Nepal Electricity Authority

Building and Physical Infrastructure Construction Project

Bhagwanpau, Kathmandu, Nepal

Construction of Badminton Covererd Hall at Dhangadi DCS, Kailali

VOLUME-I

SBD

BIDDING DOCUMENT

for

THE PROCUREMENT OF

Construction of Covered Hall at Dhangadi DCS, Kailali

National Competitive Bidding (NCB)
Single-Stage: Single-Envelope Bidding Procedure

Nepal Electricity Authority, Building and Physical Infrastructure Construction Project

Issued on: 8/4/2083

Issued to: All Eligible Bidders

Invitation for Bids No.: NEA/BPICP/NCB/WORKS-01/2083/084

Contract Identification No.: NEA/BPICP/NCB/WORKS-01/2083/084

Abbreviations

BD ... . Bidding Document

BDF .... Bidding Forms

BDS .... Bid Data Sheet

BOQ ... . Bill of Quantities

COF ..... Contract Forms

DP ... . Development Partners

DoLI... .....Department of Local Infrastructure

e-GP…….Electronic Government Procurement

ELI ... . Eligibility

EEC... .... Evaluation and Eligibility Criteria

GCC ... . General Conditions of Contract

GoN[1] ... . Government of Nepal

ICC ... . International Chamber of Commerce

IFB ……. Invitation for Bids

ITB ... . Instructions to Bidders

JV ... . Joint Venture

NCB ... . National Competitive Bidding

NRs ..... Nepalese Rupees

PAN ... . Permanent Account Number

PPA ... . Public Procurement Act, 2063

PPMO ... . Public Procurement Monitoring Office

PPR ... . Public Procurement Regulations, 2064

PS …….. Provisional Sum

SBD .... Standard Bidding Document

SCC ... . Special Conditions of Contract

TS ... .Technical Specifications

VAT ... . Value Added Tax

WRQ ... . Works Requirements

[1] "GoN" word indicates all public entities according to Public Procurement Act, 2063

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Invitation for Bids

Nepal Electricity Authority

Building and Physical Infrastructure Construction Project

Invitation for Bids No: NEA/BPICP/NCB/WORKS-01/2083/084

Date of publication: 8/4/2083

1. ***Nepal Electricity Authority*** invites sealed bids or electronic bids from Nepalese eligible bidders for the ***Construction of 240 Sq.m -Covered Hall at Dhangadi DCS which includes mainly civil, and architectural works as mentioned in Specifications*** under National Competitive Bidding procedures. The estimated amount for the works is NRs. ***6,834,494.50*** *(without VAT & Contingency but including PS).*

2. Eligible Bidders may obtain further information and inspect the Bidding Documents at the office of ***Building and Physical Infrastructure Construction Project***
   Bhagwanpau, Kathmandu, Nepal
   bpicp@nea.org.np
   01-4537675, 01-4537665
   or may visit PPMO website www.bolpatra.gov.np/egp.

3. Bidders who choose to submit their bid electronically may download the bidding documents for e-submission from PPMO's e-GP system www.bolpatra.gov.np/egp at no cost.

4. Pre-bid meeting shall not be held.

5. Electronic bids must be submitted through PPMO website www.bolpatra.gov.np/egp on or before ***12:00 Hours*** on ***8/25/2083.*** Bids received after this deadline will be rejected.

6. The bids will be opened in the presence of Bidders' representatives who choose to attend at ***12.15 Hours, 8/25/2083*** at the office of ***Bhagwanpau, Kathmandu, Nepal.*** Bids must be valid for a period of ***Ninety (90) Days*** from the bid submission deadline and must be accompanied by a bid security or scanned copy of the bid security in .pdf format in case of e-bid, amounting to a minimum of ***200,000 (In words: Two lakhs Rupees Only)***, which shall be valid for 30 days beyond the validity period of the bid ***(12/27/2083, AD April 10, 2027)***

7. If the last date of purchasing and /or submission falls on a government holiday, then the next working day shall be considered as the last date. In such case the validity period of the bid and bid security shall remain the same as specified for the original last date of bid submission.

Part - I Bidding Procedures

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SECTION– I: Instructions to Bidders

This section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, and evaluation of bids and on the award of contract.

A. General	
1. Scope of Bid	1.1 In connection with the Invitation for Bids indicated in the **Bid Data Sheet (BDS)**, the Employer, as indicated **in the BDS**, issues this Bidding Document for the procurement of Works as specified in Section V (Works Requirements). The name, identification, and number of lots (Contracts) / multiple contracts of the National Competitive Bidding (NCB) are provided **in the BDS.**
	1.2 Throughout this Bidding Document: (a) the term "in writing" means communicated in written form and delivered against receipt through e-GP system or e-mail or fax or courier; (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and (c) "day" means calendar day.
2. Source of Funds	2.1 GoN Funded: In accordance with its annual program and budget, approved by the GoN, the implementing agency indicated **in the BDS** plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or Public Entities' own Resource Funded: In accordance with its annual program and budget, approved by the public entity, the implementing agency indicated **in the BDS** plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or DP Funded: The GoN has applied for or received financing (hereinafter called "funds") from the Development Partner (hereinafter called "the DP") indicated **in the BDS** toward the cost of the project named in the BDS. The GoN intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
	2.2 DP Funded: Payment by the DP will be made only at the request of the GoN and upon approval by the DP in accordance with the terms and conditions of the financing agreement between the GoN and the DP (hereinafter called the "Loan/Grant Agreement"), and will be subject in all respects to the terms and conditions of that Loan/Grant Agreement. No party other than the GoN shall derive any rights from the Loan Agreement or have any claim to the funds.
3. Fraud and Corruption	3.1 Procuring Entities as well as bidders, suppliers and contractors and their sub-contractors under GoN/DP-financed contracts, shall adhere to the highest

	standard of ethics during the procurement and execution of such contracts. In pursuance of this; (a) the Employer adopts, for the purposes of this provision, the terms as defined below: (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party; (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party. (v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an investigation; (b) making false statements to investigators in order to materially impede an investigation; (c) failing to comply with requests to provide information, documents, or records in connection with an investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (e) materially impeding GoN/DP's contractual rights of audit or access to information; and (vi) "integrity violation" is any act which violates Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of GoN/DP sanctions, retaliation against whistleblowers or witnesses, and other violations of Anticorruption Policy, including failure to adhere to the highest ethical standard. (b) the Employer will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the contract; (c) DP will cancel the portion of the financing allocated to a contract if it determines at any time that representative(s) of the GoN or of a beneficiary of DP-financing engaged in corrupt, fraudulent, collusive, or coercive practices or other integrity violations during the procurement or the execution of that contract, without the GoN having taken timely and appropriate action satisfactory to DP to remedy the situation. (d) DP will impose remedial actions on a firm or an individual, at any time,

	in accordance with DP's Anticorruption Policy and related Guidelines (as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate in DP-financed, -administered, or -supported activities or to benefit from an DP-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and (e) The Contractor shall permit the GoN/DP to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the GoN/DP, if so required by the GoN/DP.
	3.2 The Bidder shall not carry out or cause to carry out the following acts with an intention to influence the implementation of the procurement process or the procurement agreement: (a) give or propose improper inducement directly or indirectly, (b) distortion or misrepresentation of facts, (c) engaging in corrupt or fraudulent practice or involving in such act, (d) interference in participation of other competing bidders, (e) coercion or threatening directly or indirectly to cause harm to the person or the property of any person to be involved in the procurement proceedings, (f) collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Employer the benefit of open competitive bid price, (g) contacting the Employer with an intention to influence the Employer with regards to the bids or interference of any kind in examination and evaluation of the bids during the period from the time of opening of the bids until the notification of award of contract.
	3.3 PPMO, on the recommendation of the Procuring Entity may blacklist a Bidder for a period of one (1) to three (3) years for its conduct including on the following grounds and seriousness of the act committed by the bidder: (a) if convicted by a court of law in a criminal offence which disqualifies the Bidder from participating in the contract, (b) if it is established that the contract agreement signed by the Bidder was based on false or misrepresentation of Bidder's qualification information, (c) if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for, or in executing, a GoN/DP-financed contract. (d) if the successful bidder fails to sign the contract. (e) if the bidder fails to inform or informs after the specified time about the

	saturation of the maximum number of contracts as per ITB 4.9. (f) a Bidder requests for withdrawal or modification of its bid: (i) after the Bid Submission deadline and during the period of validity specified by the Bidder on the Letter of Bid, in case of electronic submission; (ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Bid, in case of hard copy submission. (g) if the bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification pursuant to ITB 24.1. (h) a Bidder changes the prices or substance of the bid while providing information pursuant to ITB 24.1.
	3.4 A bidder declared blacklisted and ineligible by the GoN, Public Procurement Monitoring Office (PPMO), by a competent authority under the prevailing law for failure to repay a loan disbursed by a bank or financial institution, and/or the DP in case of DP funded project, shall be ineligible to bid for a contract during the period of time determined by the GoN, PPMO, the competent authority and/or the DP. 3.5 In case of a natural person or firm/institution/company which is already declared blacklisted and ineligible by the GoN, any other new or existing firm/institution/company owned partially or fully by such Natural person or Owner or Board of director of blacklisted firm/institution/company; shall not be eligible bidder.
	3.6 Furthermore, Bidders shall be aware of the provisions of GCC 28.3 and GCC 72.3(j).
4. Eligible Bidders	4.1 A Bidder may be a natural person, private entity, or government - owned entity—subject to ITB 4.5—or any combination of them in the form of a Joint Venture (JV) under an existing agreement, or with the intent to constitute a legally-enforceable joint venture. In the case of a JV: (a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. Maximum number of JV shall be as specified **in the BDS**. The eligibility criteria requirement of the parties to the JV shall be as specified in Section III Evaluation and Eligibility Criteria, and (b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during Contract execution.
	4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of any country or eligible countries mentioned **in the BDS**. A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that

	country. This criterion shall also apply to the determination of the nationality of proposed sub-Contractors or suppliers for any part of the Contract including related services.
	4.3 A Bidder shall not have a conflict of interest. A Bidder found to have a conflict of interest shall be disqualified. if any of, including but not limited to, the following apply: (a) they have controlling partners in common; or (b) they receive or have received any direct or indirect subsidy from any of them; or (c) they have the same legal representative for purposes of this bid; or (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or improperly influence on the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or (e) a Bidder participates in more than one bid in this bidding process either individually or as a partner in a joint venture. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of ITB 4.3 (a)-(d) above, this does not limit the participation of the same subcontractor in more than one bid; or (f) a Bidder or any of its affiliated entity, participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or (g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Employer as Engineer for the Contract. or (h) a Bidder that has a close business or family relationship with a professional staff of the Procuring Entity.
	4.4 A firm that is under a declaration of ineligibility by the GoN/DP in accordance with ITB 3, at the date of the deadline for bid submission or thereafter, shall be disqualified. A firm shall not be eligible to participate in any procurement activities under an DP-financed, -administered, or -supported project while under temporary suspension or debarment by DP pursuant to the DP's Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by the DP, or enforced by other DPs pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.
	4.5 Enterprises owned by Government shall be eligible only if they can establish that they are legally and financially autonomous and operate under commercial law, and that they are not a dependent agency of the GoN.
	4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.
	4.7 Firms shall be excluded in any of the cases, if

	(a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Nepal prohibits any import of goods or Contracting of works or services from that country or any payments to persons or entities in that country. (b) DP Funded: as a matter of law or official regulation, Nepal prohibits commercial relations with that country, provided that the DP is satisfied that such exclusion does not preclude effective competition for the supply of goods or related services required; (c) DP Funded: a firm has been determined to be ineligible by the DP in relation to their guidelines or appropriate provisions on preventing and combating fraud and corruption in projects financed by them.
	4.8 The Bidder, including all parties constituting the Bidder, shall be ineligible to participate in the open competitive bidding process if it has already secured maximum number of construction contracts (in open competitive bidding) **as specified in BDS** and has not yet completed the work as stipulated in the respective contracts.
	4.9 For the purpose of ITB 4.8 above, the bidder shall declare that the bidder, and all parties constituting the Bidder have not already secured maximum number of construction contracts (in open competitive bidding in procurement of works) **as specified in BDS**. If the bidder, and all parties constituting the Bidder has participated in bidding processes of many public entities and during that period the maximum number of contracts have been attained as specified saturates due to issuance of letters of acceptance by a particular public entity, the bidder shall inform in writing to all other concerned public entities, where the bidder have participated in bidding process, within three days of issuance of last letter of acceptance that saturates the maximum number of contracts as specified.
5. Eligible Materials, Equipment and Services	5.1 The materials, equipment and services to be supplied under the Contract shall have their origin in any source countries as defined in **the BDS** and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.
	5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.
B. Contents of Bidding Documents	
6. Sections of Bidding	6.1 The Bidding Document consist of Parts I, II, and III, which include all the Sections indicated below, and should be read in conjunction with any

Document	Addenda issued in accordance with ITB 8. PART I Bidding Procedures Section I Instructions to Bidders (ITB) Section II Bid Data Sheet (BDS) Section III Evaluation and Eligibility Criteria (EEC) Section IV Bidding Forms (BDF) PART II Requirements Section V Works Requirements (WRQ) Section VI Bill of Quantities (BOQ) PART III Conditions of Contract and Contract Forms Section VII General Conditions of Contract (GCC) Section VIII Special Conditions of Contract (SCC) Section IX Contract Forms (COF)
	6.2 The Invitation for Bids (IFB) issued by the Employer is not part of the Bidding Document.
	6.3 The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the Invitation for Bids.
	6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document and to furnish with its bid all information and documentation as is required by the Bidding Documents. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.
7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting	7.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Employer in writing at the Employer's address indicated **in the BDS** or raise any question or curiosity during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received within the period as mentioned in ITB 7.5. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 17.2
	7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself, on its own risk and responsibility, all information that may be necessary for preparing the bid and entering into a Contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
	7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will

	release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
	7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for **in the BDS.** The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. 7.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer as mentioned **in BDS**.
	7.5 The Bidder is requested, to submit any questions in writing, to reach the Employer as mentioned **in BDS**.
	7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
	7.7 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
8. Amendment of Bidding Document	8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing addendum or several addenda.
	8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
	8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 19.2. However, the time available to submit bids shall not be less than five (5) days since amendment in bidding document.
C. Preparation of Bids	
9. Cost of Bidding	9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
10. Language of Bid	10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language specified **in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified **in the BDS**, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11. Documents Comprising the Bid	11.1 The Bid shall comprise the following: (a) Letter of Bid; (b) completed Bill of Quantities (BoQ), in accordance with ITB 12 and ITB 13, or as stipulated **in the BDS**; (c) Bid Security, in accordance with ITB 16; (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 17.2; (e) documentary evidence of establishing the Bidder's eligibility; (f) Bids submitted by a Joint Venture shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful Bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement. The Joint Venture agreement, or letter of intent to enter into a Joint Venture including a draft agreement shall indicate at least the parts of the Works to be executed by the respective partners; (g) Table of Price Adjustment (if applicable); and (h) any other required documents required, in the **BDS**.
	11.2 The Bidder is solely responsible for the authenticity of the submitted documents.
12. Letter of Bid and Schedules	12.1 The Letter of Bid, Schedules, and all documents listed under ITB 11, shall be prepared using the relevant forms in Section IV (Bidding Forms) and in Section VI (Bill of Quantities).The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
13. Bid Prices and Discounts	13.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Schedules shall conform to the requirements specified below.
	13.2 The Bidder shall submit a bid for the whole of the works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section VI (Bill of Quantities). In case of Unit Rate Contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.
	13.3 The price to be quoted in the Letter of Bid shall be the total price of the Bid, excluding any discounts offered. Absence of the total price in the Letter of Bid may result in rejection of the Bid.
	13.4 The Bidder shall quote any discounts and the methodology for their application in the Letter of Bid, in accordance with ITB 12.1.
	13.5 If so indicated in ITB 1.1 and ITB 29.4, bids are invited for individual Contracts or for any combination of Contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify

	in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 13.4, provided the bids for all Contracts are submitted and opened at the same time.
	13.6 Unless otherwise provided **in the BDS** and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Table of Adjustment Data in Section IV (Bidding Forms) and the Employer may require the Bidder to justify its proposed indices and weightings.
	13.7All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 30 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the Bidder.
14. Currency of Bid and Payment	14.1 The currency of the bid and payment shall be in Nepalese Rupees.
15. Period of Validity of Bids	15.1 Bids shall remain valid for the period specified **in the BDS.** The bid validity period shall start from the bid submission deadline as prescribed by the Employer in accordance with ITB 19.1. If the prescribed bid submission deadline date falls on a government holiday, then the next working day shall be considered as the bid submission deadline date. In such case the validity period of the bids shall be considered from the original bid submission deadline date. In the case of electronic bid submission, if any technical issue arises in the handling of the e-GP system, the PPMO may extend the deadline for bid submission. However, the validity period of the bids shall still be counted from the original bid submission deadline. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
	15.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 16, it shall also be extended 30 days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid and to include any additional conditions against the provisions specified in Bid Documents.
16. Bid Security	16.1 The Bidder shall furnish as part of its bid, in original form, a bid security as specified **in the BDS.** In case of e-submission of bid, the Bidder shall upload scanned copy of Bid security letter at the time of electronic submission of the bid. The Bidder accepts that the scanned copy of the Bid security shall, for all purposes, be equal to the original. The details of original Bid Security and the

	scanned copy submitted with e-bid should be the same otherwise the bid shall be non-responsive.
	16.2 The bid security shall be, at the Bidder's option, in any of the following forms: (a) an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law or; (b) a cash deposit voucher in the Employer's Account as specified **in BDS**. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV (Bidding Forms) or in another Form acceptable to the employer. The form must include the complete name of the Bidder. The bid security shall be valid for minimum thirty (30) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 15.2. A bid security valid for a shorter period shall be rejected by the Employer as nonresponsive.
	16.3 Any bid not accompanied by an enforceable and substantially compliant bid security shall be rejected by the Employer as nonresponsive. In case of e-Submission, if the scanned copy of an acceptable Bid Security letter is not uploaded with the electronic Bid, then Bid shall be rejected.
	16.4 The public entity shall return the bid securities except those that are to be forfeited as per ITB 16.5 to the respective bidders within three (3) days after the successful bidder has furnished the required performance security and signed the Contract Agreement pursuant, to ITB 34.1 and ITB 35.1.
	16.5 The bid security shall be forfeited if: (a) a Bidder requests for withdrawal or modification of its bid, except as provided in ITB 15.2: (i) during the period of bid validity specified by the Bidder on the Bid, in case of electronic submission; (ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Bid, in case of hard copy submission. (b) a Bidder changes the prices or substance of the bid while providing information pursuant to ITB 24.1; (c) a Bidder involves in fraud and corruption pursuant to ITB 3.1; (d) the successful Bidder fails to: (i) furnish a performance security in accordance with ITB 29.5, ITB 29.8 and ITB 34.1; or (ii) sign the Contract in accordance with ITB 35.1 or (iii) accept the correction of arithmetical errors pursuant to ITB 28.1; (e) if the bidder fails to inform about the saturation of the maximum number of contracts as per ITB 4.9.
	16.6 The Bid Security of a JV shall be in the name of the JV that submits the bid. If

	the JV has not been legally constituted at the time of bidding, the Bid Security shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.
17. Format and Signing of Bid	17.1 The Bidder shall prepare one original of the documents comprising the bid as described in ITB 11 and clearly mark it ORIGINAL". In addition, the Bidder shall submit copies of the bid in the number specified **in the BDS**, and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail. In case of e-submission of bid, the Bidder shall submit his bid electronically in PDF or web forms files as specified in ITB Clause 18.1(b),
	17.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified **in the BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid, except for un amended printed literature, shall be signed or initialed by the person signing the bid.
	17.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.
D. Submission and Opening of Bids	
18. Sealing and Marking of Bids	18.1 Unless otherwise specified **in BDS**, Bidders shall submit their bids by electronic or by mail/by hand/by courier. Procedures for submission, sealing and marking are as follows: (a) Bidders submitting bids by mail, by hand or by courier i. Bidders shall enclose the original and each copy of the Bid. These envelopes containing the original and the copies shall then be enclosed in one single envelope. ii. The inner and outer envelopes shall: (aa) bear the name and address of the Bidder; (bb) be addressed to the Employer as provided **in BDS**19.1; (cc)bear the specific identification of this bidding process indicated **in BDS** 1.1; and (dd) bear a warning not to open before the time and date for bid opening. iii. If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid. (b) Bidders submitting Bids electronically shall follow the electronic bid submission procedure specified **in BDS**.
19. Deadline for Submission of Bids	19.1 Bids must be received by the Employer at the address and no later than the date and time indicated **in the BDS**. In case of e-submission, the standard time for e-submission is Nepalese

	Standard Time as set out in the server. The e-procurement system will accept the e-submission of bid from the date of publishing of notice and will automatically not allow the e-submission of bid after the deadline for submission of bid.
	19.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
20. Late Bids	20.1 The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 19. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
21. Withdrawal, and Modification of Bids	21.1 A Bidder may withdraw, or modify its bid after it has been submitted either in hard copy or by e-submission. Procedures for withdrawal or modification of submitted bids are as follows: (i) Bids submitted in hard Copy a) Bidders may withdraw or modify its bids by sending a written notice in a sealed envelope, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 17.2 before 24 hours prior to the last deadline of submission of bid. The corresponding modification of the bid must accompany the respective written notice. All notices must be: (aa) prepared and submitted in accordance with ITB 17 and ITB 18, and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "MODIFICATION;" and (bb) received by the Employer twenty-four hour prior to the deadline prescribed for submission of bids, in accordance with ITB 19. ii) E-submitted bids. a) Bidder may submit modification or withdrawal prior to the deadline prescribed for submission of bids through e-GP system by using the forms and instructions provided by the system.
	21.2. Bids requested to be withdrawn in accordance with ITB 21.1 shall not be opened. In case of hard copy submission, the Bid will be returned unopened to the Bidders.
	21.3 Except in case of any modification or correction in bid document made by procuring entity, Bidder may submit request for withdrawal or modification only one time. 21.4 In case of hard copy bid, no bid may be withdrawn if the bid has already been modified; except in case of any modification or correction in bid document by procuring entity.
	21.5 Request for withdrawal or modification must be made through the same medium of submission. Request for withdrawal or modifications through

	different medium shall not be considered.
	21.6 The following provisions apply for withdrawal or modification of the Bids: (i) In case of bids submitted in hard copy no bid shall be withdrawn or modified in the interval between 24 hours prior to the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof. (ii) In case of e-submitted bids no bids shall be withdrawn or modified in the interval between deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.
	21.7 Once a Bid is withdrawn, bidder will not be able to submit another bid for the same bid.
22. Bid Opening	22.1 The Employer shall open the bids in public at the address, date and time specified **in the BDS** in the presence of Bidders` designated representatives who choose to attend.
	22.2 The Employer shall download the e-submitted bid files. The e-GP system allows the Employer to download the e-submitted bid files (report) only after bid opening date and time after login simultaneously by two members of the Bid opening committee.
	22.3 Electronically submitted bid shall be opened at first in the same time and date as specified above. Electronic Bids shall be opened one by one and read out. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files shall be considered incomplete.
	22.4 Thereafter, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be Permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "MODIFICATION" shall be opened and read out with the corresponding bid. No bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening. Only envelopes that are opened and read out at bid opening shall be considered further.
	22.5 All other envelopes shall be opened one at a time, reading out: the name of the Bidder; the Bid Price(s), including any discounts and alternative bids and indicating whether there is a modification; the presence of a bid security and any other details as the Employer may consider appropriate. Only discounts and alternative offers read out at bid opening shall be considered for evaluation. No bid shall be rejected at bid opening except for late bids, in accordance with ITB 20.1.

