.

Manholeladdersshallhavebrackets(notlessthantwopairsperladder)ofmaterialequaltothestingersbuiltintotheblockworkorconcreteatintervalsofnotmorethan2.0metres.

Indeepmanholessuitablerestchambersshallbeprovidedatabout6metreintervals,eachwithalandingplatformincorporatingahingedtrapdoorimmediatelyundertheladderasdetailedinthecontract.

Coverslabsofmanholesshallbereinforcedasshownonthedrawings,minimumcovertosteel40mm,andtheconcreteshallbeasdetailedinthecontract.Allmanholesonsewersof600mmdiameteranddovershallbeprovidedwithsafetychainsacrossthemouthoftheseweronthedownstreamsideandha

ndholdsora25mmsolidbarhandrailshallbeprovidedontheedgesofallbenching platformsetc.,asdetailedordirected.Thecontractorshallsupplytwosetsofliftingkeysforeachpattern ofmanholecoverincorporatedinthework.*GeneralSpecifications* Allmanholesandchamberswhencompletedmustbewatertightandtothesatisfactionofthearchite ct.

ACONCRETE BLOCKWORK MANHOLES

Concreteblockworkmanholesforsewersupto750mmdiametershallbeconstructedasdetailedont hedrawings,usingconcreteblocksasspecifiedlaidinEnglishbondbedsandverticaljointsshallbec ompletelyfilledwithmortarastheblocksarelaid.Externaljointsshallbeflushpointedandinternalj ointsshallberakedouttoreceiverenderingasworkproceeds.Cutsblocksshallonlybeincorporated whennecessaryforclosures.

Wherebuiltintomanholewalls,pipesof375mmdiameterandaboveshallhave150mmthickconcre terelievingarchesturnedovertothefullthicknessoftheblockwork.Wherethedepthoftheinvertexce eds5.0metresbelowthefinishedgroundlevelthe arch shallbe300mmthick.Wallsofmanholesupto2.0metresdeepandupto4.0metresshallbeincreasedinth icknessto400mmblockwork.Wallsover4.0metresdeepandupto7.0metresshallbe600mmblock workandover7.0metresdeepmanholesshallbeprecastconcreteorinsituconcreteasdirectedbyth earchitect.Overallmanholedeepmanholesshallbeadjustedtothenearesthalfblocksizewiththeap provalofthearchitect.

Manholeshaftsshallbe750mmby675mmandwhereladdersareusedthissizeshallbeincreasedto8 25mmby675mmwiththeshafttopcorbelledasnecessary.

Stepironhavingtail230mmlongshallbebuiltinat300mmverticalintervalsasshownwiththeupper moststepironfrom60mmto900mmfromthetopofthemanholecoverasdetailed.

NOTES TO BILLS OF QUANTITIES

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 Millimeter
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,
Ditto Shall mean the whole of the preceding description except as qualified in the description Inwhich it occurs.
m.s. Shall mean measured separately.
a.b.d Shall mean as before described. Throughout these Bills, units of measurement and terms are abbreviated and shall be interpreted as follows:-

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. Persons or firms nominated by the PROJECT MANAGER to execute work or to provide and fix materials or goods are described herein as Nominated Sub-Contractors. Persons or firms so nominated to supply goods or materials are described herein as Nominated Suppliers.

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 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".

Attendance

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.

Adjustment of PC 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 if the work were executed by a Nominated Sub-Contractor.

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 , 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.