	22.6 The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, or modification; the Bid Price, per Contract if applicable, including any discounts and alternative offers; and the presence or absence of a bid security. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.
E. Evaluation and Comparison of Bids	
23. Confidentiality	23.1 Information relating to the examination, evaluation, comparison, and recommendation of Contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
	23.2 Any attempt by a Bidder to influence the Employer in the evaluation of the bids or Contract award decisions may result in the rejection of its bid.
	23.3 Notwithstanding ITB 23.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.
24. Clarification of Bids	24.1 To assist in the examination, evaluation, and comparison of the bids, the Employer may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the prices or substance of the bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids, in accordance with ITB 28. In case of e-submission of bid, upon notification from the employer, the bidder shall also submit the original of documents comprising the bid as per ITB 11.1 for verification of submitted documents for acceptance of the e-submitted bid.
	24.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Employer's request for clarification, its bid shall be rejected.
25. Deviations, Reservations, and Omissions	25.1 During the evaluation of bids, the following definitions apply: (a) "Deviation" is a departure from the requirements specified in the Bidding Document; (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
26. Determination of Responsiveness	26.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB 11.
	26.2 A substantially responsive bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material

	deviation, reservation, or omission is one that, (a) if accepted, would: (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.
	26.3 If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
	26.4 In case of e-submission bids, the Employer evaluates the bid on the basis of the information in the electronically submitted bid files. If the Bidder cannot substantiate or provide evidence to establish the information provided in e-submitted bid through documents/ clarifications as per ITB Clause 24.1, the bid shall not be considered for further evaluation.
27. Nonconformities, Errors, and Omissions	27.1 Provided that a bid is substantially responsive, the Employer may waive any non-conformities in the bid that do not constitute a material deviation, reservation, or omission.
	27.2 Provided that a bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the bid. Failure of the Bidder to comply with the request may result in the rejection of its bid.
	27.3 Provided that a bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the methods indicated in Section III (Evaluation and Eligibility Criteria).
	27.4 If the monetary value of such non-conformities is found to be more than fifteen percent of the Bid Price of the bidder on account of minor discrepancies pursuant to ITB 27.3, such bid shall be considered non responsive and shall not be involved in evaluation.
28. Correction of Arithmetical Errors	28.1 Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis: (a) only for unit price Contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity,

	the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and (c) If there is a discrepancy between the bid price in the Summary of Bill of Quantities and the bid amount in item (c) of the Letter of Bid, the bid price in the Summary of Bill of Quantities will prevail and the bid amount in item (c) of the Letter of Bid will be corrected. (d) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) ,(b) and (c) above.
	28.2 If a Bidder does not accept the correction of arithmetical errors, its bid shall be disqualified and its bid security shall be forfeited.
29. Evaluation of Bids	29.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.
	29.2 To evaluate a bid, the Employer shall consider the following: (a) the bid price, excluding Value Added Tax and Provisional Sums in the Summary Bill of Quantities, for Unit Rate Contracts, or Schedule of Prices for lump sum Contracts, but including Day work items, where priced competitively; (b) adjustment for correction of arithmetic errors in accordance with ITB 28.1; (c) adjustment due to discounts offered in accordance with ITB 13.4; (d) adjustment for nonconformities in accordance with ITB 27.3; (e) application of all the evaluation factors indicated in Section III (Evaluation and Eligibility Criteria); If the evaluated Bid Price of the Bidder is more than 30 (thirty) percent below or substantially higher than the cost estimate, the Employer shall reject the Bid as non-responsive.
	29.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
	29.4 If this Bidding Document allows Bidders to quote separate prices for different Lots (Contracts), and to award multiple Contracts to a single Bidder **as specified in BDS**, the methodology to determine the lowest evaluated price of the Contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III (Evaluation and Eligibility Criteria).
	29.5 If the bid for a Unit Rate Contract, evaluated as per ITB 30.1, is front-loaded or has quoted abnormally high rate for any item believing that the item was underestimated, the Employer **shall** require the Bidder to provide clarification along with detailed rate analysis, for any or all items of the Bill of Quantities

	as per ITB 24.1. The rate analysis submitted shall be analyzed and compared against prevailing norms and rates, on the basis of the work execution methodology, technology, and management methods specified by the bidder. If the clarification is deemed unsatisfactory, the Employer shall require that the amount of the performance security be increased at the expense of the Bidder as **specified in BDS**.
	29.6 In case of e-submission bids, the Employer evaluates the bid on the basis of the information in the electronically submitted bid files. If the Bidder cannot substantiate or provide evidence to establish the information provided in e-submitted bid through documents/ clarifications as per ITB Clause 24.1, the bid shall not be considered for further evaluation.
	29.7 If all the Bids evaluated are substantially higher than the cost estimate, the employer may negotiate with the bidder who submitted the lowest evaluated substantially responsive Bid to propose a lump sum discount rate in order to bring the bid price within the approved cost estimate. However, no change in the substance of the bid is permitted during the negotiations.
	29.8 If no agreement can be reached as per ITB 29.7, the employer shall cancel the procurement proceedings.
30. Comparison of Bids	30.1 The Employer shall compare all substantially responsive bids in accordance with ITB 29.2. The Employer shall determine the Average Bid Price of all the substantially responsive Bids. The Bid Price which is closest to the Average Bid Price AND is not substantially higher than the cost estimate shall be selected for awarding the contract. In case two or more Bid Prices are determined to be equally closest to the Average Bid Price, the Bid Price which is below the Average Bid Price shall be selected for awarding the contract.
	30.2 While evaluating the Bid Price as per ITB 30.1, if the Bid Price of two or more Bidders is found to be equal, the Employer shall select the bid for awarding the contract by drawing of lots in presence of Bidders' designated representatives who choose to attend in date, time and place as notified by the Employer in writing to the concerned bidders. The Bidders' representatives who are present shall be requested to sign a record evidencing their attendance. The omission of a Bidder's signature on the record or the absence of a Bidder during the drawing of lots shall not invalidate the contents and the effect of the record. The method of drawing of lots shall be determined by the Employer.
31. Employer's Right to Accept Any Bid, and to Reject Any or All Bids	31.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to Contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.
	31.2 The public entity shall give notice of the rejection of bids or the cancellation of the procurement proceedings pursuant to ITB 31.1, along with the reasons

	for such rejection or cancellation, to all bidders participating in the bid**.**
	31.3 Where any bidder requests, within thirty (30) days of the communication of the notice pursuant to ITB 31.2, the grounds for the rejection of all bids or the cancellation of the procurement proceedings, the public entity shall provide such information to that bidder**.**
F. Award of Contract	
32. Award Criteria	32.1 The Employer shall award the Contract to the Bidder whose Bid Price is selected as per ITB 29.7, ITB 30.1 or ITB 30.2 and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.
33. Letter of Intent to Award the Contract/Notification of Award	33.1 The Employer shall notify the concerned Bidder whose bid has been selected in accordance with ITB 32.1 within seven days of the selection of the bid, in writing that the Employer has intention to accept its bid and the information regarding the name, address and amount of selected bidder shall be given to all other bidders who submitted the bid.
	33.2 After issuance of the notice under ITB 33.1 if the concerned bidder provides information pursuant to ITB 4.9 regarding saturation of maximum number of contracts, the employer shall disqualify the bidder and shall select the next Bidder whose Bid Price is closest to the previously determined Average Bid Price in accordance with ITB 32.1 and notify accordingly as per ITB 33.1.
	33.3 If no bidder submits an application pursuant to ITB 36 within a period of seven days of the notice provided under ITB 33.1, the Employer shall, accept the bid selected in accordance with ITB 32.1 and Letter of Acceptance shall be communicated to the selected bidder prior to the expiration of period of Bid validity, to furnish the performance security and sign the contract within fifteen days.
	33.4 After communicating letter of acceptance under ITB 33.3, if the concerned bidder provides information pursuant to ITB 4.9 regarding saturation of maximum number of contracts, the employer shall reject the bid of that bidder and shall select the next Bidder whose Bid Price is closest to the previously determined Average Bid Price in accordance with ITB 32.1 and shall issue the notice accordingly as per ITB 33.1. In such case bid security of the rejected bidder shall not be forfeited.
34. Performance Security	34.1 Within Fifteen (15) days of the receipt of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security in an amount equal to 5 (five) percent of the Bid Price from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal in accordance with the conditions of Contract using Sample Form for the Performance Security included in Section IX (Contract Forms), or another form acceptable to the Employer. The Bid Price shall be without VAT but including Provisional Sum.

	34.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security. In that event the Employer may award the Contract to the next Bidder whose Bid Price is closest to the previously determined Average Bid Price in accordance with ITB 32.1 whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily. The process shall be repeated according to ITB 33.
35. Signing of Contract	35.1 The Employer and the successful Bidder shall sign the Contract Agreement within the period as stated ITB 34.1.
	35.2 At the same time, the Employer shall affix a public notice on the result of the award on its notice board and make arrangement for causing such notice to be affixed on the notice board also of the **District Coordination Committee, District Administration Office, Provincial Treasury and Controller Office and District Treasury and Controller Office**. The Employer may make arrangements to post the notice into its website, if it has; and if it does not have, into the website of the Public Procurement Monitoring Office, identifying the bid and lot numbers and the following information: (i) the result of evaluation of bid; (ii) date of publication of notice inviting bids; (iii) name of newspaper; (iv) reference number of notice; (v) item of procurement; (vi) name and address of bidder making contract and (vii) contract price.
	35.3 Within thirty (30) days from the date of issuance of notification pursuant to ITB 33.1 unsuccessful bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their bids were not selected. The Employer shall promptly respond in writing to any unsuccessful Bidder who, requests for debriefing.
	35.4 If the bidder whose bid is accepted fails to sign the contract as stated ITB 35.1, the Public Procurement Monitoring Office shall blacklist the bidder on recommendation of the Public Entity.
36. Complaint and Review	36.1 If a Bidder is dissatisfied with the Procurement proceedings or the decision made by the Employer in the intention to award the Contract, it may file an application to the Chief of the Public Entity within Seven (7) days of providing the notice under ITB 33.1 by the Public Entity, for review of the proceedings stating the factual and legal grounds.
	36.2 Late application filed after the deadline pursuant to ITB 36.1 shall not be processed.
	36.3 The chief of Public Entity shall, within five (5) days after receiving the application, give its decision with reasons, in writing pursuant to ITB 36.1: (a) whether to suspend the procurement proceeding and indicate the procedure to be adopted for further proceedings; or (b) to reject the application. The decision of the chief of Public Entity shall be final.

SECTION - II
Bid Data Sheet

This section consists of provisions that are specific to each procurement and supplement the information or requirements included in Section I. Instructions to Bidders.

A. General	
ITB 1.1	The number of the Invitation for Bids is : **NEA/BPICP/NCB/WORKS-01/2083/084**
ITB 1.1	The Employer is: ***Nepal Electricity Authority, Building and Physical Infrastructure Construction Project***
ITB 1.1	**Multiple Contract or lots (contracts) is *Not Applicable***
ITB 2.1	The name of the Project is: Construction of Covered Hall at Dhangadi DCS, Kailali**,** The implementing agency is: ***Nepal Electricity Authority***
ITB 4.1 (a)	Maximum number of partner in a joint venture shall be : ***3 (three)***
ITB 4.2	For GoN funded: Eligible countries: ***Nepal***
ITB 4.4	For GoN: *https://blacklist.ppmo.gov.np/blacklisted*
ITB 4.8 & ITB 4.9	For GoN Funded: The Bidder, including all parties constituting the Bidder, shall be ineligible to participate in the open competitive bidding process if it has already secured **five (5)** construction contracts (in open competitive bidding) and has not yet completed the work as stipulated in the respective contracts. Following Procurement of Works contracts shall not be counted for this purpose: a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D) b) The works for which tender have been invited and contracts accepted after 2078-12-03 B.S (March 17, 2022 A.D) but the work acceptance report has been approved according to Rule 117 of PPR. c) The works for which tenders were invited or contracts accepted under all types of foreign assistance.
ITB 5.1	For GoN funded: For the purpose of Country of Origin: "all Countries"
B. Bidding Document	
ITB 7.1	For clarification purposes only, the Employer's address is: Attention: Project Manager Address: Bhagwanpau, Kathmandu, Nepal Telephone: : 01-4537675, 01-4537665 Electronic mail address: bpicp@nea.org.np

ITB 7.4	A Pre-Bid meeting **shall not be** held. A site visit ***shall not be*** organized by the Employer.
ITB 7.5	Time for request: Requests for clarification should be received by the Employer no later than 10 days prior to the deadline for submission of bids.
C. Preparation of Bids	
ITB 10.1	The language of the bid is: English/ Nepali
ITB 11.1 (b)	In accordance with ITB 12 and ITB 14, the following schedules shall be submitted with the bid, including the priced Bill of Quantities for Unit Rate Contracts and Schedule of Prices for lump sum contracts: _____
ITB 11.1 (h)	The Bidder shall submit with its bid the following additional documents: [***insert if any additional documents required which is not against the provision of Public Procurement Act/Regulation/Directives and Standard Bidding Document issued by PPMO***].
ITB 13.6	The prices quoted by the Bidder ***shall not be*** subject to adjustment during the performance of the Contract.
ITB 15.1	The bid validity period shall be: ***Ninety (90) days***.
ITB 16.1	The Bidder shall furnish a bid security, from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal with a minimum of **NRs *200000.00 (In words: Two lakhs Rupees Only)***, which shall be valid for 30 days beyond the validity period of the bid.
ITB 16.2 (b)	Account Name: NEA BUILDING AND PHYSICAL INFRASTRUCTURE Bank Name: Nabil Bank Limited Bank Address: Kathmandu Account Number: 00201017505561
ITB 17.1	In addition to the original of the bid, the number of copy/ies is/are: ***Not Applicable***
ITB 17.2	The written confirmation of authorization to sign on behalf of the Bidder shall indicate: (a) The name and description of the documentation required to demonstrate the authority of the signatory to sign the Bid such as a Power of Attorney; and (b) In the case of Bids submitted by an existing or intended JV, an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.

<table>
<tr><th colspan="2">D. Submission and Opening of Bids</th></tr>
<tr><td>ITB 18.1</td><td>Bidders shall have the option of submitting their bids: by electronic only</td></tr>
<tr><td>ITB 18.1 (b)</td><td>
<u>Electronic bid submission procedure:</u>
(a) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in this clause.
i. Bidders who choose to submit their bids electronically, can view/download the bidding documents from "published bids" section of e-GP system, https://bolpatra.gov.np/egp.
ii. For the purpose of e-Submission, the bidder shall, at first, register in e-GP system and maintain their organization profile data and documents required during bid response preparation. The details of e-GP registration and profile management procedure are specified in Article No 9 and 10 respectively of e-GP Directives issued by PPMO, which can be downloaded from Download section of e-GP system.
iii. The bidders shall prepare their bids using data and documents maintained in bidder's profile, instruction provided by e-GP system and forms/format provided in the bidding document.
iv. Bidders may submit bids as a single entity or as a joint venture (JV). Bidder submitting bid in JV shall have to upload joint venture agreement along with partner(s) Bolpatra ID provided during bidder's registration.
v. Bidders (all partners in case of JV) shall update their profile data and documents required during preparation and submission of their bids.
vi. In case of bid submission in JV, the consent of the partners shall be obtained through the confirmation link sent to the registered email address and the partners shall have to acknowledge their confirmation.
vii. Bidders shall submit the required documents as specified in Section I-Instruction to Bidders, Section II-Bid Data Sheet and Section III-Evaluation and Eligibility Criteria of the bidding document. The format of the documents shall be in PDF and/or web form as provisioned in the e-GP system.
The required forms and documents shall be part of bid.
<table>
<tr><th>No.</th><th>Document</th><th>Requirement</th><th>Remarks</th></tr>
<tr><td>1.</td><td>Letter of Bid</td><td>Mandatory</td><td>PDF</td></tr>
<tr><td>2.</td><td>Bid Security / Bank Guarantee</td><td>Mandatory</td><td>PDF</td></tr>
<tr><td>3.</td><td>Firm or Company registration Certificate</td><td>Mandatory</td><td>PDF</td></tr>
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</td></tr>
</table>

4.	VAT and PAN registration Certificate	Mandatory (for domestic bidders only)	PDF
5.	Business Registration Licence	Mandatory	PDF
6.	Tax Clearance Certificate / Tax return submission evidence / evidence of time extension	Mandatory (for domestic bidders only)	PDF
7.	Power of Attorney of Bid signatory	Mandatory	PDF
8.	Joint venture agreement	Mandatory in case of JV Bids Only	PDF
9.	Completed Bill of Quantities (BoQ)	Mandatory	Online Forms
10.	Price Adjustment Table (if Applicable)	Mandatory (If Applicable)	Online Forms
11.	Additional documents specified in ITB 11.2 (h)	Mandatory (If any)	PDF

Note:

a) The documents specified as "Mandatory" should be included in e-submission and non-submission of the documents shall be considered as non-responsive bid.

b) Bidders (all partners in case of JV) should verify/update their profile documents as appropriate for the specific bid before submitting their bid electronically.

viii. After providing all the details and documents, the e-GP system will generate bid response documents for the bidder. Bidders shall download, verify and confirm the bid response documents prior to bid submission.

ix. For verifying the authentic user, the system will send one time password (OTP) in the registered e-mail address of the bidder. System will validate the OTP and then only allow bidders to submit their bid.

x. Electronically submitted bids can be modified and/or withdrawn through the system within the bid submission deadline.

xi. The bidder/bid shall meet the following requirements and conditions for e-submission of bids;

aa) The e-submitted bids must be readable through PDF reader.

bb) The bidders are fully responsible for using the e-GP system as per specified procedures and in no case the employer shall be held liable for bidder's inability to use the system.

cc) When a bidder submits electronic bid through the e-GP System, it is assumed that the bidder has prepared the bid by studying and examining

	the complete set of the bidding document and e-GP instruction including the provision stipulated in e-GP Directives.
ITB 19.1	**<u>For bid submission purposes only, the Employer's address is :</u>** Attention: Project Manager Address: Bhagwanpau, Kathmandu, Nepal **<u>The deadline for bid submission is :</u>** Date : 8/25/2083 Time: 12:00 Hours.
ITB 22.1	The bid opening shall take place at : Address : Bhagwanpau, Kathmandu, Nepal Date : 8/25/2083 Time : ***12.15 Hours***
E. Evaluation and Comparison of Bids	
ITB 29.4	Bidders are ***not permitted*** to quote separate prices for lots (Contracts).
ITB 29.5	The amount of the performance security be increased by Eight (8) percent of the quoted bid price (without VAT but Including PS).

SECTION - III
Evaluation and Eligibility Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and eligible Bidders. GoN/DP requires bidders to be qualified by meeting predefined eligibility criteria. In accordance with ITB 29, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section IV (Bidding Forms).

1. Evaluation

In addition to the criteria listed in ITB 29.2 (a) - (e) the following criteria shall apply:

1.1 Multiple Contracts

Pursuant to Sub-Clause ITB 29.4 of the Instructions to Bidders, if Works are grouped in multiple contracts, evaluation will be as follows:

Works are grouped in multiple contracts and pursuant to Sub-Clause 29.4 of the Instructions to Bidders, the Employer will evaluate and compare Bids on the basis of a contract, or a combination of contracts, or as a total of contracts in order to arrive at the least cost combination for the Employer by taking into account discounts offered by Bidders in case of award of multiple contracts.

1.2 Quantifiable Nonconformities and Omissions

Subject to ITB 13.2 and ITB 29.2, the evaluated cost of quantifiable nonconformities including omissions, is determined as follows:

[***Insert in bidding document:*** "Pursuant to ITB 27.3, the cost of all quantifiable nonmaterial nonconformities shall be evaluated, but excluding omission of prices in the Bill of Quantities. The Employer will make its own assessment of the cost of any nonmaterial nonconformities and omissions for the purpose of ensuring fair comparison of bids."]

2. Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
2.1 Conflict of Interest					
No conflicts of interest in accordance with ITB Sub-Clause 4.3.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Bid
2.2 Government/DP Eligibility					
Not having been declared ineligible by government/DP, as described in ITB Sub-Clause 4.4.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Bid

2.3 Government-owned Entity					
Bidder required to meet conditions of ITB Sub-Clause 4.5.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Bid, Forms ELI - 1, ELI - 2, with attachments
2.4 UN Eligibility					
Not having been declared ineligible based on a United Nations resolution or Employer's country law, as described in ITB Sub-Clause 4.7.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Bid
2.5 Bidder's Running Contracts					
Bidder's have not yet secured five (5) number of construction contracts[2](in open competitive bidding) as described in ITB Sub-Clause 4.8.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Bid, Form ELI-3
2.6 Other Eligibility					
Firm or Company Registration Certificate	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
Business Registration License	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
VAT and PAN Registration certificate	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment

[2]Note: Following Procurement of Works contracts shall not be counted for this purpose:

a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S or March 17, 2022 A.D

b) The works for which tender have been invited and contracts accepted after 2078-12-03 B.S or i.e March 17, 2022 A.D and accepted but the work acceptance report has been approved according to Rule 117 of PPR.

c) The works for which tenders were invited or contracts accepted under all types of foreign assistance

Tax clearances certificate for the **F/Y 2082/083** or Tax return submission evidence or evidence of tax time extension for.	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
Additional requirements ***[Insert if any]***	…….	……	……	……	……

SECTION - IV

Bidding Forms

This Section contains the forms which are to be completed by the Bidder and submitted as part of its Bid.

Letter of Bid

The Bidder must accomplish the Letter of Bid in its letterhead clearly showing the Bidder's complete name and address.

Date: .....

Name of the contract: .....

Invitation for Bid No.: .....

To: ***[Insert Complete name of Employer]*** ……

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) Clause 8;

(b) We offer to execute in conformity with the Bidding Documents the following Works: ***[Insert Description of the works].***

(c)The total price of our Bid, excluding any discounts offered in item (d) below is: ***[Insert one of the options below as appropriate]*** or when left blank is the Bid Price indicated in the Bill of Quantities.

Option 1, in case of single contract: Total price is: ***[insert the total price of the Bid in words and figures]***;

Or

Option 2, in case of multiple lots (contracts): (i) Total price of each lot (contracts): ***[insert the total price of each lot in words and figures]***; (ii) Total price of subject contract [say Lot1] and Lot2 [another contract] [insert the total price in words and figures]; (iii) Total price of subject contract [say Lot1]and Lot3 [another contract] ***[insert the total price in words and figures]***; Total price of subject contract [say Lot1], Lot2 [another contract], Lot3 [another contract], **……..*[insert the total price in words and figures];***

(d) The discounts offered and the methodology for their application for subject contract [single contract] are:…….. [For Bidding Documents not provisioning multiple contracts]

Add following if Bidding Document provisions applicability of multiple contracts

The discounts offered and the methodology for their application for subject contract [say Lot1] and Lot2 [another contract] are:……..

The discounts offered and the methodology for their application for subject contract [say Lot1] and Lot3 [another contract] are:……..

The discounts offered and the methodology for their application for subject contract [say Lot1], Lot2 [another contract] and Lot3 [another contract],……,
are:……..

[Note:

1. Formulate possible combinations depending upon the number of lots under Bidding Process and modify accordingly Paragraph (c) and (d)]

(e) Our bid shall be valid for a period of ……..***[insert validity period as specified in ITB 15.1]*** days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(f) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document;

(g) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries or any countries [insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a consortium or association, and the nationality of each Subcontractor and Supplier];

(h) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3;

(i) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.3;

(j) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;

(k) *[*We are not a government owned entity*]* / *[*We are a government owned entity but meet the requirements of ITB 4.5*]*; *

(l) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed;

(m) We declare that, we have not been black listed as per ITB 3.4 and no conflict of interest in the proposed procurement proceedings and we have not been punished for an offense relating to the concerned profession or business.

(n) We declare that we have not yet secured five (5) number of constructions contracts[3] (in open competitive bidding) as described in ITB Sub-Clause 4.9.

(o) We understand that you are not bound to accept the bid closest to the Average Bid Price or any other bid that you may receive; and

(p) If awarded the contract, the person named below shall act as Contractor's Representative:

(q) We agree to permit the Employer/DP or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by the Employer.

(r) We declare that we are solely responsible for the authenticity of the documents submitted by us. The document and information submitted by us are true and correct. If any document/information given is found to be concealed at a later date, we shall accept any legal actions by the Employer.

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

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

Signed ***[signature of the person whose name and capacity are shown above]***……

Duly authorized to sign the Bid for and on behalf of ***[insert complete name of the Bidder]***……

Date ***[insert date of signing]***…….....

---

[*] Note: Use one of the two options as appropriate.

[3] Note: Following Procurement of Works contracts shall not be counted for this purpose

a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D).

b) The works for which tender have been invited and contracts accepted after 2078-12-03 B.S (March 17, 2022 A.D) and accepted but the work acceptance report has been approved according to Rule 117 of PPR.

c) The works for which tenders were invited or contracts accepted under all types of foreign assistance.

Table of Price Adjustment Data[4]

[To be used if Price Adjustment is applicable as per GCC 53.1]

Code	Index Description	Source of Index*	Base Value and Date	Employer's Proposed Weighting Range (coefficient)	Bidder's Proposed Weighting (coefficient)**
1	**2**	**3**	**4**	**5**	**6**
	Non - adjustable (A)			0.15	0.15
	Labor (b)				
	Materials (c)***				
	…				
	Equipment usage (d)				
		Total			**1.00**

*Normally following source of index shall apply. Public Entity shall choose applicable Index for each item.

(a) Labor:

"National Salary and Wage Rate Index"- "Construction Labor" of Nepal Rastra Bank

or

rate fixed by District Rate Fixation Committee

(b) Material: "National Wholesale Price Index" - Construction Materials" of Nepal Rastra Bank

(c) Equipment usage:

"National Wholesale Price Index"-"Machinery and Equipment" of Nepal Rastra Bank

or

"Fuel" Price fixed by Nepal Oil Corporation.

** Bidders proposed weightings should be within the range specified by the Employer in column - 5

***Note: The materials can be broken down into major construction materials if necessary. In this case the source of index shall be the specified by Employer, preferably as per the published ex-factory price or published price from the sole authorized seller.

[4] Non-compliance of the data (stipulated by the bidder in this table) with requirements described here shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

Table of Price Adjustment Data[5]

[To be used if Price Adjustment is applicable as per GCC 53.6]

Code	Construction Material*	Unit	Base Price (NRs/Unit) (Ex-factory)	Source (Factory)**
1	2	3	4	5

* Major construction materials to be specified by Employer in column - 2.

** Base Price and source normally to be specified by Employer (or alternatively informed to be proposed by bidder) in column 4 and5.

Note:
The base prices of the construction materials shall be taken as of 30 days before the deadline for submission of the Bid as quoted by the Bidder and verified by the Employer. For the purpose of calculation of price adjustment, the Ex-factory price of the same source shall be taken into consideration.

[5] Non-compliance of the data (stipulated by the bidder in this table) with requirements described here shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

Bid Security

Bank Guarantee

Bank's Name, and Address of Issuing Branch or Office

(On letterhead paper of the Bank)

Beneficiary: ..... ***[Insert name and address of Employer]*** …….

Date: ……...

Bid Security No.: .....

We have been informed that . …….. ***.[insert name of the Bidder]*** (hereinafter called "the Bidder") intends to submit its bid (hereinafter called "the Bid") to you for the execution of ……... ***[Insert name of Contract*** **.** …… under Invitation for Bids No. ……***[insert IFB No.]*** ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we……. . ***[Insert name of Bank]*** …….. hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of Nepalese Rupees. . ***……...[Insert amount in figures and amount in words]*** upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

(a) has withdrawn or modifies its Bid:

(i) during the period of bid validity specified by the Bidder on the Letter Bid, in case of electronic submission

(ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Bid, in case of hard copy submission; or

(b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or

(c) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the performance security, in accordance with the ITB; or

(d) is involved in fraud and corruption in accordance with the ITB; or

(e) a Bidder changes the prices or substance of the bid while providing information pursuant to ITB 24.1; or

(f) if the bidder fails to inform about the saturation of the maximum number of contracts as per ITB 4.9.

This guarantee will remain in force up to and including the date ……**number**……days after the deadline for submission of Bids as such deadline is stated in the instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not letter than the above date.

This Bank guarantee shall not be withdrawn or released merely upon return of the original guarantee by the Bidder unless notified by you for the release of the guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG), 2010 Revisions, ICC Publication No. 758 .except that the supporting statement under Article 15(a) is hereby excluded.

. . .Bank's seal and authorized signature(s) . . .

Note:

The bid security of ……..……. has been counter guaranteed by the Bank ……..……... ...…… on ……....……..……. (Applicable for Bid Security of Foreign Banks).

Bidder's Information Format

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Bidder's Information

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of JV, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following original documents.	
1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm or JV named in above, in accordance with ITB 17.2. 3. In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. 4. In case of a government-owned entity, any additional documents not covered under 1 above required to comply with ITB 4.5.	

Form ELI - 2: JV Information Sheet

Each member of a JV must fill in this form

JV / Specialist Subcontractor Information	
Bidder's legal name	
JV Partner's or Subcontractor's legal name	
JV Partner's or Subcontractor's country of constitution	
JV Partner's or Subcontractor's year of constitution	
JV Partner's or Subcontractor's legal address in country of constitution	
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following original documents.	
1. articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm named above, in accordance with ITB .2. 3. In the case of government-owned entity, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5.	

Form ELI - 3: Bidder's Running Contracts****

Each member of a JV must fill in this form

	Bidder's Running Contracts				
Name of office	**Contract Identification no.**	**Source of Fund***	**Date of issuance of Letter of Acceptance**	**Status of contract****	**Date of Issuance of Taking Over Certificate*****

* Mention GON funded or DP funded or Other PE (Insert name) funded

** Mention "Yet to sign" if contract is not signed, "Running" if contract has been signed and contract is running and "Substantially completed" if taking over certificate has been issued.

*** Insert date of issuance of taking over certificate if the awarded contract has been substantially completed and taking over certificate has been issued.

****Note: Following Procurement of Works contracts shall not be counted for this purpose

a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D).

b) The works for which tender have been invited and contracts accepted 2078-12-03 B.S (March 17, 2022 A.D) but the work acceptance report has been approved according to Rule 117 of PPR.

c) The works for which tenders were invited or contracts accepted under all types of foreign assistance.

Part – II

REQUIREMENTS

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SECTION - V
Works Requirements

This Section contains the Scope of Work, Specification, the Drawings, and supplementary information that describe the Works to be procured.

Scope of Work

Construction of 240 Sq.m -Covered Hall at Dhangadi DCS which includes mainly civil, and architectural works as mentioned in Specifications

Specifications

Notes on the Specifications

A set of precise and clear specifications is a prerequisite for Bidders to respond realistically and competitively to the requirements of the Employer without qualifying or conditioning their Bids. The specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, and performance of the goods and services to be procured. Only if this is done will the objectives of economy, efficiency and fairness in procurement be realized, responsiveness of Bids be ensured, and the subsequent task of bid evaluation facilitated. The specifications should require that all goods and materials to be incorporated in the Works be new, unused, of the most recent or current models, and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.
Samples of specifications from previous similar projects are useful in this respect. The use of metric units is encouraged by the Funding Agency in case of funding assisted projects. Most specifications are normally written specially by the Employer or Project Manager to suit the Contract Works in hand. The available standard specification of works of Ministry of Physical Infrastructure and Transport, DoLI and Other line Ministries can be adopted for respective civil construction works.
There are considerable advantages in standardizing General Specifications for repetitive Works in recognized public sectors, such as highways, urban housing, irrigation, and water supply, in the same country or region where similar conditions prevail. The General Specifications should cover all classes of workmanship, materials, and equipment commonly involved in construction, however it may not necessarily be adequate to be used in a particular Works Contract and may necessitate preparation of Particular (Special) Specifications to amend and or supplement the provision of the General Specifications to meet the requirement of the particular Works.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for goods, materials, and workmanship, recognized international standards should be used as much as possible. Where other particular standards are used, whether national standards of Nepal or other standards, the specifications should state that goods, materials, and workmanship that meet other authoritative standards, and which ensure substantially equal or higher quality than the standards mentioned, will also be acceptable.

Employers should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in the Procurement Documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential bidders. For example:

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

Such alternative solutions shall be accompanied by all information necessary for a complete evaluation by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details.

Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Project Manager's prior review and written consent. Differences between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor and submitted to the Project Manager at least 30 days prior to the date when the Contractor desires the Project Manager's consent. In the event the Project Manager determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents. These Notes for Preparing Specifications are intended only as information for the Employer or the person drafting the Procurement Documents. They should not be included in the final documents.

Specification attached in Volume II.

Drawings

Note:

1. It is customary to bind the drawings in a separate volume, which is often larger than other volumes of the contract documents. The size will be dictated by the scale of the drawings, which must not be reduced to the extent that details are reduced illegible.

2. A simplified map showing the location of the Site in relation to the local geography, indicating major roads, posts, airports, and railroads, is helpful.

3. The construction drawings, even if not fully developed, must show sufficient details to enable bidders to understand the type and complexity of the work involved and the price the Bill of Quantities.

Drawings attached in Volume III.

Supplementary Information

[insert supplementary information if any]

SECTION - VI
Bill of Quantities[6]

Notes for Unit Rate Contracts:

Objectives

The objectives of the Bill of Quantities are

(a) to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and

(b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

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

Content

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

(a) Preamble;

(b) Work Items (grouped into parts);

(c) Day works Schedule;

d) Provisional Sums; and

(d) Summary.

Preamble

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

Work Items

The items in the Bill of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the works may be grouped as a separate section in the Bill of Quantities.

Day work Schedule

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

[6]In lump sum contracts, delete "Bill of Quantities" and replace with "Schedule of Activities" throughout this section.

(a) A list of the various classes of labour, materials, and Constructional Plant for which basic day work rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a day work basis.

(b) Nominal quantities for each item of Day work, to be priced by each Bidder at Day work rates as bid. The rate to be entered by the Bidder against each basic Day work item should include the Contractor's profit, overheads, supervision, and other charges.

Provisional Sums

A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the Contract Data should state the manner in which they will be used, and under whose authority (usually the Project Manager's).

Summary

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

These Notes for Preparing Specifications are intended only as information for the Employer or the person drafting the Bidding documents. They should not be included in the final documents.

Preamble of Bill of Quantities

A. General

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Project Manager and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Project Manager may fix within the terms of the Contract.

3. For any item for which measurement is based on records made before or during construction the records shall be prepared and agreed between the Engineer and the Contractor. Should the Contractor carry out such work without the prior agreement of the Engineer, the Engineer may request the Contractor to carry out investigations to confirm the extent of the work and the quantity of work certified for payment shall be solely at the Engineer's discretion. The cost of any such investigation shall be borne by the Contractor.

4. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

5. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

6. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

7. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities. The Specification Clause references, where given in the item description of the Bills of Quantities, are for the convenience of bidders and generally refer to the principal relevant- specification clause but do not necessarily represent the whole of the specification requirements for the work required within the item. The presence of a Specification clause reference shall not in any way reduce the Bidders obligation to complete work in accordance with all the requirements of the Specification.

8. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager in accordance with the Conditions of Contract.

9. The method of measurement of completed work for payment shall be in accordance with the Specifications.

10. The abbreviations and symbols used in this Bill of Quantities are: ***[Insert as applicable]***

B. Day work Schedule

a) **General**

1. Work shall not be executed on a day work basis except by written order of the Project Manager. Bidders shall enter basic rates for day work items in the Schedules. These rates shall apply to any quantity of day work ordered by the Project Manager. Nominal quantities have been indicated against each item of day work, and the extended total for day work shall, be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for day work shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

b) Day work Labor

1. In calculating payments due to the Contractor for the execution of day works, the hours for labor will be reckoned from the time of arrival of the labor at the job site to execute the particular item of day work to the time of departure from the job site, but excluding meal breaks and rest periods. Only the time of classes of labor directly doing work ordered by the Project Manager and are competent to perform such work will be measured. The time of gangers (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.
2. The Contractor shall be entitled to payment in respect of the total time that labor is employed on day work, calculated at the basis rates entered by it in the " SCHEDULE OF DAY WORK RATES: 1. LABOR". The rates for labor shall be deemed to cover all costs to the Contractor including (but not limited to) i) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances, ii) any sums

paid to or on behalf of such labor for social benefits in accordance with Nepal law, iii) Contractor's profit, overheads, superintendence, liabilities and insurance and iv) charges incidental to the foregoing.

c) Day work Equipment

1. The Contractor shall be entitled to payments in respect of Constructional Plant already on site and employed on day work at the basis rental rates entered by him in the "SCHEDULE OF DAY WORK RATES:2 EQUIPMENT". The said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricant, and other consumables and all overhead, profit and administrative costs related to the use of such equipment. The cost of drivers, operators and assistants also shall be included in the rate of the equipment and no separately payment shall be made for it.
2. In calculating the payment due to the Contractor for Constructional Plant employed on day work, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Project Manager, the travelling time from the part of the Site where the Construction Plant was located when ordered by the Project Manager to be employed on day work and the time for return journey there to shall be included for payment.

d) Day work Materials

1. The Contractor shall be entitled to payment in respect of materials used for day work (except for materials for which the cost is included in the percentage addition to labor costs as detailed heretofore), at the rates entered by him in the "SCHEDULE OF DAY WORK RATES: 3 MATERIALS" and shall be deemed to include overhead charges and profit as follows;

   (i) the rates for materials shall be calculated on the basis of the invoiced price, freight, insurance, handling expenses, damage, losses, etc. and shall provide for delivery to store for stockpiling at the Site.

   (ii) the cost of hauling materials for use on work ordered to be carried out as day work, from the store or stockpile on the Site to the place where it is to be used also shall be include in the same rate.

Provisional Sums

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Employer to select such specialized contractors. To provide an element of competition among the Bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

Bill of Quantities

[insert Bill of Quantities]

PART-III CONDITIONS OF CONTRACT AND CONTRACT FORMS

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Section VII: General Conditions of Contract

Nepal Electricity Authority

Construction of Covered Hall at Dhangadi DCS, Kailali,NEA/BPICP/NCB/WORKS-01/2083/084

General Conditions of Contract

This Section provides the General Conditions of Contract that will apply to the Contract for which the Biding document is issued.