BILL NO. 1 : PRELIMINARIES

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	The contractor is advised to read and understand all preliminary items.Prices**SHALL BE INSERTED** against items of preliminaries. The Contractor shall be deemed to have included in his prices for all costs involved in complying with all the requirements for the proper execution of the whole of the works in the Contract.				
A	**BID SECURITY** The contractor shall provide a bid security duly signed, sealed and stamped from an approved Bank or Insurance company of required the amount				
B	**SIGNBOARD** 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. ***(See Attached Drawing)***				
C	**PERFORMANCE BOND** A bond of 5 % of the contract sum will be required. In form of Bank Guarantee from a an approved Bank or from an Insurance Company. No payment on account for the works executed will be made to the contractor until he has submitted the Performance Bond to the Project Manager duly signed, sealed and stamped.				
D	**INSURANCE** The Contractor shall insure as required in Conditions No. 30 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.				
	TOTAL CARRIED TO COLLECTION				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	COMPIANCE WITH LABOUR LAWS				
A	Allow for complying with all Government Labour Law and Regulations in regard to the safety, health and welfare of the workers. This should include allowing for provisonos site sqfet training and provision of safety gear.				
	LABOUR CAMPS				
B	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.				
	PROJECT MANAGER OFFICE				
C	The Contractor shall provide, erect and maintain where directed on site and afterwards dismantle a site office complete with furniture and necessary sanitation facities. 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 leveling staff, ranging rods and 50 metre metallic or linen tape.				
	SITE SECURITY				
D	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.				
	TOTAL CARRIED TO COLLECTION				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	**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.				
B	**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				
C	**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.				
D	**<u>HOARDING</u>** The Contractor shall secure the roof area during the re-roofing with strong nets to ensure no dangerous objects falls to the ground thus avoiding any injuries to people moving around the building.				
	TOTAL CARRIED TO COLLECTION				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SAMPLES				
A	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 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.				
	EXISTING SERVICES AND PROPERTY				
B	Prior to the commencement of any work, the Contractor is to ascertain from the relevant authority the exact position, depth and level of all existing services in the area and he/she shall make whatever provisions may be required by the authorities concerned for the support, maintenance and protection of such services.				
C	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				
	TOTAL CARRIED TO COLLECTION				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	PROTECTION OF THE WORKS.				
A	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.				
	PLANT, TOOLS AND VEHICLES				
B	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.				
	CLEARING AWAY				
C	The Contractor shall remove all temporary works, rubbish, debris and surplus materials from the site as they accumulate and upon completion of the works, remove and clear away all plant, equipment, rubbish, unused materials and stains and leave in a clean and tidy state to the reasonable satisfaction of the Project Manager.				
D	The whole of the works shall be delivered up clean, complete and in perfect condition in every respect to the satisfaction of the Project Manager.				
	TOTAL CARRIED TO COLLECTION				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	PRELIMINARIES SUMMARY				
	Brought forward from page PR/1				
	Brought forward from page PR/2				
	Brought forward from page PR/3				
	Brought forward from page PR/4				
	Brought forward from page PR/5				
	TOTAL FOR PRELIMINARIES CARRIED TO SUMMARY				

BILL NO.2. STORM DRAINAGE WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SUBSTRUCTURES **(ALL PROVISIONAL)** **Excavations and Earth works**				
A	Clear the site of all grass, shrubs, undergrowth and small trees including grubbing up roots and burn arisings	113	SM		
B	Excavate to remove vegetable soil ave 200mm deep and cart away	339	SM		
C	Excavate for storm drain not exceeding 1.5 metres deep from reduced level	305	CM		
D	Excavate for storm drain not exceeding 1.5 metres - 3.0 metres deep	185	CM		
E	Return, ram and fill depths around storm drains	178	CM		
F	Allow for keeping excavations free of surface water by pumping or any other approved method	1	ITEM		
G	Allow for maintaing and upholding sides of excavation clear of all falling materials by plunking and strutting	1	ITEM		
H	Load and cart away from site surplus excavated material to Nyeri County Government designated disposal sites	343	CM		
	Total carried to Collection				

DW/1

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	50mm thick blinding in plain concrete(1:4:8) unde:				
A	Drains	252	SM		
	Vibrated reinforced concrete (1:2:4) in:				
B	100mm thick bases	252	SM		
C	100mm thick walls including formed groove to bear the precast concrete cover (m/s)	465	SM		
	Reinforcement (All Provisional) **Supply, cut, bend and fix the following reinforcement bars including tying wire, stirrups and spacer blocks to B.S. 4461**				
D	D10	5,787	KG		
	Steel mesh fabric reinforcement to BS 4483				
E	B.R.C fabric mesh reinforcement ref: A98 weighing 2.22 kg / m2 laid with 200 mm laps (measured net-no allowance made for laps)	252	SM		
	Sawn formwork to;				
F	Sides of wall	1,017	SM		
	Precast Concrete Cover Slabs (Concrete Class 20/20)				
G	Precast concrete cover slabs size 1000x600x75mm thick reinforced with 8mm diameter at 100c/c both ways placed onto grooved channel	225	SM		
	Total carried to Collection				
	COLLECTION *Total carried from page dw/1* *Total carried from bove*				
	Total for Strom Drainage Works carried to Grand Summary				

BILL NO.3:ABLUTION BLOCK

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 1 **SUBSTRUCTURES(ALL PROVISIONAL)**				
A	Clear site of all grass, bushes, shrubs, undergrowth and small trees including grubbing up roots and burn arisings.	72	SM		
B	Excavate to remove top soil comencing from ground level, average depth 150mm and dispose as directed	72	SM		
C	Excavate for strip foundation trenches not exceeding 1.5 metres deep .	48	CM		
D	Allow for keeping excavations free of surface water by pumping or any other approved method		ITEM		
E	Allow for maintaing and upholding sides of excavation clear of all falling materials by plunking and strutting		ITEM		
	Backfilling				
F	Return fill and ram selected material around foundation	22	CM		
	Disposal				
G	Load and cart away from site surplus excavated material to county disposal site	26	CM		
	Imported filling				
H	300mm thick hardcore bed hand packed watered and compacted in 150 mm thick layers	18	CM		
J	50mm Thick approved quality murram or quarry dust blinding to surfaces of hardcore (m.s) to receive damp- proof membrane	65	SM		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Damp-Proof membrane				
A	500 gauge polythene damp proof membrane or equal and approved laid over blinded hardcore (m.s) with 200 mm end and side laps (measured net-no allowance for laps)	65	SM		
	Anti-termite treatement				
B	Termidor 25 EC" or other equal and approved anti-termite chemical treatement applied by an approved pest control specialist with a 10 year waranty strictly applied according to manufacturer's printed instructions	65	SM		
	50mm thick blinding in plain concrete (1:4:8) in:-				
C	Strip footing	32	SM		
	Vibrated reinforced concrete (1:2:4/20-20mm) aggregate as described in:				
D	Strip footing	7	CM		
E	150mm thick floor slab	65	SM		
	Reinforcement (All Provisional) **Supply, cut, bend and fix the following reinforcement bars including tying wire, stirrups and spacer blocks to B.S. 4461** **Square twisted high tensile bars**				
F	D10mm bars (D-10)	140	KG		
G	8mm bars (D-8)	70	KG		
H	B.R.C fabric mesh reinforcement ref: A142 weighing 2.22 kg / m2 laid with 200 mm laps (measured net-no allowance made for laps)	65	SM		
	Sawn form work to:				
J	Sides of Strip	22	SM		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	Edges of floor slab 75-150mm wide	38	LM		
	Natural Kiganjo stone walling bedded and jointed in cement sand (1:4) mortar; raking where necessary reinforced with 25x3mm thick hoop iron in every alternate course				
B	200mm thick walling	67	SM		
	Total carried to collection				
	COLLECTION *Total carried from page AB/1* *Total carried from page AB/2* *Total carried from above*				
	Total for Substructures carried to Ablution Block Summary				

AB/3

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO.2				
	WALLING				
	Damp-proof Course				
A	200mm wide	67	LM		
	Smooth dressed natural local (Kiganjo stone) walling in cement and sand (1:3) mortar and including reinforcing with 20x3mm thick hoop iron in every alternate course				
C	200mm thick walling	140	SM		
	Vibrated reinforced concrete (1:2:4/20-20mm) aggregate as described in:				
E	Ring Beams	4	CM		
	Reinforcement (All provisional)				
F	12mm diameter bars (D12)	205	KG		
G	8mm diameter bars (D8)	100	KG		
	Sawn Form work to:				
H	Sides and soffts of beams and columns	43	SM		
	-				
	-				
	Total for Walling carried to Ablution Block Summary				