General	
1. Definitions	1.1 Boldface type is used to identify defined terms. (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects. (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events. (c) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid. (d) **Compensation Events** are those defined in GCC 50 hereunder. (e) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 68.1. (f) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below. (g)The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer. (h)The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer. (i)The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract. (j) **Days** are calendar days; months are calendar-months. (k) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant. (l) A **Defect** is any part of the Works not completed in accordance with the Contract. (m) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor. (n) The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects. (o) **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract. (p) The **Employer** is the party who employs the Contractor to carry out the Works, as **specified in the SCC**. (q) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works. (r) **Force Majeure** means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not

	reasonably have avoided or overcome; and, which is not substantially attributable to the other Party. (s) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance. (t) **In writing** or **written** means hand written, type written, printed or electronically made, and resulting in permanent record. (u) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is **specified in the SCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order. (v) **Letter of Acceptance** means the formal acceptance by the Employer of the Bid and denotes the formation of the contract at the date of acceptance. (w) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works. (x) **Party** means the Employer or the Contractor, as the context requires. (y) **SCC** means Special Conditions of Contract (aa) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function. (bb) The **Project Manager** is the person **named in the SCC** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract. (cc) **Retention Money** means the aggregate of all monies retained by the Employer pursuant to GCC 54.1. (dd) **Schedules** means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Bids, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices. (ee) The **Site** is the area defined **as such in the SCC.** (ff) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site. (gg) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager. (hh) The **Start Date** is given i**n the SCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates. (ii) 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. (jj) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works. (kk) A **Variation** is an instruction given by the Project Manager which varies the Works (ll) The **Works** are what the Contract requires the Contractor to construct, install,

	and turn over to the Employer, as **defined in the SCC**.
2. Interpretation	2.1 In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
	2.2 If sectional completion is **specified in the SCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
	2.3 The documents forming the Contract shall be interpreted in the following order of priority: (a) Contract Agreement, (b) Letter of Acceptance, (c) Letter of Bid, (d) Special Conditions of Contract, (e) General Conditions of Contract, (f) Specifications, (g) Drawings, (h) Bill of Quantities (or Schedules of Prices for lump sum contracts), and (i) Any other document **listed in the SCC** as forming part of the Contract.
3. Language and Law	3.1 The language of the Contract and the law governing the Contract are **stated in the SCC**.
	3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when (a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Employer's Country prohibits any import of goods from, or any payments to, a particular country, person, or entity. Where the Employer's country prohibits payments to a particular firm or for particular goods by such an act of compliance, that firm may be excluded.
4.Contract Agreement	4.1 The Parties shall enter into a Contract Agreement within 15 days after the Contractor receives the Letter of Acceptance, unless the Special Conditions establish otherwise. The Contract Agreement shall be based upon the attached Contract forms in Section IX.
	4.2 Without altering the basic nature or scope of work, the contract may be amended upon mutual written consent as per prevailing Public Procurement Law.

5. Assignment	5.1 Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party (a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party; and (b) may, as security in favor of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.
6. Care and Supply of Documents	6.1 The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, one copy of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.
	6.2 Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.
	6.3 The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.
	6.4 If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.
7. Confidential Details	7.1 The Contractor's and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify the Contractor's compliance with the Contract and allow its proper implementation.
	7.2 Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.
	7.3 Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this Clause.
8. Compliance with Laws	8.1 The Contractor shall, in performing the Contract, comply with applicable Laws of Nepal.

9. Joint and Several Liability	9.1 If the Contractor is a joint venture of two or more entities , all such entities shall be jointly and severally liable to the Employer for the fulfillment of the provisions of the Contract, and shall designate one of such persons to act as a leader with authority to bind the joint venture. **The contractor shall not handover the responsibility of the contract to any one member or some members of Joint Venture or any other parties, not involved in the contract.** The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.
10. Project Manager's Decisions	10.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
11. Delegation	11.1 The Project Manager may delegate any of his duties and responsibilities to other people after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
12. Communications	12.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices and requests, these communications shall be: (a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as **stated in the SCC**; and (b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract. However: (i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and (ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued. Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed.
	12.2 A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.
13. Subcontracting	13.1 **For GON Funded:** A list of approved Subcontractors including its value/works is included as Article 2 (k) of contract Agreement. Approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties, or responsibilities under the contract. **For DP Funded:** 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. Bidders may propose subcontracting up to the percentage of total value of contracts as specified in the SCC. The Sub contractor shall meet the qualification

	requirement as specified **in SCC.** 13.2 The contractor shall give prior notice to the Employer clearly specifying the nature, scope, and responsibilities of the work to be performed, to engage other subcontractors, material suppliers, equipment suppliers, service providers, or other persons or entities during the implementation of the contract. 13.3 Before notifying the Employer as per GCC 13.2, the contractor shall enter into a written agreement with the subcontractor, material suppliers, equipment suppliers, service providers, or other persons or entities clearly specifying the scope of work, responsibilities, quality requirements, duration, payment terms, security, labor-related obligations, and conditions relating to performance of the work. 13.3 Any subcontracting arrangement made in accordance with GCC 13.2 shall not relieve the Contractor of any of its obligations or liabilities under the Contract. 13.4 The contractor shall provide the Employer with details of the payments made to the subcontractor, material suppliers, equipment suppliers, service providers, or other persons or entities engaged under GCC 13.1 and/or GCC 13.2. 13.5 If the contractor is found not to have made payment to the subcontractor, material suppliers, equipment suppliers, service providers, or other persons or entities engaged under GCC 13.1 and/or GCC 13.2 in accordance with the terms of the agreement, the Employer may determine the amount payable to such subcontractor, material suppliers, equipment suppliers, service providers, or other persons or entities and make payment to them from any remaining dues to be paid to the contractor, retention money, or forfeited performance security.
14. Other Contractors	14.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, **as referred to in the SCC**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification
15 Personnel and Equipment	15.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid to carry out the Works, or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.
	15.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.
	15.3 If the Employer, Project Manager, or Contractor determines, that any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive,

	coercive, or other prohibited practices during the execution of the Works, then that employee shall be removed in accordance with Clause 15.2 above.
16. Employer's and Contractor's Risk	16.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
17. Employer's Risks	17.1 From the Start Date until the Defects Liability Certificate has been issued, the following are 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 the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.
	17.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to (a) a Defect which existed on the Completion Date, (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or (c) the activities of the Contractor on the Site after the Completion Date.
18. Contractor's Risks	18.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.
19. Insurance	19.1 The Contractor shall provide insurance in the joint names of the Employer and the Contractor from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles **stated in the SCC** for the following events which are due to the Contractor's risks: (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.
	19.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the proportions of Nepalese Rupees required to rectify the loss or damage incurred.
	19.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
	19.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager.
	19.5 Both parties shall comply with any conditions of the insurance policies.
20. Site Investigation Reports	20.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to **in the SCC**, supplemented by any information available to the Contractor.
21. Contractor to Construct the Works	21.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
22. The Works to Be Completed within intended Completion Date	22.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them within the intended Completion Date.
23. Design by contractor and Approval by the Project Manager	23.1 The contractor shall be responsible for the design of permanent works as **specified in SCC**.
	23.2 Contractor shall be responsible for design of the Temporary Works. The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.
	23.3 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 their use.
	23.4 The Project Manager's approval shall not alter the Contractor's responsibility for design of temporary works.
24. Safety,	24.1 The Contractor shall, throughout the execution, and completion of the works and

Security and Protection of the Environment	remedying of any defects therein: a. Have full regard for the safety of all persons entitled to be upon the site and keep the site (so as the same is under his control) and the works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons. b. Provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when necessary or required by the Project Manager or by any duly constituted authority, for the protection of the Works of for the safety and convenience of the public or others. c. Take all reasonable steps to protect the environment on and off the site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. d. Ensure that any cut or fill slopes are planted in grass or other plant cover as soon as possible to protect them from erosion. e. Any spoil or material removed from drains shall be disposed of to designated stable tipping areas as directed by the Project Manager. f. Shall not use fuel wood as a means of heating during the processing or preparation of any materials forming part of the works. g. The Project Manager shall have the power to disallow any working practice or activity of the Contractor or direct that such practices or activities be modified should the Project Manager consider, on the advice of the relevant Government Departments, that the practices or activities will be harmful to wildlife. h. Provide on the Site such lifesaving apparatus as may be appropriate and an adequate and easily accessible first aid outfit or such outfits as may be required by any government ordinance, factory act, etc., subsequently published and amended from time to time.
	24.2 The Contractor shall comply with the Employer's Occupational Health and Safety (OHS) Policy, Guideline and/or Operating Manual, if any, **as specified in the SCC.**
25. Discoveries	25.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
26. Possession of the Site	26.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date **stated in the SCC**, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
27. Access to the Site	27.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.
28.Instructions,	28.1 The Contractor shall carry out all instructions of the Project Manager which

Inspections and Audits	comply with the applicable laws where the Site is located.
	28.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and sub consultants to keep accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.
	28.3 The Contractor shall permit the GoN/DP and/or persons appointed by the GoN/DP to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the GoN/DP if required by the GoN/DP. The Contractor's attention is drawn to Sub-Clause 73.2 which provides, inter alia, that acts intended to materially impede the exercise of the GoN's/DP's inspection and audit rights provided for under this Sub-Clause constitute a obstructive practice subject to contract termination.
29.Dispute Settlement	29.1 The Employer and the Contractor shall attempt to settle amicably by direct negotiation any disagreement or dispute arising between them under or in connection with the Contract.
	29.2 Any dispute between the Parties as to matters arising pursuant to this Contract which cannot be settled amicably within thirty (30) days after receipt by one Party of the other Party's request for such amicable settlement may be referred to Arbitration within 30 days after the expiration of amicable settlement period.
30. Procedures for Disputes	30.1 In case of arbitration, the arbitration shall be conducted in accordance with procedures in accordance with law of Nepal at the place **given in the SCC**.
B. Staff and Labor	
31. Forced Labor	31.1 The Contractor shall not employ forced labor, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor–contracting arrangements.
32. Child Labor	32.1 The Contractor shall not employ children in a manner that is economically exploitative, or is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. Where national laws have provisions for employment of minors, the Contractor shall follow those laws applicable to the Contractor. Children below the age of 18 years shall not be employed in dangerous work.
33.Non-discrimination and Equal Opportunity	33.1 The Contractor shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. In countries where national law provides for non-discrimination in employment, the Contractor shall comply with national law. When national laws are silent on

	nondiscrimination in employment, the Contractor shall meet this Sub clause's requirements. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination.
B1. Time Control	
34. Program	34.1 Within the time **stated in the SCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.
	34.2 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.
	34.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period **stated in the SCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall Provide an updated Activity Schedule within 15 days of being instructed to by the Project Manager.
	34.4 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.
35. Extension of the Intended Completion Date	35.1 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.
	35.2 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 for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information at least 21 days prior to the intended completion date. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. Along with full supporting information, the contractor shall also submit a revised work schedule and ensure that the Performance Security, Insurance, and Advance Payment Security remain valid. Within fifteen (15) days of the receipt of Letter of Extension of Intended Completion Date from the Employer, the contractor shall submit Performance Security, Advanced Payment Guarantee (if any) and Insurance Policy documents as

	required with extended validity.
	35.3 If the contractor fails to submit Performance Security, Advanced Payment Guarantee (if any) and Insurance Policy documents, as required with extended validity within the prescribed time as per ITB 35.2, the Contractor shall pay fine at the rate of 0.01% of the final contract price (without VAT but including PS) per day for a maximum of fifteen (15) days. The Employer may deduct the fine from payments due to the Contractor.
36. Acceleration	36.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
	36.2 If the Contractor's priced proposals for acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
37. Delays Ordered by the Project Manager	37.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
38.Management Meetings	38.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
	38.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
39. Early Warning	39.1 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.
	39.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.
C. Quality Control	
40. Identifying Defects	40.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a

	Defect and to uncover and test any work that the Project Manager considers may have a Defect.
41. Tests	41.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
42.Correction of Defects	42.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at issuance of taking over certificate pursuant to GCC clause 69.2, and is **defined in the SCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
	42.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
43.Uncorrected Defects	43.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.
D. Cost Control	
44. Contract Price	44.1 In the case of a Unit Rate contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.
	44.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.
45. Changes in the Contract Price	45.1 In the case of an Unit Rate contract: (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 2 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. (b) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.
	45.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.
46. Variations	46.1 All Variations shall be included in updated Programs, and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.
	46.2 The Contractor shall provide the Project Manager with a quotation for carrying

	out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.
	46.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.
	46.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
	46.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
	46.6 In the case of an Unit Rate contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in **GCC 45.1** or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.
47.Cash Flow Forecasts	47.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.
48.Payment Certificates	48.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.
	48.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within 30 days of submission by contractor.
	48.3 The value of work executed shall be determined by the Project Manager.
	48.4 The value of work executed shall comprise: (a) In the case of an Unit Rate contract, the value of the quantities of work in the Bill of Quantities that have been completed; or (b) In the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule.
	48.5 The value of work executed shall include the valuation of Variations and Compensation Events.

	48.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
49. Payments	49.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest as **indicated in the SCC** on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made.
	49.2 If an amount certified is increased in a later certificate or as a result of an award by an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.
	49.3 Items of the Works for which no rate or price has been entered in BOQ shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
50.Compensation Events	50.1 The following shall be Compensation Events: (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 26.1. (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract. (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time. (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects. (e) The Project Manager unreasonably does not approve a subcontract to be let. (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site. (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons. (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor. (i) The advance payment is delayed. (j) The effects on the Contractor of any of the Employer's Risks. (k) The Project Manager unreasonably delays issuing a Certificate of

	Completion.
	50.2 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.
	50.3 As soon as information demonstrating 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 shall assume that the Contractor shall react competently and promptly to the event.
	50.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
51. Tax	51.1 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 bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 53.
52. Currency	52.1 The currency of Contracts shall be Nepalese Rupees.
53.Price Adjustment	53.1 Prices shall be adjusted for fluctuations in the cost of inputs only if **provided for in the SCC**. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due.
	53.2 Adjustment Formulae[7]: The formulae will be of the following general type: $pn = A + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{En}{Eo} + etc.$ Where: *pn* is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Clause 49;

[7] For complex Works involving several types of construction work with different inputs, a family of Formulae will be necessary. The various items of Day work may also require different formulae, depending on the nature and source of the inputs

	A is a constant, specified in the Bidding Forms- Table of Price Adjustment data, representing the nonadjustable portion in contractual payments;[8]b, c, d, etc., coefficients representing the estimated proportion of each cost element (labor, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, **as specified in the SCC;** *Ln, Mn, En,* etc., are the current cost indices or reference prices of the cost elements for month "n," determined pursuant to Sub-Clause 53.4, applicable to each cost element; and *Lo, Mo, Eo,* etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 53.4
	53.3 Sources of Indices and Weightings: The sources of indices shall be those listed in the Bidding Forms- Table of Price Adjustment data, as approved by the Project Manager and stated in SCC. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightings and Source of Indices in the Bidding Forms, which shall be subject to approval by the Project Manager.
	53.4 Base, Current and Provisional Indices: The base cost indices or prices shall be those prevailing on the day 30 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 30 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Project Manager will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.
	53.5 Weightings: The weightings for each of the factors of cost given in the Bidding Forms shall be adjusted if, in the opinion of the Project Manager, they have been rendered unreasonable, unbalanced or inapplicable as a result of varied or additional work already executed or instructed under Clause 46 or for any other reason.
	53.6 Where, price adjustment provision is not applicable pursuant to Sub-clause 53.1 then the Contract is subject to price adjustment only for construction material in accordance with this clause. If the prices of the construction materials stated in the contract is increased or decreased in an unexpected manner in excess of ten (10%) percent in comparison to the base price construction material stated in Section –IV, Bidding Forms-Table of Price Adjustment Data, then the price adjustment for the increase or decrease of price of the construction material beyond 10% shall be made by applying the following formulas: For unexpected increase in price

[8] Insert a figure for factor A only where there is a part of the Contractors' expenditures which will not be subject to fluctuation in cost or to compensate for the unreliability of some indices. A should normally be 0.15. The sum of A, b, c, d, etc., should be one.

	$P = [R_1 - (R_0 \times 1.10)] \times Q$ For unexpected decrease in price P $= [R_1 - (R_0 \times 0.90)] \times Q$ Where: "P" is price adjustment amount "R_1" is the present price of the construction material (Source of indices shall be those listed in the Bidding forms) "R_0" is the base price of the construction material "Q" is quantity of the construction material consumed in construction during the period of price adjustment consideration If the Base price and source is to be proposed by the Bidder as per the provision made in Section –IV, Bidding Forms- Table of Price Adjustment Data then the Base price and source filled by Bidder for the construction material stated in the Bidding Form shall be subject to the approval of the Project manager and shall be as **stated in SCC**..
	53.7 The Price Adjustment amount shall be limited to a maximum of the initial Contract Amount **as specified in the SCC**.
	53.8 The Price Adjustment provision shall not be applicable for delayed period if the contract is not completed in time due to the delay caused by the contractor or the contract is a Lump sum Contract.
54. Retention	54.1 The Employer shall retain from each payment due to theContractor the proportion **stated in the SCC** until Completion of the whole of the Works.
	54.2 Upon the issue of a Defects Liability Certificate by the Project Manager, in accordance with GCC 70.1, half the total amount retained shall be repaid to the Contractor and half when the Contractor has submitted the evidence of submission of tax return to the concerned Internal Revenue Office.
	54.3 The Contractor may substitute retention money with an unconditional bank guarantee issued from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law if: (a) at least eighty (80) percent of the whole works have been completed, (b) progress of the works is satisfactory in accordance with the Contract as per approved work schedule, and (c) it can be assured that the works can be completed at the intended completion date. The validity of the bank guarantee under this sub-clause shall be at least 30 days beyond the end of Defect Liability Period.
	54.4 If retention money is substituted by bank guarantee in accordance with clause 54.3, the bank guarantee shall be submitted either using the Retention Money

	Security Form included in Section X (Contract Forms) or in another Form acceptable to the employer. The validity of the bank guarantee shall be at least one month more than the end of defect liability period.
55.Liquidated Damages	55.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the SCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount **defined in the SCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.
	55.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC 49.
56. Bonus	56.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the SCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.
57.Advance Payment	57.1 Unless otherwise **stated in SCC,** the Employer shall make advance payment to the Contractor of the amounts stated in the SCC, in two equal installments by the date **stated in the SCC**, against provision by the Contractor of an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in a form acceptable to the Employer in amounts equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment. The validity of the bank guarantee under this sub-clause shall be at least 30 days beyond the end of intended completion date. The contractor shall submit the list of activities for which the Advance Payment for mobilization to be used along with their time schedules.
	57.2 The Contractor is to use the advance payment only to pay for the purpose of construction site preparation, establishment of temporary camp facilities, construction of workers' housing, mobilization of labors, materials or equipment etc required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.
	57.3 The advance payment shall be repaid by deducting proportionate amounts, **as stated in SCC**, from payments otherwise due Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be

	taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
	57.4 If the advance provided under GCC 57.1 is not repaid due to non-performance of the works under the contract, by the contractor within the time period specified in the contract, the Employer shall recover the advance by enforcing the bank guarantee as provided under GCC 57.1, and shall also recover interest on the advance amount from the contractor at a rate **stated in SCC.**
58. Securities	58.1 The Performance Security, including any additional security required as per ITB 29.5, shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the SCC,** by a Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal in accordance with the conditions of Contract using Sample Form for the Performance Security included in Section IX (Contract Forms), or another form acceptable to the Employer, and denominated in Nepalese Rupees. The Performance Security shall be valid until a date 30 days beyond the end of the Defect Liability Period. Any additional performance security required as per ITB 29.5 shall be valid until a date 30 days beyond the end of the intended completion date.
	58.2 The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by a Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal.
59. Day works	59.1 If applicable, the Day works rates in the Contractor's Bid 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.
	59.2 All work to be paid for as Day works shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.
	59.3 The Contractor shall be paid for Day works subject to obtaining signed Day works forms.
60. Cost of Repairs	60.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.
F. Force Majeure	
61.Definition of Force Majeure	61.1 In this Clause, "Force Majeure" means an exceptional event or circumstance, (a) which is beyond a Party's control; (b) which such Party could not reasonably have provided against before entering into the Contract; (c) which, having arisen, such Party could not reasonably have avoided or overcome; and

	(d) which is not substantially attributable to the other Party.
	61.2 Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied: (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies; (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war; (c) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel; (d) munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; and (e) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.
62. Notice of Force Majeure	62.1 If a Party is or will be prevented from performing its substantial obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.
	62.2 The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.
	62.3 Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.
63. Duty to Minimize Delay	63.1 Each Party shall at all times use all reasonable endeavors to minimize any delay in the performance of the Contract as a result of Force Majeure.
	63.2 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.
64. Consequences of Force Majeure	64.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under GCC 62, and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to GCC 30 to (a) an extension of time for any such delay, if completion is or will be delayed, under GCC35 ; and (b) if the event or circumstance is of the kind described in sub-paragraphs (a) to (d) of GCC 61.2 and, in the case of subparagraphs (b) to (d), occurs in the

	Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destructed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in GCC 19.
	64.2 After receiving this notice, the Project Manager shall proceed in accordance with GCC 10 to agree or determine these matters.
65. Force Majeure Affecting Subcontract or	65.1 If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's nonperformance or entitle him to relief under this Clause.
66.Optional Termination, Payment and Release	66.1 If the execution of substantially all the Works in progress is prevented for a continuous period of 90 days by reason of Force Majeure of which notice has been given under GCC 62, or for multiple periods which total more than 150 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with GCC 72.5.
	66.2 Upon such termination, the Project Manager shall determine the value of the work done and issue a Payment Certificate, which shall include (a) the amounts payable for any work carried out for which a price is stated in the Contract; (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal; (c) other Costs or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works; (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and (e) the Cost of repatriation of the Contractor's staff and labor employed wholly in connection with the Works at the date of termination.
67. Release from Performance	67.1 Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises, which makes it impossible or unlawful for either or both Parties to fulfill its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the