AB/4

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 3				
	ROOFING				
	Roof Construction				
	Sawn cypress, second grade; well seasoned and treated with approved wood preservative; with and including all jointing and connection (packing piece, bolts, etc.) as neccesary; in roof				
	The following in trusses and/or independent member				
A	100x50mm Rafter	62	LM		
B	Ditto Kingpost	13	LM		
C	Ditto Ties and Struts	106	LM		
D	75x50mm purlins	142	LM		
E	100x50mm wall plate; fixed to concrete or masonary with and including approved bolts at 100mm centers	38	LM		
F	200x25mm wrot cypress fascia board	40	LM		
	Roof Covering				
G	Prepainted box profile gauge 26 roofing sheets as MRM or any other equal and approved nailed to timber purlins.	96	SM		
H	Matching ridge/hip cover	24	LM		
	Total for Roofing carried to Ablution Block Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 4 **WINDOWS**				
	Precast Concrete, once throated fixed with cement and sand (1:3) mortar				
A	250x75mm thick window cill	16	LM		
	Supply and fix the following purpose made steel casement windows fabricated from standard sections complete with frames, mullions and transomes including all necessary locking and window stays screws and nuts once shop primed before delivery to site. Rate to include 25 x 4mm flat at 300 mm centres as burglar proofing				
B	Window size 1200x600mm high	4	NO		
C	Ditto 800x600 mm high	9	NO		
D	Ditto 1200x1200 mm high	1	NO		
	Glazing **Obscure Sheet Glass**				
E	6mm obscure glass and glazing to metal putty in panes	10	SM		
	Touch up primer and apply one undercoat and two finishing coats of first quality super gloss paint to:-				
F	General surfaces of windows (b.s.m)	20	SM		
	Total for Windows carried to Ablution Block Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	DOORS				
	Steel doors				
A	Purpose made mild steel panelled door size 900x2400mm high made from 50x37.5 x3mm RHS outer framing, and 25 x25x 3mm vertical and horizontal members,steel panelled plate with 1000mm glazed top complete with 3 -lever Union lock and all other necessary fittings	3	NO		
	Timber doors				
B	50mm thick wrot cypress framed ledged and braced match boarded door 900x2100mm with 300mm high fanlight	7	NO		
C	Ditto double leaf and double swing door size 1200x2400mm high	1	NO		
	Wrot Cypress or other equal and approved:-				
D	100 x 50mm Frame with two labours plugged.	44	LM		
E	45 x 38mm Architraves.	44	LM		
F	25mm diameters quadrant.	44	LM		
	Supply anc fix the following ironmongery with screws to match				
G	100mm Brass butts hinges.	12	PRS		
	Painting and Decorations.				
	Knot, Prime, Prepare and Apply three coats of gloss oil paint to:-				
H	General surfaces of timber	34	SM		
J	Ditto between 100 -200mm girth.	44	LM		
K	Ditto not exceeding 100mm girth.	88	LM		
L	General surfaces of timber	13	SM		
	Total for Doors carried to Ablution Block Summary				

AB/7

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 5				
	FINISHES				
	Cement: Lime: Sand (1:2:9) plaster to				
A	25mm rendering to plastered surfaces externally	13	SM		
B	Extra-over walling for Keying and pointing in cement/sand 1:3	85	SM		
	Prepare surfaces and apply one undercoat and two finishing coats of crown permacoat paint to:				
C	General rendered surfaces externally	13	SM		
	Prepare and apply undercoat and two finishing coats of gloss oil paint on wooden surfaces to:-				
D	Fascia surfaces exceeding 150mm but not exceeding 200mm girth	40	LM		
	Cement and Sand (1:3) screed				
E	38 mm thick screed to receive ceramic floor tiles (m/s)	56	SM		
F	15 mm thick screed to receive ceramic wall tiles (m/s)	120	SM		
	Ceramic Floor Tiles				
G	600 x 600 x 8mm ceramic floor tiles 'SAJ' ***(or other equal approved)*** jointed in approved tile adhesive with spacers and grouting *(Tiles must be approved)*	56	SM		
H	Ditto but skirting 150mm high	85	LM		
	Total carried to collection				

AB/8

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Ceramic Wall Tiles				
A	600 x 300 x 6mm ceramic wall tiles 'SAJ' ***(or other equal approved)*** jointed in approved tile adhesive with spacers and grouting *(Tiles must be approved)*	120	SM		
B	Extra-over tiles for aluminium corner strip	40	LM		
	15mm thick cement and sand (1:4) plaster trowelled smooth comprising 12mm backing and 3mm finishing coat to:				
C	Plastered to walls internally	145	SM		
	Prepare and apply one undercoat and two finishing coats of first quality silk vinyl paint on:				
D	Plastered surface of walls	145	SM		
	Sawn cypress				
E	50x50mm Brandering	270	LM		
	Ceiling				
A	12mm celotex softboard ceiling board fixed to brandering (m.s)	56	SM		
B	Extra over for forming 600x600mm trap door with cypress framing	2	NO		
C	100x50mm moulded cornice plugged	95	LM		
	Prepare and apply two undercoats stainer and two finishing coats of varnish to:-:				
D	General surfaces of ceiling boards	56	SM		
E	Surfaces not exceeding 100mm girth to cornice	95	LM		
	Total carried to collection				