	Contract, then upon notice by either Party to the other Party of such event or circumstance, (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract; and (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under GCC 66 if the Contract had been terminated under GCC 66.
G. Finishing the Contract	
68. Completion	68.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed.
	68.2 In addition to the other provisions, before acceptance of the completed works, Employer shall verify and assure that such works are within the set objective, quality and appropriate to operate and use.
69. Taking Over	69.1 In the contractor's Opinion, if the works are complete and ready for taking over, the contractor may apply by notice to the Project Manager for a Taking-Over Certificate. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.
	69.2 The Project Manager shall, within 30 days after receiving the Contractor's application: (a) issue the Taking-Over Certificate to the Contractor if physical progress of works is at least ninety (90) percent in accordance with the Contract except for any minor outstanding work and defects (as listed in the Taking-Over Certificate) which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or (b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.
	69.3 If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 30 days, and if the Works or Section (as the case may be) are substantially completed in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.
70. Final Account	70.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 60 days of receiving the Contractor's account if it is correct and complete. If it is not,

	the Project Manager shall issue within 60 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.
71. Operating and Maintenance Manuals	71.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the **dates stated in the SCC**.
	71.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the SCC** pursuant to **GCC 71.1,** or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the SCC** from payments due to the Contractor.
72. Termination	72.1 The Employer may terminate the Contract at any time if the contractor; a. does not commence the work as per the Contract, b. abandons the work without completing, c. fails to achieve progress as per the Contract.
	72.2 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
	72.3 Fundamental breaches of Contract shall include, but shall not be limited to, the following: a) the Contractor uses the advance payment for matters other than the contractual obligations, b) the Contractor stops work for 30 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager; c) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days; d) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation. e) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 90 days of the date of the Project Manager's certificate; f) 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; g) the Project Manager gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with GCC Sub clause 22.1 and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Project Manager; h) the Contractor does not maintain a Security, which is required; i) the Contractor has delayed the completion of the Works by the number of days

	for which the maximum amount of liquidated damages can be paid, **as defined in the SCC**; and j) If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC 73.1. k)The Contractor fails to submit Performance Security, Advanced Payment Guarantee (if any) and Insurance Policy documents with extended validity within the time prescribed pursuant to GCC 35.3.
	72.4 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 GCC 72.3 above, the Project Manager shall decide whether the breach is fundamental or not.
	72.5 Notwithstanding the above, the Employer may terminate the Contract for convenience.
	72.5 Notwithstanding the above, the Employer may terminate the Contract for convenience. 72.6 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.
73.Fraud and Corruption	73.1 If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 15 days' notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site.
	73.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with GCC Clause 15. For the purposes of this GCC 73; (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party. (ii) "fraudulent practice"[5] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "collusive practice"[6] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party; (iv) "coercive practice"[7] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (v) "obstructive practice" is

	(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (bb) acts intended to materially impede the exercise of the GON's/DP's inspection and audit rights provided for under GCC28.3.
	73.3 The contractor shall be prosecuted for offenses under prevailing criminal laws, if the contractor: (i) Misuses the Advance Payment or payments received from the Employer; (ii) Receives payment by submitting false information or documents; (iii) Abandons the works before completion; (iv) Commits a serious violation of the contract; or (v) Causes loss or damage to the Employer.
74. Black Listing	74.1 Without prejudice to any other rights of the Employer under this Contract, GoN, Public Procurement Monitoring Office (PPMO), on the recommendation of procuring entity, may blacklist a Bidder or contractor for its conduct for a period of one (1) to three (3) years on the following grounds and seriousness of the act committed by the bidder or contractor: (a) if it is established that the Contractor has committed substantial defect in implementation of the contract or has not substantially fulfilled its obligations under the contract or the completed work is not of the specified quality as per the contract. (b) If convicted from a court of law in a criminal offense liable to be disqualified for taking part in procurement contract, (c) If it is established that the Contractor has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.
75. Payment upon Termination	75.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
	75.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.
	75.3 If the Contract is terminated because of fundamental breach of Contract or for any other fault by the Contractor, the Employer may:

	(a) withhold further payments to the Contractor until the costs of design, execution, completion and remedying of any defects, liquidated damages (if any), and all other costs incurred by the Employer, have been established, and/or (b) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor, as Government dues. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor. (c) forfeit the Performance Security. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
76. Property	76.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
77.Release from Performance	77.1 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 and for any work carried out afterwards to which a commitment was made.
78. Suspension of DP Loan/Credit/ Grant	78.1 In the event that the DP suspends the loan/ credit/grant to the Employer from which part of the payments to the Contractor are being made: a. the Employer is obligated to notify the Contractor of such suspension within 7 days of having received the DP's suspension notice; and b. if the Contractor has not received sums due him within the 30 days for payment provided for in GCC 49.1, the Contractor may immediately issue a 15-day termination notice.
79. Eligibility	79.1 The Contractor shall have the nationality of an eligible country as specified in Section V of the bidding document. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.
	79.2 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries **as specified in SCC** and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment, and services.
	79.3 For purposes of GCC 79.2, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through

	manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.
80.ProjectManager's Duties and Authorities	80.1 The Project Manager's duties and authorities are restricted to the extent as **stated in the SCC**.
81.Quarries and Spoil Dumps	81.1 Any quarry operated as part of this Contract shall be maintained and left in a stable condition without steep slopes and be either refilled or drained and be landscaped by appropriate planting. Rock or gravel taken from a river shall be removed over some distance so as to limit the depth of material removed at any one location, not disrupt the river flow or damage or undermine the river banks. The Contractor shall not deposit excavated material on land in Government or private ownership except as directed by the Project Manager in writing or by permission in writing of the authority responsible for such land in Government ownership, or of the owner or responsible representative of the owner of such land in private ownership, and only then in those places and under such conditions as the authority, owner or responsible representative may prescribe.
82. Local Taxation	82.1 The prices bid by the Contractor shall include all taxes that may be levied in accordance to the laws and regulations in being in Nepal on the date 30 days prior to the closing date for submissions of Bids on the Contractor's equipment, plant and materials acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from his responsibility to pay any tax that may be levied in Nepal on profits made by him in respect of the Contract.
83. Value Added Tax	83.1 The Contract is not exempted from value added tax. An amount specified in the schedule of taxes shall be paid by the Contractor in the concerned VAT office within time frame specified in VAT regulation.
84. Income Taxes on Staff	84.1 The Contractor's staff, personnel and labor will be liable to pay personal income taxes in Nepal in respect of their salaries and wages, as are chargeable under the laws and regulations for the time being in force, and the Contractor shall perform such duties in regard to such deductions as may be imposed on him by such laws and regulations.
	84.2 The issue of the Final Account Certificate pursuant to clause GCC 70 shall be made only upon submittal by the Contractor of a certificate of income tax clearance from the Government of Nepal.
85. Duties, Taxes and Royalties	85.1 Any element of royalty, duty or tax in the price of any goods including fuel oil, and lubricating oil, cement, timber, iron and iron goods locally procured by the Contractor for the works shall be included in the Contract rates and prices and no reimbursement or payment in that respect shall be made to the Contractor.
	85.2 The Contractor shall familiarize himself with GON the rules and regulations with regard to customs, duties, taxes, clearing of goods and equipment, immigration and

	the like, and it will be necessary for him to follow the required procedures regardless of the assistance as may be provided by the Employer wherever possible.
	85.3 The Contractor shall pay and shall not be entitled to the reimbursement of cost of extracting construction materials such as sand, stone/boulder, gravel, etc. from the river beds or quarries. Such prices will be levied by the concerned Local Government (LG) as may be in force at the time. The Contractor, sub-contractor(s) employed directly by him and for whom he is responsible, will not be exempted from payment of royalties, taxes or other kinds of surcharges on these construction materials so extracted and paid for to the concerned Local Government (LG)
86. Member of Government , etc, not Personally Liable	86.1 No member or officer of GoN or the Employer or the Project Manager or any of their respective employees shall be in any way personally bound or liable for the act or obligations of the Employer under the Contract or answerable for any default or omission in the observance or performance of any of act, matter or thing which are herein contained.
87. Approval of Use of Explosives	87.1 No explosives of any kind shall be used by the Contractor without the prior consent of the Employer in writing and the Contractor shall provide, store and handle these and all other items of every kind whatsoever required for blasting operations, all at his own expense in a manner approved in writing by the Employer.
88 Compliance with Regulations for Explosives	88.1 The Contractor shall comply with all relevant ordinances, instructions and regulations which the Government, or other person or persons having due authority, may issue from time to time regarding the handling, transportation, storage and use of explosives.
89. Permission for Blasting	89.1 The Contractor shall at all times maintain full liaison with and inform well in advance, and obtain such permission as is required from all Government authorities, public bodies and private parties whatsoever concerned or affected, or likely to be concerned or affected by blasting operation.
90.Records of Explosives	90.1 Before the beginning of the Defects Liability Period, the Contractor shall account to the satisfaction of the Project Manager for all explosives brought on to the Site during the execution of the Contract and the Contractor shall remove all unused explosives from the Site on completion of works when ordered by the Project Manager.
91. Traffic Diversion	91.1 The Contractor shall include the necessary safety procedures regarding and pedestrian traffic diversion that is needed in execution of the works. The Contractor shall include in his costing of works, any temporary works or diversion that are needed during the construction period. All traffic diversion should be designed for the safety of both the motoring public and the men at work. It shall ensure the uninterrupted flow of traffic and minimum inconvenience to the public during the period concerned. As such, adequate warning signs, flagmen and other relevant safety precautionary measures shall be provided to warn motorists and

	pedestrians well ahead of the intended diversion as directed by the Project Manager. All traffic devices used shall be designed in accordance with the instruction of Project Manager.
92. Social Security Fund	92.1 The contractor shall enroll the laborers, employees, or other workforce engaged in such work in the Social Security Fund in accordance with prevailing laws. 92.2 The contractor shall be responsible to disburse the remuneration, benefits, and other payments of the laborers, employees, or workforce into the bank account of the concerned individual. 92.3 The contractor shall be responsible for ensuring that the required work permit has been obtained in accordance with prevailing laws in respect of foreign personnel.

Section VIII: Special Conditions of Contract

The following Special Conditions of Contract shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Nepal Electricity Authority

Construction of Covered Hall at Dhangadi DCS, Kailali

Contract Identification No.: NEA/BPICP/NCB/WORKS-01/2083/084

Special Conditions of Contract

A. General	
GCC 1.1 (p)	The Employer is ***Nepal Electricity Authority, Building and Physical Infrastructure Construction Project***
GCC 1.1 (u)	The Intended Completion Date for the whole of the Works shall be ***8 months.***
GCC 1.1(bb) & GCC 10.1	The Project Manager is chief of ***Building and Physical Infrastructure Construction Project*** The Project Manager and Engineer are synonyms.
GCC 1.1 (ee)	The Site is located at ***Dhangadi, Kailali District.***
GCC 1.1 (hh)	The Start Date shall be ***21 days from signing of Contract***
GCC 1.1 (ll)	The Works consist of ***Construction of 240 Sq.m -Covered Hall at Dhangadi DCS which includes mainly civil, and architectural works as mentioned in Specifications.***
GCC 2.2	Sectional Completions are: ***Not Applicable***
GCC 2.3 (i)	The following documents also form part of the Contract: ***Minutes of Meeting, if any***
GCC 3.1	The language of the contract is **ENGLISH/NEPALI** The law that applies to the Contract is the law of NEPAL
GCC 11.1	The Project Manager ***may*** delegate any of his duties and responsibilities.
GCC 12.1 (a)	The agreed electronic transmission shall be: ***bpicp@nea.org.np***
GCC 14.1	Schedule of other contractors: ***Not Applicable***
GCC 19.1	The minimum insurance amounts and deductibles shall be: 1. The minimum cover for loss of or damage to the Works, Plant and Materials is: **115 %** of the Contract Amount. 2. The maximum deductible for insurance of the Works and of Plant and Materials is: ***[insert value as per the provision of Nepal Insurance Authority].*** 3. The minimum cover for loss or damage to immovable Equipment/plants is : ***100% (i.e Replacement Cost)*** 4. The maximum deductible for insurance of immovable Equipment/plant is: ***[insert value***

	as per the provision of Nepal Insurance Authority]. 5. The minimum cover for loss of or damage to other property is: ***[insert amount]***[9]with unlimited number of occurrences 6. The maximum deductible for insurance of other property is: ***[insert value as per the provision of Nepal Insurance Authority].*** 7. The minimum cover for personal injury or death insurance i. for the Contractor's employees is that specified in the Labor act of Nepal and ii. for other people is ***:[insert amount between 0.7 to 1 million]*** with an unlimited number of occurrences
GCC 20.1	Site Investigation Reports are: ***Not Applicable.***
GCC 23.1	The following shall be designed by the Contractor: ***Temporary Works, if required at site.***
GCC 24.2	***[Insert OHS Policy, Guideline and/or Operating Manual, if any].***
GCC 26.1	The Site Possession Date(s) shall be: ***15 days from the date of signing Contract Agreement.***
GCC 30.1	The place of arbitration shall be: ***Kathmandu***
C. Time Control	
GCC 34.1	The Contractor shall submit for approval a Program for the Works within ***15 days*** from the date of the Letter of Acceptance.
GCC 34.3	The period between Program updates is ***30 days.*** The amount to be withheld for late submission of an updated Program is **NRs. 25,000/- (In Words: Twenty Five Thousand Rupees Only)**
D. Quality Control	
GCC 42.1	The Defects Liability Period is: ***365*** days. *[The defects liability period is usually limited to 365 days, but could be less in very simple cases or could be more in special cases as defined by employer.]*
E. Cost Control	
GCC 49.1	***5% (Five)***
GCC 53.1	The Contract ***is not*** subject to price adjustment, and the following information regarding coefficients ***does not*** apply.

[9] The amount depends on location, environment of construction site, surrounding property etc. and hence differs case to case. Suitable amount should be inserted depending upon site condition and surrounding environment.

<table>
<tr><td>GCC 53.6</td><td>Not Applicable</td></tr>
<tr><td>GCC 53.7</td><td>Not Applicable</td></tr>
<tr><td>GCC 54.1</td><td>The proportion of payments retained is: 5 (five) percent.</td></tr>
<tr><td>GCC 55.1</td><td>The liquidated damages for the whole of the Works are 0.05 Percent of the final Contract Price (without VAT but including PS) per day. The maximum amount of liquidated damages for the whole of the Works is 10 Percent of the final Contract Price (without VAT but including PS).</td></tr>
<tr><td>GCC 56.1</td><td>The provision of bonus Not Applicable in the contract.</td></tr>
<tr><td>GCC 57.1</td><td>The provision of Advance Payments Applicable in the contract. If Applicable, the Advance Payments shall be: 20% of initial contract amount (without VAT and Contingencies but including PS) and shall be paid in two equal installments and to the Contractor.
<table>
<tr><th>S.No.</th><th>Installment</th><th>Percentage</th><th>Requirement</th></tr>
<tr><td>1</td><td>First</td><td>10</td><td>First installment of 10 (Ten) % shall be made to the contractor within 30 days upon submission of equivalent acceptable Bank Guarantee for advanced payment after submission of insurance policy and completion of site mobilization as required under the Contract and to the satisfaction of the Engineer.</td></tr>
<tr><td>2</td><td>Second</td><td>10</td><td>Second installment of 10 (Ten) % shall be made to contractor after the contractor completes works that are valued not less than 5 (Five) % of the Contract Price upon the submission of acceptable Bank Guarantee.</td></tr>
</table></td></tr>
<tr><td>GCC 57.3</td><td>Deductions from Payment Certificates will commence in the first certificate in which the value of works executed exceeds 30% of the Contract Price. Deduction will be at the rate of 40% of the respective Monthly Interim Payment Certificate until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the end of 80 % of the approved contract price.</td></tr>
<tr><td>GCC 57.4</td><td>Recover interest on the advance amount from the Contractor should be at a rate of 10 %.</td></tr>
<tr><td>GCC 58.1</td><td>The Performance Security amount is: …….. [Insert required Amount at the time of Contract agreement].
[insert amount including an additional amount based on ITB 29.5 and/or ITB 34.1 if the Employer has increased the Performance Security amount]</td></tr>
<tr><td colspan="2">G. Finishing the Contract</td></tr>
<tr><td>GCC 71.1</td><td>The date by which operating and maintenance manuals are required is; Not Applicable</td></tr>
</table>

GCC 71.2	The date by which "as built" drawings are required is: ……*[For GoN funded: insert 30 days after work acceptance date]* The amount to be withheld for failing to produce "as built" drawings and/or Operating and maintenance manuals is: ***50,000/- (In Words: Fifty Thousand Ruypees Only)***
GCC 72.3 (i)	The maximum number of days is: **200**
GCC 79.2	For NEA funded: For the purpose of Country of Origin: "all Countries"
GCC 80	The Project Manager has to obtain the specific approval of the Employer for taking any of the following actions : a. Approving subcontracting of any part of the works under General Conditions of Contract Clause 13; b. Certifying additional costs determined under General Conditions of Contract Clause 50; c. Determining start date under General Conditions of Contract Clause 1; d. Determining the extension of the intended Completion Date under General Conditions of Contract Clause 35; e. Issuing a Variation under General Conditions of Contract Clause 1 and 46, except in an emergency situation, as reasonably determined by the Project Manager; emergency situation may be defined as the situation when protective measures must be taken for the safety of life or of the works or of adjoining property. f. Adjustment of rates under General Conditions of Contract Clause 45;

Section IX: Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and when required Advance Payment Security and Retention Money Security, shall only be completed by the successful Bidder after contract award.

Letter of Intent

[on letterhead paper of the Employer]

Date: ... ……

To: .....***Name and address of the Contractor***.....

Subject: …… Issuance of letter of intent to award the contract.....

This is to notify you that, it is our intention to award the contract ... .***[insert date]*** .....for execution of the ... .***[insert name of the contract and identification number, as given in the Contract BDS/SCC]*** to you as your bid price ***Nepalese Rupees*** ..... ***[insert amount of contract price in figures and words including taxes]*** as corrected and modified in accordance with the Instructions to Bidders is hereby selected as substantially responsive evaluated bid closest to the Average Bid Price.

Authorized Signature: ……

Name: ... ……..

Title: ……..

CC:
[Insert name and address of all other Bidders, who submitted the bid]

[Notes on Letter of Intent
The issuance of Letter of Intent is the information of the selection of the bid of the successful bidder by the Employer and for providing information to other unsuccessful bidders who participated in the bid as regards to the outcome of the procurement process. This standard form of Letter of Intent to Award should be filled in and sent to the successful Bidder only after evaluation and selection of substantially responsible evaluated bid closest to the Average Bid Price.]

Letter of Acceptance

[on letterhead paper of the Employer]

Date: ……..

To: ……***Name and address of the Contractor***……...

Subject: ……*Notification of Award*

This is to notify that your Bid for the Invitation of Bids dated ***.....[Insert date of bid invitation]*** ……..for execution of the……..***[Insert name of the contract and identification number, as given in the Contract BDS/SCC]*** ……... for the Contract price of Nepalese Rupees ***[insert amount in figures and words including taxes],*** as corrected in accordance with the Instructions to Bidders is hereby accepted in accordance with the Instruction to Bidders.

You are hereby instructed to contact this office to sign the formal contract agreement within 15 days with Performance Security of **NRs**. ……. in accordance with the Conditions of Contract, using for that purpose the Performance security Form included in Section X (Contract Forms) of this Bidding Document.

Authorized Signature: ……...

Name and Title of Signatory: ……

Contract Agreement

THIS AGREEMENT made the .....day of…..between……. name of the Employer ***……(hereinafter "the Employer"),*** of the one part, and ……name of the Contractor ……(hereinafter "the Contractor"), of the other part:

WHEREAS the Employer desires that the Works known as …….... name of the Contract .....should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects in the sum of NRs ***…..…...[insert amount of contract price in words and figures including taxes]***(hereinafter "the Contract Price").

The Employer and the Contractor agree as follows:

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

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
   (a) the Letter of Acceptance;
   (b) the Letter of Bid;
   (c) the Addenda Nos ..... ***[Insert addenda numbers if any]***
   (d) the Special Conditions of Contract;
   (e) the List of Eligible Countries as per GCC,
   (f) the General Conditions of Contract;
   (g) the Specification;
   (h) the Drawings;
   (i) Bill of Quantities (or Schedules of Prices for lump sum contracts), and
   (j) Table of Price Adjustment Data
   (k) List of Approved Subcontractors
   (l).....***[Specify if there are any other document]***

3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

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

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Nepal on the day, month and year indicated above.

Signed by …….
for and on behalf the Contractor in the presence of
Witness, Name, Signature, Address, Date

Signed by……..
for and on behalf of the Employer in the presence of
Witness, Name, Signature, Address, Date

Witness, Name Signature, Address, Date List of Approved Subcontractors

In accordance with GCC Sub-Clause 13.1, The following Subcontractors are approved for carrying out the work as specified below.

Name of Subcontractors	Description of Works	Value/Percentage of subcontract

Performance Security

(On letterhead paper of the Bank)

..... ***Bank's Name, and Address of Issuing Branch or Office*** .....

Beneficiary: ..... ***[Insert Name and Address of Employer]*** …….....
Date: .....

Performance Guarantee No.:…….

We have been informed that ... ... ***[insert name of the Contractor, which in the case of a joint venture shall be the name of the joint venture]*** (hereinafter called "the Contractor") has been notified by you to sign the Contract No. …….. ***[insert reference number of the Contract]*** for the execution of …….. ***[insert name of contract and brief description of Works]*** (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we..…. ***[insert name of the Bank]*** hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of Nepalese Rupees .....***[insert amount in figures* and amount in words)*** such sum being payable in Nepalese Rupees, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the……***[insert day]***……..Day of ……***[insert month, year]***…… **, and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG), 2010 Revisions,, ICC Publication No. 758 , .except that the supporting statement under Article 15(a) is hereby excluded..

……

Seal of Bank and Signature(s)

Note:
All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

* *The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract in Nepalese Rupees.*

*** Insert the date thirty days after the date specified for the Defect Liability Period. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*

Advance Payment Security

(On letterhead paper of the Bank)

…….. Bank's Name, and Address of Issuing Branch or Office.....

Beneficiary: ……***[Insert Name and address of employer]***

Date : ……

Advance Payment Guarantee No……..

We have been informed that **……**…… ***[insert name of the Contractor, which in the case of a joint venture shall be the name of the joint venture]*** (hereinafter called "the Contractor") has entered into Contract No. ..... ***[insert refrence number of the contract]*** ……dated …… ***[insert agreement date]*** with you, for the execution of ***.....[Insert name of the contract and brief description of Works]*** (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum Nepalese Rupees ……. ***[insert amount in figures*and in words]*** is to be made against an advance payment guarantee.

At the request of the Contractor, we..... ***[insert name of the Bank]*** hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of Nepalese Rupees …….***[insert*** amount in figures****. =and amount in words]*** upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor:

(a) Used the advance payment for purposes other than the costs of mobilization in respect of the Works. Or

(b) .Has failed to repay the advance payment when it has become due and payable in accordance with the conditions of the contract, specifying the amount payable by the contractor.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the .. ***[insert day]***..... day of ... ***[insert month, year]***...**, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG), 2010 Revisions,, ICC Publication No. 758 , except that the supporting statement under Article 15(a) is hereby excluded..

……

Seal of Bank and Signature(s)

Note:

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

**The Guarantor shall insert an amount representing the amount of the advance payment in Nepalese Rupees of the advance payment as specified in the Contract.*

*** Insert the date Thirty days after the expected completion date. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*

Retention Money Security

(On letterhead paper of the Bank)

..... ***Bank's Name, and Address of Issuing Branch or Office***.....

Beneficiary: _____ ***[Insert name and Address of Employer]***

Date: _____***[Insert date of issue]***

RETENTION MONEY GUARANTEE No.: ***[Insert guarantee reference number]***

We have been informed that _____ ***[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]*** (hereinafter called "the Contractor") has entered into Contract No. _____ ***[insert reference number of the contract]*** dated _____ with the Beneficiary, for the execution of _____ ***[insert name of contract and brief description of*** **Works*]*** (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when at least eighty (80) percent of the whole works have been completed, progress of the works is satisfactory in accordance with the Contract as per approved work schedule and it can be assured that the works can be completed at the intended completion date, payment of ***[insert the amount of the Retention Money]*** is to be made against a Retention Money guarantee.

At the request of the Contractor, we, .. . ***[insert name of the Bank]*** ……., as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of Nepalese Rupees _____ ***[insert amount in figures andamount in words]***[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

This guarantee shall expire no later than the …***[insert day]***... day of ……***[insert month, year***… [2], and any demand for payment under it must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG), 2010 Revisions,, ICC Publication No. 758 , except that the supporting statement under Article 15(a) is hereby excluded.

……

Seal of Bank and Signature(s)

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

[1] *The Guarantor shall insert the amount of the Retention Money.*

[2] *Insert the same expiry date which is 30 days more than the end of Defect Liability Period. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*

Annex-1

Table of Price Adjustment Data
[GCC 53.1]

Code	Index Description	Source of Index*	Base Value and Date	Employer's Proposed Weighting Range (coefficient)	Bidder's Proposed Weighting (coefficient)**
1	**2**	**3**	**4**	**5**	**6**
	Non - adjustable (A)			0.15	0.15
	Labor (b)				
	Materials (c)				
	…				
	Equipment usage (d)				
		Total			**1.00**

Note: Base value and Bidder's proposed weighting coefficient to be filled as per "Bid Form of Table of Price Adjustment Data" in Bidding Forms (Section-IV) after verification by the Employer in case of the alternative provision of Bidder proposed value and weighting coefficient.

Table of Price Adjustment Data
[GCC 53.6]

Code	Construction Material*	Unit	Base Price (NRs/Unit) ** (Ex-factory)	Source (Factory)**
1	**2**	**3**	**4**	**5**

** For the purpose of calculation of price adjustment, the Ex-factory price of the same source mentioned in the table shall be taken into consideration.

Note: Base Price and source to be filled as per "Bid Form of Table of Price Adjustment Data" in Bidding Forms (Section-IV) after verification by the Employer in case of the alternative provision of Bidder proposed source and base price.

Nepal Electricity Authority

Building and Physical Infrastructure Construction Project

Bhagwanpau, Kathmandu, Nepal

Construction of Badminton Covererd Hall at Dhangadi DCS, Kailali

VOLUME-II

TECHNICAL SPECIFICATIONS

1. CONTRACT DOCUMENTS

This Specifications and Bills of Quantities shall be read in conjunction with the other Contract Documents. All the documents and drawings are to be regarded as mutually explanatory. In the event of any discrepancy or assumed discrepancy being found between them, the Contractor shall immediately inform the Engineer of the matter in writing and the Engineer will issue his instructions in the matter in accordance with the Conditions of Contract.

2. STANDARDS

2.1 Reference Standards and Codes

The Works shall be carried out in accordance with the relevant quality standards, test procedures or codes of practice, collectively referred to as Reference Standards, listed in the relevant parts of the Specifications. The Contractor shall familiarize himself fully with the requirements of such standards. If no standard is indicated then the relevant ISO Standard or, in the absence of such standard, the relevant British, American or Indian Standards shall apply, or others, if so approved.

All standards referred to in the Contract Documents or on any Contract Drawings or instructions forming part of the Contract or issued under the provisions of the Contract shall refer to the editions in effect on the date of issue of the Tender Documents, or any superseding Standard, including all amendments published thereto unless some other edition is specially referred to herein or referred to in instructions issued subsequent to the signing of the Contract.

The following references to standards shall be interpreted as follows:

BS	Standard by British Standards Institute
BS EN	European Standard adopted by British Standards Institute
CP	Code of Practice by British Standards Institute
IS	Standard by Indian Standards Institute
ASTM	Standard by American Society for Testing and Materials
AASHTO	Standard by American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AWS	American Welding Society
CAN/CGSB	Standard by Canadian General Standards Board
CSA	Standard by Canadian Standards Association
NS	Nepal Standard
DIN	German Standard
SS	Singapore Standard
MS	Malaysian Standard
SIS	Swedish Standards
NZS	New Zealand Standards

Equivalent internationally recognized standards will be accepted as meeting the requirements of the specification subject to approval of the Engineer.

Where it is unclear which specific provisions of a Standard are intended to apply, or where Standards may conflict in their requirements, the matter shall be referred to the Engineer who shall make a

determination, which shall not constitute a variation to the contract.

The Contractor will be required to maintain a complete set of Standards referred to in the specification, and those deemed equivalent, on site for review by the Engineer upon request.

The Contractor shall also turn over one identical set of Standards to the Engineer.

3. APPROVALS

The terms “approved”, “directed”, “instructed”, “satisfactory”, and “required” shall mean to the approval, direction, instruction, satisfaction or requirement of the Engineer or the Engineer’s Representative.

4. RESTRICTIONS ON THE CONTRACTOR AND METHOD OF WORK

The Contractor shall take account of the restrictions, method of work, sequence of work and other conditions detailed in the following sub-clauses of this clause.

4.1 CONTRACTOR’S RESPONSIBILITY

The Contractor shall be solely responsible for all the vehicles, equipment and personnel employed directly or indirectly and shall be responsible for ensuring that the requirements and restrictions imposed by this specification are understood and adhered to by all personnel engaged under this contract in the execution of the works.

4.2 VEHICLE MOVEMENTS

Further to the requirements of Clauses 74 of the Conditions of Contract, the Contractor shall control all construction related vehicle movements as to avoid impeding traffic flows both within and outside of the boundary. Queuing of vehicles on the roads attached to the construction site will not be permitted. Vehicles shall be required to wait, if required, within the Contractor’s Compound.

The Contractor shall ensure that all vehicles he intends to use on the public roads comply with and are used in accordance with all relevant statutory regulations currently in force in Nepal.

The Contractor shall take every precaution and shall make adequate provisions to prevent excavated material or other debris being dropped or deposited on the public roads from his vehicles and shall promptly comply with any instructions issued by a local authority or the Engineer to remove at the Contractor’s expense any material which is so deposited.

4.3 BUILDING WORKING AREAS

1 SAFETY PROCEDURES

Ensure that the following procedures and principals are observed while planning and undertaking work. These requirements are in addition to those of the Construction Safety Code approved for the Project.

a) Life safety is of paramount importance. No work will be undertaken so as to imperil the physical safety or life of any person.

b) Ensure that access for fire vehicles is maintained to all parts of the construction at all time.

c) Ensure working areas are clearly defined, enclosed and separated from Public Areas.

d) Debris, trailing cords and lines, and other obstructions will not be permitted in Public areas under any circumstances.

e) The Construction site will be kept clean, neat and well organized at all times. Hoardings, barriers and temporary structures will be neatly constructed and painted. Every effort will be made to mitigate the appearance and effects of construction on the public.

f) When it is necessary, post persons to direct flows of people and vehicles, and protect and secure construction areas. Such persons shall be neatly uniformed, speak both Nepali and English, and act in a courteous manner at all times.

g) Any temporary structures of any sort will be engineered to resist all dead and live loads that may be applied. Upon request, engineering calculations done by the Contractor's professional engineer are to be provided to the Engineer for review.

4.4 TEMPORARY SIGNAGE

The Contractor will be responsible for providing all temporary signage, professionally prepared to the Engineers approval, as required.

5. SUBMITALS

5.1 GENERAL REQUIREMENTS

The Contractor will maintain an approved system of recording and tracking submissions indication dates, status (i.e. approved, not approved, approved subject to conditions), quantities, and other details as required.

Copies of all approved submissions will be retained securely and properly filled on site, available for reference by the Engineer at any time.

5.2 PROGRAMME OF WORK

As soon as possible after the letter of acceptance and before signing of the Contract Agreement, the Contractor shall submit in triplicate the programme and particulars required under Clause 27 of the General Conditions of Contract. In the programme and particulars the Contractor shall provide details of how he proposes to carry out the Works including:

1. A Critical Path Analysis showing all major activities, trades and phases of works. Detail shall be sufficient and to the satisfaction of the Engineer to demonstrate the relations and interdependencies between all aspects of the work. The Critical Path Analysis shall identify off-site as well as on-site activities including delivery lead time, shop drawing production and approval, materials testing, samples submission and preparation of mock-up. The Critical Path Analysis shall be prepared by a competent and experienced

   construction programmer using a computer programme approved by the Engineer. It shall be prepared so as to permit revisions, inclusion of additional detail and regular updates as the work progress.

2. A detailed Statement of Construction Management Procedures he proposes to adopt. He shall also state his intentions regarding shift work. In all respects he shall pay particular attention to the security and to seasonal rainfall and to the construction sequencing and restrictions identified for the Work Packages.

3. Detailed Phasing Drawings showing to the satisfaction of the Engineer all the proposed phases and sequences of work, lines, types and details of hoardings and barriers, provisions to maintain public access and safety, temporary signage and all temporary work proposed. The scale of such drawings shall not be less than 1: 200 for building works and 1:500 for site works. As necessary to clarify the stages of work, independent drawings representative of each stage shall be prepared.

5.3 CONTRACTOR'S MONTHLY PROGRESS REPORT

The Contractor shall report monthly progress to the Engineer on charts submitted in triplicate and showing actual work done superimposed upon copies of the programme. He shall furnish an explanation of any deviation from the programme stating his proposals for improving progress should this be lacking in any respect and he shall furnish the Engineer with his amended critical path analysis in triplicate.

5.4 SHOP DRAWING

5.4.1 The Contractor shall prepare and submit the Shop Drawings for all Works to the Engineer for his review and approval. They shall be prepared by the competent professionals and shall be approved from the Engineer 14 (fourteen) days prior to the start of the Works. No works shall be started by the Contractor without getting approval on the Shop Drawings. The Shop Drawings shall show at a suitable scale all particulars of the work including sizes, capacities, performance, manufacturer, materials, methods of jointing, finishes, tolerances, site dimensions, lines, levels and all other details of the work required to show compliance with the specification, the suitability of the item for its purpose.

5.4.2 Shop drawings shall be fully reviewed and checked by the Contractor and signed and dated by a representative of the Contractor prior to submission to the Engineer. The Contractor shall review drawings for compliance with the specification and drawings including coordination of work within and between Divisions and trades. Drawings requiring substantive revision must not be forwarded to the Engineer. Any drawings not meeting the requirements between Divisions and trades will be returned without Engineer's review.

5.4.3 Each shop drawing for non-catalogue items shall be prepared specifically for the project and shall include a title block indicating the project title, date of preparation, scale, item described by the drawing, fabricator's name, Contractor's name and a drawing number.

5.4.4 Brochures and/or standard drawings submitted for catalogue items of standard manufacture shall be clearly marked in green ink noting the relevant information and

items to be supplied, and the date of submission. The information supplied shall be equivalent in detail and content as that supplied for custom produced shop drawings.

5.4.5 The Engineer and his representatives will review the drawings only for their general compliance with the intent of the drawings and specifications. Responsibility for accuracy of dimensions, technical design, performance and suitability for intended

purpose of the item remains with the Contractor.

5.4.6 Three (3) copies of each drawing are to be submitted in sufficient time to allow for review, possible revisions and resubmission for approval prior to ordering materials, fabricating, installing and coordinating all affected and contingent work without delay to the scheduled of construction.

5.4.7 One copy of all shop drawings will be retained by the Engineer. The remaining copies will be returned to the Contractor signed by a representative of the Engineer and marked “REVIEWED” with either:

a) a request for resubmission and notes as to deficiencies:

b) a note indicating the drawing has been reviewed but is subject to conditions noted or listed, and does not require resubmission; or

c) a note indication the drawing has been reviewed and is considered to meet the intent of the design and does not require resubmission.

5.4.8 Do not commence fabrication, or order materials or products until shop drawings have been reviewed and are returned under conditions of Clause 6.4.7 b) or 6.4.7 c) except when instructed by the Engineer.

5.5 SAMPLES

5.5.1 The Contractor shall submit samples of all material and equipment together with the manufacturers' specifications and test certificates to the Engineer for his approval prior to commencement of the Works. At his discretion the Engineer's Representative may order independent tests to verify the quality of any particular item submitted for use in the Works by the Contractor, whether the manufacturer's test certificate has been submitted or not. Cost of such tests will be borne by the Contractor.

5.5.2 The Engineer may at his discretion request or take samples of any material or product for use in the Works. Where samples are requested in the specification they shall be submitted in the number requested or if not specified then as directed by the Engineer.

5.5.3 Samples will be of the type and size specified and is fully representative of the materials proposed to be used.

5.5.4 Samples will be indelibly and clearly marked with the date submission, material reference and any other data required to determine the source and kind of sample.

5.5.5 One or more samples of each kind submitted will either be returned marked “ACCEPTED” and signed by a representative of the Engineer or the Contractor will be requested to provide new samples and be notified of deficiencies present in the submitted samples.

5.5.6 One or more “accepted” samples will be retained by the Engineer for comparison with materials and workmanship supplied and will form the standard of acceptance.

5.5.7 One or more “accepted” samples shall be retained at the Contractor’s site office and be available for reference on request.

5.5.8 The Engineer may reject any materials and goods which in his opinion are inferior to

the samples thereof previously approved and the Contractor shall promptly remove such materials and goods from the site.

5.6 COPIES OF ORDERS

The Contractor shall provide the Engineer with one copy of all orders for the supply of materials and goods required in connection with the Works as the Engineer may require.

5.7 MOCK-UPS

Mock-ups of sizes and types specified shall be prepared by the Contractor for review and acceptance of the Engineer. They shall be in location agreed with the Engineer, and if so specified may be incorporated into the work in a clearly identified position upon approval of the Engineer. The Contractor shall carry out such changes or prepare new mock-ups as required to obtain the Engineer's approval. Approved mock-ups will form the standard of acceptance of subsequent materials and workmanship. Approval will be in the form of 3 prints of a photograph of the mock-up prepared by the Contractor, marked "ACCEPTED" and signed by a representative of the Engineer. Two copies will be retained by the Engineer and one will be returned to the Contractor.

5.8 PHOTOGRAPHIC PROGRESS RECORD

The Contractor shall provide a photographic record of the execution of the Works by having photographs taken at monthly intervals from such points as the Engineer may specify from time to time. The number of such photographs shall not exceed 36 per month. The Contractor shall supply three copies of 200 x 250mm colour prints together with the negative/ or digital copy of each photograph to the Engineer within five days of the end of the month. All three sets of the aforementioned prints shall be captioned, and a type-written label indicating the caption, date and signature of the Contractor and the Engineer’s Representative shall be affixed to the back of each photograph. One copy of such prints will be returned to the Contractor.

5.9 PROGRESS REPORT

The Contractor shall furnish the Engineer, at no extra cost to the Employer, at regular monthly intervals, no. of copies and formats determined by the Engineer, with Progress Report containing the following information:

(a) physical progress for the report month and estimated progress for the next month;

(b) completion schedules (target and actual) based on the approved construction programme as provided in Clause 27 of the Conditions of Contract;

(c) Updated S-curves for physical progress at different sections of the Works

(d) any report which may be specifically requested by the Employer and/or the Engineer.

(e) Quality management activities

(f) Weather / daily report

These monthly reports shall be submitted not later than 7 days after the end of the report month.

5.10 AS BUILT DRAWINGS

Until the handover of the project, the Contractor shall submit As Built Drawings based on AUTOCAD printout and corresponding digital files. The following requirements will apply:

5.10.1 The Drawings shall be prepared on a computer using AUTOCAD of the latest release available at the start of the Defects Liability Period. Manually prepared or marked-up drawings will not be accepted.

5.10.2 The As Built Drawings prepared shall be at least to the standard of the Drawings prepared for the original construction.

5.10.3 The drawings will include all available information on the construction.

5.10.4 Site drawings will include all the area covering the Buildings, Services and Site Development works.

5.10.5 The acceptance of the As-Built Drawings shall not relieve the Contractor from his responsibilities for ensuring the accuracy of all information shown.

5.10.6 The drawings shall show the following:

- All site services existing, new and altered, including invert levels, sizes, capacities, manholes, gullies and all other features. Sub-service levels for services shall also be identified.
- Road geometry, grades and cross-falls at 10 meter intervals and spot elevations on a 10m grid, and at all intersections of roads and in corners of fixed areas such as the parking lots.
- Accurate building plans at all levels including roof, building sections and building elevations showing clearly all structure, windows, doors, claddings, finishes, rooms named and numbered, stairs, elevators, reflected ceilings and all other architectural features,
- All services installations, including electrical distribution, lighting, public address system, security system, fire alarm system, plumbing distribution, sanitary system, storm water system, HVAC system and all other services. Riser diagrams shall also be provided for all relevant services.
- All As-Built Drawings shall be in the English language.
- The As-Built Drawings shall show the general arrangement of all plants, equipment and auxiliaries, positions of all switchgears, pumps, motors and motor starters, all cables and conduit runs, interconnecting wiring diagrams, positions of

  all electrical outlets, lighting and power systems, fittings, switches, switchboards, control panels, air and water systems, flow sheets, control schematics, alarm and zoning systems, valve charts and full details of all integral systems. These As-Built Drawings shall also include the names of all manufacturer's model and type numbers, details of motor sizes, speeds, vee belts, pulleys as well as details of duty and ratings of all items of plant. Schematic diagram shall be clear and easily read.
- All proprietary materials and equipment shall be clearly identified on the As-Built Drawings by reference to the manufacturer's name and reference number sufficient to enable identification in the Handover Documentation.

- All abbreviations on the As-Built Drawings shall be identified on a list of symbols on the particular drawings or an index drawing where acceptable to the Engineer.
- Drawings shall be at a scale suitable for easy reference and as required to clearly depict all required information.
- The Contractor shall conduct such on-site checks as required to ensure the accuracy of the as-built drawings.
- Three sets of drawings shall be submitted in bound sets sub-divided by discipline. Three sets of drawings will also be submitted on CD in unprotected AUTOCAD format. Copyright for all material submitted will be vested in the Employer without further compensation or charge.
- AUTOCAD files shall be organized in layers and to a format approved by the Engineer. Such Format will be agreed and approved prior to preparation of drawings.