AB/9

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	COLLECTION *Total carried from page AB/8* *Total carried from page AB/9*				
	Total for Finishes carried to Ablution Block Summary				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ABLUTION BLOCK SUMMARY				
1	SUBSTRUCTURES				
2	WALLING				
3	ROOFING				
4	WINDOWS				
5	DOORS				
6	FINISHES				
	Total for Ablution Block carried to Grand Summary				

AB/11

BILL NO.4:MECHANICAL WORKS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SANTITARY FITTINGS				
	Water Closet				
A	Squatting water closet suite comprising of white cereamic floor mounted squatting pan and integral foot threads,'P' or 'S' trap connector to be as "Twyfords Nile" or approved equivalent.	7	NO		
B	Top enrty type toilet flushvalve with integral vacuum breaker and non-hold-open feature and butterfly valve with wall plate comprising of flushvalve, bent flushpipe and rubber pipe coonector. All to be as "Flushmaster" or approved equivalent.	7	NO		
	Ambulant Disabled Water Closet Suite				
C	Close wash down water closet suite for the elderly and disabled in white complete with horizontal outlet *AND BOTTOM SUPPLY AND OVERFLOW WITH CLOSE COUPLING SIDE LEVER TREATMENT,* 7.5 litre cistern, raised heavy duty toilet seat and cover and S-trap outlet and 600 x 35mm stainless steel grab rails (4No.). The set to be complete with wash and hand basin, 6mm thick mirror, toilet roll holder and robe hook. All to be as "Twyfords Avalon BTW" or approved equivalent.	1	NO		
	Wash Hand Basin				
D	Wash hand basin size 510 x 420mm with one tap hole and chain stay hole, 32mm diameter chrome plated pop up chain waste, concealed wall bracket, chrome plated bottle trap (32mm 'P' trap) with 75mm seal. The wash hand basin to be as Twyfords 'Sola 510' or equal and approved.	6	NO		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Urinal Bowls				
A	Ceramic urinal bowl complete with 4No. Ceramic urinal bowl Divisions, chrome plated Flush pipes,7.5 Litres ceramic Cistern, 40mm Heavy duty plastic Bottle trap and 40mm Diameter chrome plated outlet with Grating firmly fixed on the wall with Chrome Plated screws. The fittings shall be as Twyfords or Equal and Approved	1	SET		
	Toilet Roll Holder				
D	Toilet roll holder in vitreous china to BS 3402 in white colour of size 165 x 165mm and recessed into wall. Toilet roll holder to be as Twyfords "SEMI RECESSED & ORNAMENTAL" accessories Ref. No. VC 9808 WH.	7	NO		
	Mirrors				
C	6mm thick polished glass, silver blacked mirror with bevelled edges, sizes 600 x 600mm plugged and screwed to wall with 4No. Chrome plated chrome capped screws and 5mm thick foam back nest.	6	NO		
	INTERNAL PLUMBING WORKS				
	Supply, deliver and install Polypropylene Random Copolymer (PPR) pipes, including all fittings e.g. couplings, connectors, joints unions etc. as required in running length of pipework. Also where necessary for pipe fitting clips, holder bats plugged or screwed.				
	PPR Pipe				
D	50mm diameter PPR pipe	8	LM		
E	40mm -ditto-	17	LM		
F	32mm -ditto-	5	LM		
G	25mm -ditto-	9	LM		
H	20mm -ditto-	20	LM		
	Bends				
I	50mm Diameter Bend	4	NO		
J	40mm -ditto-	2	NO		
K	32mm -ditto-	2	NO		
L	20mm -ditto-	4	NO		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Tees				
A	50 equal tee	2	NO		
B	40 -ditto-	8	NO		
C	32 -ditto-	5	NO		
D	25 -ditto-	4	NO		
	GMS Reducers				
E	50x40mm diameter reducer	4	NO		
F	40x32 -ditto-	4	NO		
G	40x20-ditto-	6	NO		
H	32x25 -ditto-	4	NO		
I	32x20-ditto-	5	NO		
J	25x20 -ditto-	6	NO		
	Threaded Fittings				
K	20x20mm diameter female threaded elbow	14	NO		
L	40mm diameter male adapter	4	NO		
	Gate Valves				
M	50mm dia. Approved medium pressure screw down full way non-rising stem wedge gate valve to BS 1952, with wheel and head joints to steel tubing. The gate valve to be as "Pegler" or approved equivalent	2	NO		
N	Allow pressure testing, flushing out and sterilization of the cold water system as required to the satisfaction of the Engineer	1	ITEM		
	WATER TANK				
O	Supply and install water storage tanks of capacity 5000 litres made of plastic of dimensions 2.4m diameter and 1.25m height as Rotor or equivalent approved. The tank shall be complete with inlet, outlet, overflow and drain connection. It should have a 20mm diameter medium ball valve with silencer pipe, bronze lever and copper float all as "Glenfield or approved equivalent. The tank shall be firmly supported in the roof at high level.	1	NO		
	Total carried to collection				