6. CONTRACT DRAWINGS

The Contractor shall be issued with two copies of each of the Contract Drawings. When necessary the Contractor shall also be supplied with two copies of any further drawings which may be issued in accordance with the Conditions of Contract.

7. QUALITY OF MATERIALS AND LABOUR

All materials incorporated in the Works shall be new, of the best quality of their respective kinds and entirely suitable for their intended purpose and conditions of service. The Workmanship in every case shall be of the best character and the whole shall be subject to the approval of the Engineer.

All materials and equipment shall be the best quality available and shall conform to the requirements of above Specifications, or in case of ambiguity, Engineer's decision will be final. All material and equipment supplied and used in the Works shall be new, unless otherwise specified or permitted in writing by the Engineer and shall be fabricated, handled and used to the best standards and practices currently prevailing. Workmanship shall conform to the best practices currently prevailing and only those craftsmen capable of working with best practice methods shall be engaged in this Project.

8. SOURCES OF MATERIALS

The use of any king or class of material from more than one source is prohibited, except by written permission of the Engineer's Representative. Such permission, if granted, will set forth the conditions under which the change may be made. The sources or kinds of materials shall not be changed at any time without written permission of the Engineer. If the product from any source proves unacceptable at any time, the Contractor shall make such arrangements as may be necessary to assure acceptance material, either by alternations in plant operations or by a change of source. Claims for increased costs, which maybe occasioned by such alternations or changes, will not be given consideration unless the source of the unacceptable material was designated in the Contract as a source of material. When any manufactured product, either new or used, is furnished by the Employer, the location at which such material will be delivered to the Contract will be designated in the Contract. In such cases the Contractor shall transport the materials from the designated delivery point to point of use, and cost for such transportation will be considered included in the Contract unit price for placing the materials in the finished work.

9. BRAND NAMES OF MATERIALS

Certain articles or materials to be incorporated in the work may be designated under a brand name or

the name of a manufacturer or from a particular catalogue. The use of an alternative article or material that is of equal quality and of the required characteristics for the purpose intended will be permitted subject to the following requirements.

a. Contractor has to proof that materials/products are not being manufactured any more or any other valid reason.

b. The burden of proof as to the quality and suitability of alternatives shall be one the Contractor and he shall furnish all information necessary as required by the Engineer to verify. The Engineer shall be the sole judge as to the quality and suitability of all alternative articles or materials and his decision shall be final.

c. Whenever the Specifications permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material will be made until the Contractor submits in writing a request for substitution and submits all relevant information needed to verify the quality and suitability of the material or article proposed. Such request shall be made in ample time to permit approval without delaying the work.

10. APPROVAL OF SUPPLIERS OF MATERIALS

Before entering into any Sub-contract for the supply of any materials or good the Contractor shall obtain the Engineer's approval in writing of the Sub-contractor from whom he proposes to obtain such materials or goods. Should the Engineer at any time be dissatisfied with such materials or goods or with the methods of operations carried out at such Sub-contractor's works or place of business, he shall be empowered to cancel his previously given approval of such Sub-contractor and to specify any other supplier and the Contractor shall bear any additional cost thereof.

11. REMOVAL OF CONDEMNED MATERIALS

The Engineer's Representative may require the Contractor to remove and dispose of any materials employed or to be employed in the construction of the Works which, in the opinion of the Engineer's Representative, are unsuitable or have been incorrectly deposited or have suffered damage by exposure to the weather or otherwise are not in accordance with the specified requirements for such materials. The Contractor shall be entitled to no payment whatsoever in respect of the removal of such materials.

12. DISPOSAL OF EXCAVATED MATERIALS

The Contractor shall not dispose on the river and/ or road side any excavated materials of any type obtained from the Site except in designated spoil areas and then only with the written permission of the Engineer.

13. COORDINATION OF THE WORK

The Contractor shall coordinate all aspects of the work to ensure compatibility between all elements of the construction, and ensure that all aspects of the design can be accommodated together in the space provided within the intent of the design. As necessary to achieve this requirement or when directed by the Engineer, the Contractor shall prepare coordination drawings. Such drawings shall be prepared to the same standard as shop drawings and illustrate in plan, elevation and section as required, all components of the work in any particular area, at a suitable scale, and with sufficient precision, to demonstrate and/ or resolve the compatibility of all elements. Such drawings shall be used in conjunction with required shop drawings where appropriate.

Such drawings shall be submitted to the Engineer on the same basis as shop drawings, for review prior to executing affected work.

14. SETTING OUT

The Contractor shall set out the Works in accordance with the Drawings supplied by the Engineer or as instructed in writing by the Engineer.

The Contractor shall perform all setting out and check surveying of the Works in accordance with methods approved by the Engineer before construction commences. The methods and programme of checking shall be such as to ensure the construction of every part of the Works to the correct line and level. The Engineer may at any time request the Contractor to submit proof that its own setting out has been satisfactorily checked.

The number of points required for setting out as well as the spacing between these points shall be determined by the Contractor together with the Engineer in accordance with the type of the work. In addition to any coordinated points and datum levels that the Contractor establishes for it's own use, the Engineer may require that certain or all of the given points and datum levels be clearly marked during construction in such a way that the marks can be retained after completion of construction. Where this is not possible for any reason, the Contractor shall inform the Engineer in writing and an alternative position will be agreed with the Contractor and confirmed in writing.

The Contractor shall not amend the approved methods of survey control without the approval of the Engineer.

Instruments and equipment for surveys shall be subject to rigorous inspection by both the Contractor and the Engineer's Representative and any item found to be defective, in the opinion of the Engineer, shall be promptly replaced, repaired or adjusted as directed. All surveying shall be done under the direct supervision of a qualified surveyor or engineer who, as an employee of the qualified surveyor or engineer who, as an employee of the Contractor shall be subject to the approval of the Engineer at all times during the progress of the work in accordance with Clause 16 of the Conditions of Contract.

15. DIMENSIONS, LEVELS AND RECORD SURVEYS

All dimensions and levels shown on the Drawings and referred to in the documents forming part of or issued under the Contract shall be verified by the Contractor on the Site, and he will be held responsible for promptly pointing out errors or discrepancies in such dimension and levels.

The Contractor shall take and record levels in the manner directed by and in the presence of the Engineer's Representative before the surface of any such area is interfered with or the works thereon are begun. Such levels when approved and checked by the Engineer's Representative shall be recorded on drawings which shall be signed by the Contractor and the Engineer's Representative and shall form the basis of the measurements for the Engineer's Certificates.

16. SURVEY OF GROUND PROFILES

16.1 Original Ground Profiles

The Contractor shall inform the Engineer in writing, at least 7 days before commencing such work, of it's intention to perform any work which will result in a change to the topography of the existing site whether such work be for the Permanent Works to be constructed on the site or for Temporary Works which the Contractor intends to execute for it's own convenience. Thereupon, before commencing any work, the Contractor shall survey the original topography to the approval of the Engineer over the entire area to be occupied or disturbed. Such survey

may again be required after removal of vegetation, topsoil or other overburden.

The information so obtained shall be recorded by the Contractor on a drawing or drawings which shall each be signed by both the Contractor and the Engineer. The Contractor shall then provide the Engineer with a reproducible copy of each drawing to serve as a permanent record for the purpose of determining both the quantities of excavation and earthworks carried out in the construction of the Permanent Works, and the extent to which Temporary Works shall be removed or temporary excavations shall be refilled upon completion of the Works.

16.2 Excavated and Ground Profiles

The Contractor shall survey all excavated and final surfaces as required by the Engineer for the purpose of recording as-constructed details, and for the measurement of quantities:

a) On completion of excavation and prior to commencement of placing backfill, concrete or other work;

~~b)~~ on completion of placing backfill, concrete or other work.

The information shall be recorded and agreed as set out in Clause 15.1 above.

17. TESTING

17.1 Quality Control Testing

Various clauses of the Specifications contained herein state the types of test which the Contractor shall carry out for the control of the quality of Works, together with the frequencies at which each type of test shall be conducted.

The Contractor's attention is drawn to the fact that the frequencies of testing specified in the relevant clauses are intended to represent only a general guide. The Engineer's Representative shall be empowered to vary the frequencies at which tests are conducted should he deem this necessary for the proper control of the quality of Works. Should the Engineer's Representative vary the frequency stated in the relevant clauses of the Specifications, the Contractor shall not be entitled to extra payment.

17.2 Tests Generally

The Engineer may examine and may require to be tested any materials or goods required for the Works, such as he may decide from time to time. The Contractor shall arrange for the Engineer to have unrestricted access to the Contractor's, Sub-contractor's and suppliers' premises for such purpose at all times.

The Contractor shall afford the Engineer all facilities, assistance, labor and appliances necessary for the convenient examination, testing, weighing or analysis of all such materials or goods. The Contractor shall provide and prepare such test pieces of any such materials or goods as the Engineer may require.

Notwithstanding any tests which may have been carried out off the Site the Engineer shall be empowered to order further tests of any materials or goods to be made on the Site and to reject any such materials or goods should they fail to pass such tests on site.

17.3 Test Certificate

Should the Engineer not inspect any materials or goods at the place of manufacture the

Contractor shall obtain Certificates of test from the suppliers of such goods and shall send one copy of certificates to the Engineer. Such certificates shall certify that the materials or goods concerned have been tested in accordance with the requirements of the Specifications contained in the Contract Documents and shall give the results of all the tests carried out. The Contractor shall provide adequate means of identifying the materials and goods delivered to the Site with the corresponding certificates.

18. ON-SITE SERVICES FOR CARRYING OUT THE WORKS

The Contractor shall make his own arrangements for supply of electric power and water for the purposes of the Contract.

The Contractor shall be required to provide all stepdown transformers, poles, cables and other accessories needed for supply of power to the construction sites, offices and camps. The Contractor shall construct, operate and maintain a construction power distribution system to his own facilities for the duration of the Contract.

The contractor shall have available at the site an emergency power supply (diesel generators) to ensure non-interrupted construction power and to ensure the safety of the works. The locations for installing generators shall be approved by the Engineer.

The Engineer shall have the right, at all times, to inspect the Contractor's electrical installations. Those installations which are unsatisfactory shall be modified immediately by the Contractor to the Engineer's satisfaction at no additional cost to the Employer.

19. ON-SITE SANITARY SERVICES

Sanitary Services shall be the responsibility of the Contractor. There will be no access permitted by the Contractor's labour force to other areas. The Contractor will provide suitable temporary toilet facilities for all persons employed in execution of the works in a location or locations approved by Engineer. Such facilities will be cleaned twice daily. All sanitary waste will be removed from the site at regular intervals and disposed of in a manner approved by the Kathmandu Water and Sewage Board.

20. CONTRACTOR'S YARD

An area of land will be designated as the Contractor's Yard, for the exclusive use of the Contractor. The Contractor may erect such temporary buildings, or provide other facilities as required. The Contractor shall be responsible for providing an approved hoarding or other visual and security barrier at the perimeter of the designated compound as required to provide security to the Contractor's facilities and safety to the public.

The Contractor shall make his own arrangements for 24 hours per day supply of electricity for power and light and of any other services required for servicing the Yard. He shall make his own arrangements subject to approval by the Engineer's Representative for the disposal of sewage and all waste materials during the execution of the Works.

The Contractor shall make his own arrangements for providing from streams, boreholes or other approved sources adequate supplies of potable and other water. In the event of the Contractor obtaining water from any existing controlled supply, he shall comply with any regulations laid down by the local authority and shall pay for such supply, stand pipes, connections, meter rent and other charges as required.

All sources of water and the quantities of water withdrawn from them shall be approved by the Engineer's Representative and shall be such that the requirements of the local population in respect of water for irrigation, drinking purposes etc. are not interfered with or prejudiced in any way.

The Contractor shall be responsible for removal of the compound facilities and structures, grading of the site, and restoration of the site to at least the pre-construction condition of the site (as evidenced by photographs) which may include planting of grass upon completion of the contract.

21. ENVIRONMENTAL PROTECTION

Spills or discharges of pollutants resulting from the Contractor's operations, or under his control, that may cause adverse environmental effects shall be immediately reported to the Engineer. This shall include, but not be limited to all petroleum products and lubricants and any solvents or cleaning compounds.

The Contractor shall clean equipment in locations where debris and run-off shall be prevented from gaining access to storm water and drainage courses.

Trucks hauling excavated or other loose material from the site on all roads other than those constructed solely as haul roads shall have loads trimmed before leaving the site in order that no spillage occurs. Any spillage shall immediately be removed to the Engineer's satisfaction.

Protect all surrounding private and public property from damage during the works.

Preserve existing trees. Do not trim damage or remove trees, including their roots, unless previously authorized by the Engineer. Prevent soil compaction by traffic or material storage in the root zone of trees to be protected, and prevent root zone disturbance resulting from grade changes. Provide temporary erosion control, fences, and other protective measures as required.

Provide adequate measures to control dust at all times during the performance of the Work, and cover or wet down materials to prevent blowing dust and debris, to the Engineer's satisfaction. Clean areas of blown dust or debris promptly as directed by the Engineer.

During progress of the Work provide and maintain to the Engineer's satisfaction, control systems to prevent fine soil materials such clays and fine silts eroded by surface run-off from entering any storm drainage system.

22. DAMAGE TO SERVICES

The Contractor shall be held liable for all damage to roads, irrigation, ditches, mains, pipes, electric cables, lines or services of any kind caused by him or his Sub-contractors, if any, in the execution of the Works.

The Contractor must make good or arrange to make good any damage or provide temporary measures as instructed by the Engineer at this own expense without delay and, if necessary, carry out any further repair work ordered by the Engineer.

23. DISPOSAL OF WASTE

The Contractor shall make adequate arrangements to the satisfaction of the Engineer for the disposal of all waste, storm run-off and sub-soil water, sewage and all other waste materials arising from or connected with the execution of the Works. No payment shall be made for this item.

24. ASSISTANCE FOR THE ENGINEER'S REPRESENTATIVE

The Contractor shall provide at all times during the continuances of the Contract all such survey staff including chainmen, staff men and laborers for the exclusive use of the Engineer's Representative and his staff as the Engineer may deem to be necessary for carrying out his duties in connection with the

Contract. The workmen shall be selected for their intelligence and knowledge of the job and so far as is possible the same staff shall be provided throughout the period of the Contract. No extra payment shall be made for this item.

25. COMPLAINTS AND CLAIMS

During the course of the work, complaints and claims may arise from the public or from various authorities. The Contractor shall satisfy the Engineer that he is dealing with all such matters without delay until appropriate clearance certificates from any authority concerned are produced by the Contractor. This Clause shall in no way absolve the Contractor from his obligations under Clause 12 of the General Conditions of Contract.

26. DRAINAGE DURING CONSTRUCTION

In addition to any other requirements mentioned in the Specifications the Contractor shall submit for the Engineer's approval, prior to the commencement of construction of the Works or any Temporary Works, detailed plans of the measures he proposes to take for the drainage during construction of the Works and Temporary Works, the preventing or erosion of partially completed earthworks and pavements in the prevention of the movement of eroded materials and debris from construction areas into natural watercourses and on to adjoining land. In particular the Contractor shall submit details of the methods he proposes to adopt for the drainage during construction of the measures he proposes to take to ensure that construction activities in no way affect the stability of existing slopes.

The Contractor shall carry out at his own expense all such approved measures and any additional measures the Engineer may from time to time require to improve their effectiveness.

The Contractor shall take such measures as the Engineer's Representative may require to prevent the entry of spillage from concrete mixing operations, oils or other deleterious materials into any new or existing drainage system or watercourse be fouled by such materials the Contractor shall clean the drainage system or watercourse at his own expense to the satisfaction of the Engineer.

The operation of this clause shall in no way absolve the Contractor from any of his obligations under the Contract.

27. WEATHER CONDITIONS

Without limiting his liabilities under the Contract, the Contractor shall make suitable arrangements to protect the Works, Temporary Works and Constructional Plant against the effects of weather.

Unless otherwise specified all Works are to be carried out in the dry and they shall be kept free from water coming from any source whatsoever to the satisfaction of the Engineer and at the Contractor's expense.

All materials shall be stored on Site in a manner approved by the Engineer's Representative and the Contractor shall carefully protect from the weather all work and materials which may be affected thereby.

28. SOURCES OF MATERIALS

For the purpose of the Contract, borrow and quarry areas shall mean and include all such areas proposed by the Contractor and approved by the Engineer which the Contractor may use to excavate or quarry materials for use in the Works.

At the commencement of the Works, or as soon thereafter as is practicable, the Contractor shall

submit to the Engineer for approval details of:

(a) The sources from which he proposes to obtain sand, gravel, rock aggregates, stone and filling for the Works;

(b) The period during which he proposes to obtain materials from each of the several sources;

No approval by the Engineer of such proposals shall not relieve the Contractor of his obligation to provide all the materials required for the Works, or any other obligation under the Contract.

29. LANGUAGE

In addition to the requirements of Clause 3 of the General Conditions of Contract and Clause 11 of the Instructions to Bidders, the Contractor shall make provision to the satisfaction of the Engineer for all key personnel including agents, sub-agents, liaison officer, engineers, technical assistants, foremen and leading hands to be Nepali/English speaking.

30. NOTICE BOARDS

The Contractor shall provide and erect professionally prepared notice boards on the Site at his own expense. The minimum dimensions of the boards shall be 2.4 meters by 2.4 meters. The wording, script materials and method of mounting shall be to the approval of the Engineer and the Employer.

31. SCALING OF DRAWINGS

Drawings must not be scaled for any purpose. Site information in particular may not be accurately reproduced to scale. Figured dimensions and levels on drawings and dimensions and levels determined from site measurement only should be used. Where there is inadequate information, and/ or discrepancy with-in any information provided and / or discrepancy between information provided and site conditions, the matter must be referred to the Engineer for instruction.

32. WORK DURING THE DEFECTS LIABLILITY PERIOD

After the commencement of the Defects Liability Period the Contractor shall do nothing which might endanger the safety of the general public or school facilities and he shall obey all instructions of the Engineer or any other duly authorized persons or authority in this regard.

Throughout the Defects Liability Period the Contractor shall notify the Engineer of the work or operations he intends to carry out on the Site and he shall obey all instructions which the Engineer or the Employer may give as to times and manner of working so that any inconvenience to School operations is kept to a minimum.

33. PROVISIONAL SUMS

The scope of work for the contract is not completely represented by the specifications and drawings. Provisional Sums have been identified where the design is insufficient to allow the Contractor to tender the work or requirements are unknown.

The individual items of building work for which Provisional Sums have been identified are listed in the Bills of Quantities together with the anticipated scope of work each covers. Other items of building work not specifically identified as being within the scope of the Provisional Sums listed, including work specifically excluded from the scope of the Provisional Sums, shall be deemed to be included in the Unit Price quoted in the Bill of Quantities for the work.

Expenditure of Provisional Sums will be at the direction of the Engineer in accordance with the General

Conditions of the Contract Agreement and shall not be specifically limited by the scope identified.

34. HEALTH AND SAFETY

The Contractor shall take full responsibility for the prevention of unhealthy or unsafe working conditions and for the promotion of healthy and safe working conditions and practices on Site. Nothing specified herein will relieve the Contractor of any of his obligations and responsibilities in this regard.

The Contractor shall implement a health and safety program that shall be in force throughout the duration of the Contract. The program shall be based on a recognized standard and shall, as a minimum, meet the requirements of the International Labour Organization Standard “Safety and Health in Building and Civil engineering work”. In addition, the Contractor shall abide by all laws and regulation of Government of Nepal (GoN) related to safety and health.

The Contractor shall designate a minimum of one senior and one junior Safety Officers one of whom is to be present on the site at all times. Such Officers will speak and read both Nepalese and English. They shall have detailed knowledge of the Construction Safety Code and safety standards designated for the use in the Works. They shall be responsible for ensuring that the regulations are observed in all aspect of the work. They shall have responsibility and authority to immediately instruct any construction personnel on matters of safety including the cessation of work where a significant safety hazard exists.

In developing the Health and Safety Program, the Contractor shall pay particular attention to the following concerns:

34.1 DANGEROUS LOCATIONS

The Contractor shall ensure that workers and the general public are suitably protected from dangerous locations by the erection of barriers, barricades and posting of warning notices, as appropriate around open excavations and other dangerous sites. The Contractor should ensure all scaffolding is designed and erected to conform to good engineering practice.

34.2 FIRE

Special precautions shall be taken in the storage and handling of inflammable liquids and materials. Suitable measures for fire fighting shall be provided. Smoking in the vicinity of such materials shall be strictly prohibited. Good housekeeping practices shall be enforced and scrap material and rubbish regularly removed form site. The Contractor shall carry out whatever additional measures are necessary to minimize the risk of fire and to control fire damages, if a fire should occur.

34.3 HAZARDOUS PRODUCTS

Special precautions shall be exercised in the use of hazardous materials, in particular:

a. Workmen using such products should follow manufacturer's instructions

b. Workmen should be fully briefed on hazards involved and the precautions to observe.