MW/3

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Internal Foul Drainage				
	Supply, deliver and install the following UPVC, MUPVC, soil and waste system respectively to B.S 5255 with fittings fixed to manufacturers printed instructions and manufactured by reputable manufacturers. Tenderers must allow in their pipework prices for all the couplings, clippings, connectors, joints etc. as required in the running lengths of pipework and allow for connection to the nearest manholes and also where necessary, for pipe fixing clips, holder bats plugged and screwed for the proper and satisfactory functioning of the system.				
	UPVC and MUPVC Soil and Waste				
A	150mm diameter Heavy gauge golden brown UPVC pipe	30	LM		
B	100mm diameter Heavy gauge golden brown UPVC pipe	30	LM		
C	100mm diameter Heavy gauge grey UPVC pipe	8	LM		
D	50mm -ditto-	15	LM		
E	40mm -ditto-	9	LM		
F	32mm -ditto-	4	LM		
	Bends				
G	100mm diameter long radius bend	8	NO		
H	100mm diameter long radius bend with access	8	NO		
I	40mm diameter bend	8	NO		
	Tees				
J	50mm diameter sweep tee	7	NO		
K	50mm diameter access cap	5	NO		
L	40mm diameter sweep tee	6	NO		
M	40mm diameter access cap	6	NO		
N	32mm diameter sweep tee	6	NO		
O	32mm diameter access cap	6	NO		
	Reducer				
P	100x50mm diameter reducer	1	NO		
Q	40x32mm -ditto-	4	NO		
	Total carried to collection				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	100mm diameter WC connector	7	NO		
B	100mm diameter 4-way floor trap and grating	4	NO		
C	100mm floor gully trap complete with cover	4	NO		
D	100mm vent cowl	1	NO		
E	100mm diameter weathering slate and apron	1	NO		
F	Inspection chamber (manhole)	8	NO		
G	Testing and commissioning the internal drainage installation	1	ITEM		
H	Allow for steell water tower comprising of 100x100x5mm thick vertical members and 50x50x5mm thick strengthening struts	1	ITEM		
	Total carried to collection				
	<u>COLLECTION</u> *Total carried from page MW/1* *Total carried from page MW/2* *Total carried from page MW/3* *Total carried from page MW/4* *Total carried from Above*				
	Total for Mechanical Works carried to Grand Summary				

MW/5

BILL NO.5:PROVISIONAL SUM

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	The following funds to be expensed as per instructions of the Project Manager or ommitted				
A	Provide a Provisional Sum of Kenya Shillings Four Hundred (KShs.400,000) Thousand for Electrical Works				
B	Provide a Provisional Sum of Kenya Shillings Two Hundred and Fifty Thousand (KShs.250,000)for Contigenices				
C	Provide a Provisional Sum of Kenya Shilling Fifty Thousand (KShs.50,000)for Project Management				
	TOTAL FOR PROVISIONAL SUMS CARRIED TO GRAND SUMMARY				

PS/1

GRAND SUMMARY

ITEM	DESCRIPTION	TENDER'S AMOUNT	OFFICIAL USE ONLY
1	BILL NO.1: PRELIMINARIES		
2	BILL NO.2: STORM DRAINS		
3	BILL NO.3:ABLUTION BLOCK		
4	BILL NO.4:MECHANICAL WORKS		
5	BILL NO.5: PROVISIONAL SUMS		
	SUB TOTAL		
	ADD 16% VAT		
	GRAND TOTAL CARRIED		

Amount of Quotation in words:-Kenya Shillings

……

……

Tenderer's Signature and Stamp……

Address……

Date……

Witness Name and Signature……

Description……

Address……

Date……