34.4 WORKING NEAR HIGH VOLTAGE LINES

The Contractor shall not store material underneath or in the vicinity of high voltage lines. Should it be necessary for work to be carried out near voltage lines, the Contractor shall arrange with the respective power station operator that the affected lines be de-energized during the period when his workers would be at risk.

34.5 POWER TOOLS

Tools and equipment shall be operated in strict accordance with manufacturer's recommendations. Particular care shall be taken when using electrically powered tools to ensure that such tools are properly grounded.

34.6 PERSONAL SAFETY

The Contractor shall provide his Workmen with such personal protection equipment as helmets, safety boots, goggles and other personal safety devices, as are required in a given work situation.

34.7 FIRST-AID STATION

The Contractor shall establish, maintain, operate and remove first aid stations to meet the requirements of all personnel working in the area, including the required outfit and consumables for the joint use by all other contractors at the specific site, the Employer and the Engineer. This item shall include the building, furniture and all required equipment. The Contractor shall meet all requirements of the local authorities.

The Contractor shall provide required medical personnel to provide first aid medical care.

FAILURE OF OPERATE SAFETY

In the event that the Engineer observes unsafe conditions and/or unsafe working methods, the Engineer shall initially advise the Contractor to correct such conditions or practices. Should the Contractor allow such conditions or practices to persist, the Engineer shall correct such conditions and practices at the Contractor's expense.

Failure of employees to comply with safety rules and failure of supervisory staff to enforce safety and health rules established under the Health and Safety Program, on the worksite or campsite, may be cause for removal of such employees and/or supervisory staff.

No extra payment shall be made for this item. All the related activities under Health and Safety Clause shall be at the Contractor's own cost.

35. PAYMENT FOR ITEMS IN GENERAL REQUIREMENTS

No measurement or separate payment shall be made for work under this Division. It is deemed that the costs for any Clauses in the General Requirements are included for under appropriate unit prices tendered by the Contractor in the Bill of Quantities.

DIVISION: 2

SPECIFICATION FOR CIVIL WORKS

1. CLEARING, GRUBBING AND REMOVALS

1.1 DESCRIPTION

This specification applies to all clearing, grubbing and stripping the area of the Work within the limits of the Site as defined in the Drawings and ordered by the Engineer of all trees, stumps, bushes, roots, downtimber, rotten wood, rubbish, debris, humus, swamp material and any other vegetation or unacceptable material.

All material removed by clearing and grubbing operation which is useful to the Employer shall be stockpiled in accordance with the requirements of the Employer. Unwanted material shall be removed from the Site and dumped on places after prior permission has been obtained.

Clearing and grubbing shall consist of clearing the surface of the ground of materials noted in 1.2 herein. The work shall include the disposal from the project, by burning or otherwise, of all spoil materials resulting from clearing and grubbing.

1.2 EXECUTION OF WORKS

1.2.1 GENERAL

Clearing operations shall be strictly limited to the area to be occupied by the permanent works unless otherwise directed or approved by the Engineer. Clearing operations shall only be undertaken immediately prior to the commencement of construction in the area concerned.

Underground and over ground structures with a salvage value shall be removed with care and stored at points as directed by the Engineer and shall become the property of the Employer, unless used for reinstating services. Such structures shall include bricks, timber/wood, plastic and metal (reinforcing bars).

Living trees outside of grading limits shall be cut only as specified or directed by the Engineer, and all branches or trees extending into the limits shall be trimmed carefully to give a clear height as required over the Site.

Within areas where excavation or filling is to be carried out, the ground shall be cleared by removing of top soil (about 150 mm thick), all living or dead trees, and stumps and root mats shall be removed to a depth of not less than 0.3 m below the surface or a depth as directed by the Engineer. With the exception of areas to be excavated, all depressions made below the ground surface by the removal of stumps or roots shall be refilled with suitable material and compacted to the satisfaction of the Engineer.

The areas denoted on the plans to be cleared and grubbed under this item shall be marked on the ground by the Contractor and approved by the Engineer. The buildings and the structures to be removed are shown on the Drawings.

Clearing, grubbing and demolition shall be done sufficiently in advance of the earthwork, road grading and building operations.

1.2.2 REMOVAL OF STRUCTURES

Fences, buildings or structures of any character upon or within the limits of the Works and not considered for the construction shall be removed carefully by the Contractor wholly or in part as specified or directed. The materials so removed shall be piled on the abutting property, neatly and in an acceptable manner or otherwise disposed of as specified or directed by the Engineer. When fences enclosing pastured land or orchards are required to be removed, the property owner shall be notified sufficiently in advance to enable him to construct supplemental fences or make arrangements as required.

1.2.3 DEMOLITION WORK

Prior to all demolition work a written notice shall be prepared between the Employer/Engineer and the Contractor specifying all salvageable materials resulting from the demolition work. The Contractor shall store this material on site and hand it over to the Employer if not otherwise specified.

Careful coordination with other work executed at the site must be obtained to perform the demolition work involved. Before starting any demolition work, the contractor shall inspect the structure to be demolished and it shall take all necessary precautions to ensure that those parts to be retained will remain undamaged. All damage to retained parts shall be repaired by the Contractor at it's expense.

It shall be the Contractor's responsibility to secure all load-bearing parts by adequate supports, in case the demolition will change the load-bearing behaviour, or when higher loads will have to be taken either for temporary purposes or permanent use. When executing the demolition work, the surrounding areas must only be affected to the absolutely necessary minimum. In the event that demolition work might cause damage to surrounding structures, the Contractor shall, in conjunction with the Employer/Engineer and the owners of such structures, determine their present condition and the Contractor shall, if required, take appropriate measures before demolition work commences.

All debris, rubbish and other materials resulting from demolition operation shall be removed from the site. Storage or sale of removed materials will not be permitted on the Site.

1.2.4 CLEARING

Clearing includes the removal of existing obstacles above ground, except for buildings, for instance the removal of loose boulders up to 0.3 m3 volume, fences, trees and vegetation. Trees must only be removed upon approval by the Engineer.

Depressions caused by the removal of boulders, trees or other obstacles shall be filled with adequate soil and compacted at no extra cost. All unsalvageable materials shall be disposed of by removing them from the site at the Contractor's expense.

Where shown on the Drawings or directed by the Engineer trees and shrubs shall be uprooted or cut down as near to ground level as possible. In order to minimise damage to surrounding vegetation, trees shall be felled towards the centre of the area being cleared. Such individual trees as the Engineer may designate and mark in white paint shall be left standing and uninjured.

Authority to fell trees outside the area occupied by the permanent Works must be obtained by the Contractor from the concerned authority who have the right to give the permission.

Timber and bamboo cut from the area occupied by the permanent Works and meeting Specification requirements may be utilized by the Contractor for the Works providing written authorization for the use intended is obtained from the Engineer.

The Contractor shall ensure that no vegetation within the right-of-way, other than that within the area occupied by the permanent Works, or as directed by the Engineer, is harmed whether by felling, trafficking, fire or spoil disposal.

1.2.5 REMOVAL OF TOP SOIL

Where shown on the Drawings or directed by the Engineer the Contractor shall remove topsoil. The depth of the topsoil to be stripped shall be as directed by the Engineer. Where directed by the Engineer the Contractor shall, prior to removal of topsoil, excavate trial holes of a sufficient depth to enable the Engineer to measure the depth of topsoil. Topsoil shall be stripped and stockpiled in locations safe from erosion, mixing with other materials, or compaction by construction traffic. The Contractor shall maintain a record of the volume and location of topsoil stockpiles.

Topsoil excavated to enable parapet or boundary walls to be set back to new lines, or to be erected on the boundaries of the Site, shall be reserved for reuse. After erection of the walls the topsoil shall be spread over the disturbed ground, any surplus being disposed of in the manner

required

1.2.6 STOCKPILES AND DISPOSAL

Excavated material accepted by the Engineer to be used for backfill or for construction of other permanent works shall be placed, if possible, in its final position, or otherwise may be stockpiled or deposited on site at locations approved by the Engineer. The quantity of acceptable excavated material placed in stockpiles for later use shall be held to the minimum.

Spoil materials removed by clearing, grubbing and demolitions shall be disposed of by burning or by removal to the disposed area identified by the Contractor and approved by the Engineer. Piles for burning shall be placed either in the cleared area near the center or in the adjacent open spaces where no damage to trees, other vegetation or other property will occur. Before any burning is performed, permits to burn shall be obtained from authorities having jurisdiction in the area. The Engineer shall also be notified at least 24 hours before burning is started. Precautions shall be taken to prevent accidental fires or spread of fires, including provision of watchmen and standby fire-fighting equipment meeting approval of authorities having jurisdiction in the area. Ashes resulting from burning shall be removed and disposed to the spoil areas unless otherwise approved by the Engineer.

Waste concrete and masonry shall be disposed of in the areas identified by the Contractor or as directed by the Engineer. In no case shall discarded materials be left or piles adjacent to the construction limits. The manner of the disposal of materials shall be subject to the approval of the Engineer and shall not create an unsightly or objectionable view.

1.3 CLEARING, GRUBBING AND REMOVALS

In areas designated to be cleared and grubbed, all trees, stumps, down timber, logs, snags, brush, undergrowth, matted roots, hedges, heavy growth of grass or weeds, fences, debris, rubbish of any nature, natural obstructions and such material which in the opinion of the Engineer is unsuitable for the foundation of pavements or other required structures, shall be removed.

Prior to all demolition work a written notice shall be prepared between the Employer/Engineer and the Contractor specifying all salvageable materials resulting from the demolition work. The Contractor shall store this material on site and hand it over to the Employer if not otherwise specified.

Buildings designated for removal shall be dismantled or demolished in such manner as to protect workers or other persons from any danger of falling materials or collapse of the structure. The Contractor shall carry out the work so as to prevent damage to any adjoining structure or utility not intended for demolition. The Contractor shall spray buildings and structure during and after demolition with water as required to minimize dust.

Buildings, structures, foundations, wells, septic tanks, cesspools, and all like in-ground or above grade structures shall be fully demolished within earthworks grading areas. In other areas scheduled for construction of surface pavements, demolitions shall be carried out to a minimum depth of 600 mm below the design subgrade elevation. Notwithstanding the above, the roofs of all septic tanks, manholes, etc. shall be removed so that all void within such structures can be backfilled with fill type materials. Broken concrete, bituminous concrete, concrete blocks, or other objectionable spoil material which cannot be used in backfill shall be disposed off.

1.4 MEASUREMENT

All areas cleared, grubbed and stripped will be paid by area according to their plan dimensions, on which trees, bushes, crops, etc. are to be removed. Free areas in between exceeding 10 m2 in size will be deducted.

Inclined areas exceeding a slope angle of 25 degrees to the horizontal shall be measured to actual length.

Grubbing executed simultaneously with common excavation in open cut for the different structures, shall be measured as common excavation.

Grubbing executed outside the limits indicated on the drawings or without written order from the Engineer, will not be paid to the Contractor. The Engineer may increase or decrease the necessary grubbing and the Contractor shall execute this work without modifying the stipulated unit prices. The total area of grubbing in areas approved by the Engineer/Employer shall be paid for at the unit prices of the Contract. This price shall include the equipment, materials and labour necessary to remove the corresponding materials, the stockpiling of topsoil for later reuse, the loading and the placing of such materials into the waste disposal areas and, where called for, its burning.

If fences, buildings of structures of any character upon or within the limits of the Works have to be removed, they will not be paid for separately.

Demolition of buildings, structures, obstructions above ground (single volume above 1.00 m3 only) shall be measured by net volume of materials.

1.5 RATES AND BASIS OF PAYMENT

The rate includes cost of all the operation described above.

Payment for clearing, grubbing and removal of all structure above or below ground, as required by this specifications, as shown in the Drawings, or as may be directed by the Engineer will be at the contract unit price for each item tendered in accordance with the Bill of Quantities.

2. EARTHWORKS IN EXCAVATION

2.1 GENERAL

All excavation operations manually or by mechanical means shall include excavation and 'getting out' the excavated materials. In case of excavation for trenches, basements, water tanks etc. 'getting out' shall include throwing the excavated materials at a distance of at least three metre or the depth of excavation, whichever is more, clear off the edge of excavation. In all other cases 'getting out' shall include depositing the excavated materials as specified. The subsequent disposal of the excavated material shall be either stated as a separate item or included with the items of excavation stating lead.

This specification covers the earthwork in excavation for all types of foundations, wet or dry. It covers earthwork in soils of all sort, including sand, gravel, soft clay, black soil and other similar soft or loose material. It includes all materials of earthy or sandy nature which can be easily ploughed or small shingle or gravel which can be easily removed.

Excavations shall be done to the required dimensions and shall be finished according to the specified lines and slopes shown on the drawings or as directed, in a way acceptable to the Engineer. All necessary precautions shall be taken to cause the minimum possible alteration or disturbance to the material lying under and adjacent to the final excavation lines.

2.2 CLEARING SITE

The site on which the structure is to be built as shown on the plan and the area required for setting out and other operations should be cleared and all obstructions, loose stones, materials and rubbish of all kinds, stumps, brush wood and trees as specified in article 1 of this specification.

2.3 SETTING OUT

After clearing the site as per specification, the centre lines shall be given by the Engineers and it will be the responsibility of the Contractor to install substantial reference marks, bench marks etc. and maintain them as long as required true to line, curve, slopes and level. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the work. Labour, material etc. required for setting out and establishing Bench Marks and other reference marks shall be arranged by the Contractor at his own cost.

2.4 EXECUTION

2.4.1 Excavation

Foundation excavation shall include removal of all materials, of whatever nature and whether wet or dry, necessary for the construction of foundation and substructure exactly in accordance with the lines, levels, grades and curves as shown on the drawing or as directed. It shall be taken to the exact width of the lowest step of the foundation and its sides shall be left plumb where the nature of the soil admits it. If necessary, depending on the nature of the soil, the Contractor could cut the earth in slope up to 1 in 6 (1 horizontal to 6 vertical) at his own cost. Nothing extra shall be measured for payment to the earth cutting in slope. Any caving in of earth shall be cleared and re-excavated by the Contractor at his own cost.

Where the excavation reveals a combination of both suitable and unsuitable materials, the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the unsuitable materials are excavated separately for use in the works without the contamination by the unsuitable materials.

Excavated material shall be handled to allow suitable material to be recovered and placed in the embankment or in the capping of pavement sub-grades. Suitable materials shall be deposited within the designated areas of the work as shown in the plans or as directed by the Engineer. If at

the time of excavation, it is not possible to place any suitable material in its proper section of the permanent construction, it shall be stockpiled in approved areas for later use. No additional payment will be made for such temporary stockpiling.

Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the Engineer. The Engineer shall determine if the displacement of such material was unavoidable and his decision shall be final. All overbreaks shall be removed by the Contractor and disposed of as directed. Payment will not be made for removal and disposal of overbreak which the Engineer determines as avoidable. Unavoidable overbreak will be classified as "Unclassified Excavation".

The excavation shall not be carried out below the level of the existing adjacent foundations. If it is necessary for some reason to excavate below the adjacent foundations, these foundations shall be underpinned and shored by the Contractor prior to proceeding with the excavation. The Contractor shall get written permission from the Engineer for shoring as required.

All existing structures, foundations, pipes and cables, if any such are to be incorporated into the final work, shall be adequately protected or replaced by the Contractor.

As stated in Division – 1: General Requirements, the Contractor shall notify the Engineer before starting excavation to enable the latter to take cross-sectional levels for purposes of measurements before the ground is disturbed.

2.4.2 Foundation Preparation

The bottom of foundation shall be leveled both longitudinally and transversely or stepped as directed. Before the foundation is laid, the final surface shall be cleaned, slightly watered and rammed. If any soft patches are seen on inspection or ramming, these shall be dug out and dealt with as directed. All operations for foundation preparation shall be carried out in the dry, and all necessary precautions shall be taken to avoid disturbing the foundation material.

If, by the Contractor's mistake, excavation is made deeper than shown on the drawings or as directed, the extra depth shall be made up with concrete or masonry of the foundation, as directed, at the cost of Contractor. The elevation of the bottom of the foundation shown on the plan shall be considered as approximate only, and changes in the dimensions and elevations of the foundation as deemed necessary to secure satisfactory foundation shall be as per the instructions of the Engineer.

After the excavation is completed, the Contractor shall notify the Engineer that the excavation is ready for inspection. No excavation shall be covered with concrete until it has been inspected and approved by the Engineer in writing.

The surfaces shall be free of oil, stagnant or running water, mud, loose rock, residue and

impurities or any other improper material. Rock faults, depressions, and fractures shall be cleaned and all brecciate and decomposed material shall be thoroughly removed to sound ground. Immediately before concrete or sealing material placing, all surfaces shall be thoroughly cleaned by means of air and water jets, wire brushes, sand jets or by any other devices necessary to clean the foundation and keep it free of water, but shall be moistened before placing concrete or sealing material.

All earth a surface against which concrete is to be poured, shall be clean and free of any detrimental impurities, organic matter or unsuitable material. Immediately after excavation, all such surfaces shall be moistened and treated as directed by the Engineer and then protected by means of a plain concrete layer, 10 cm in thickness if required by the Engineer. Special attention shall be paid to attaining a tight interlocking connection to the subsurface.

2.4.3 Shoring

Unless separately provided for in the contract, excavation of slopes to prevent falling in of sides or providing, fixing, maintaining and removing shoring, bracing etc. shall not be paid for. The Contractor shall be responsible for the design of shoring of sufficient strength to resist side pressure and ensure safety from steps and blows and to prevent damage to work and property

and injury to persons. It shall be removed as directed after all the items for which it is required are completed.

2.4.4 Protection

Near the public places and all frequented places, foundation pits, well pits and similar excavation shall be securely fenced and marked with red lights at night to avoid accident along with the provision of a night-watchman. Adequate protective measures shall be taken to see that foundation excavations do not affect or damage adjoining structures and land. All measures required for the safety of the excavation, the people working in and near the foundation trenches, property and the people in the vicinity shall be the responsibility of the Contractor. The Contractor shall be entirely responsible for any injury to life and damage to property caused by his negligence or accidents due to his constructional operations.

2.4.5 Disposal of Excavated Materials

No materials excavated from the foundation trenches of whatever kind they may be, are to be placed even temporarily nearer than 3 meters or greater distance as directed by the Engineers from the outer edge of excavation. All materials excavated will remain the property of the Employer. Rate for excavation includes sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for back filling or other use shall be stacked in convenient places but not in such a way as to obstruct free movements of men, animals and vehicles or encroach on the area required for constructional purposes. It shall be used to the extent required to completely backfill the structure to original ground level or the elevation shown on the drawings or as directed by the Engineer. For backfilling, the materials shall be placed in 15 to 20 cm layers, moistened and well compacted. Materials not useful in any way shall be disposed off as directed by the Engineers. If useful excavated rubble is required by the Contractor for the use in other items, it shall be paid for at the rate fixed in the tender and if not so provided, at the rate at which both parties mutually agree. The site shall be left clean of all debris on completion.

Excavated materials disposed of or stockpiled adjacent to rivers or watercourses shall be adequately protected from erosion by surface runoff or by river action

2.4.6 Dewatering

Unless specially provided for as a separate item in the Contract, the excavation rate shall include pumping out all water which may accumulate in the excavation during the progress of the work either from seepage, springs, rain or any other cause and diverting surface flow if any, by bonds or

other means. The bonds shall be removed after their purpose is served.

Pumping water from any foundation enclosure or trenches shall be generally in such a manner as to preclude the possibility of any damage to the foundation trenches, concrete or masonry or any adjacent structures. The excavation shall be kept free from water (i) during inspection and measurement, (ii) when concrete and / or masonry are in progress and till they come above the natural water level and (iii) till the consultant considers that the mortar is sufficiently set.

2.4.7 Slips and Blows

If there are any slips or blows in the excavation, they shall be removed by the Contractor without any extra cost so as to provide correct dimensions required for the foundation.

2.4.8 Back Filling in Foundation Trenches

All timber work and form work shall be removed after their necessity ceases and trash of any sort shall be cleaned out from the excavation. All space between foundation masonry or concrete and the sides of excavation must be refilled to the original surface with approved materials, in layers of 15 to 20 cm in thickness, watered and rammed to compact. Normally excavated earth from same

area shall be used for filling. Earth used for filling shall be free from shrubs, rank, vegetation, grass, brushwood, stone shingle and boulders (larger than 75mm in any direction), organic or any other foreign matter. Earth containing deleterious materials, salt peter earth etc. shall not be used for filling. All clods and lumps of earth exceeding 8 cm in any direction shall be broken or removed before the earth is used for filling.

The filling shall be done after concrete or masonry is fully set and done in such a way as not to cause undue thrust on any part of the structure. Where suitable excavated material is to be used for refilling, it shall be brought from the place where it was temporarily deposited and used in refilling.

Foundations and structures shall be backfilled with approved material compacted in layers as per Engineer's instruction by suitable equipment until optimum stability and backfill density has been obtained to the satisfaction of the Engineer. Compacting shall be carried out with special care by means of pneumatic or mechanical tampers or other compactors of a type previously approved by the Engineer to avoid damage to structures.

If payment is not provided for under a special item in the Bill of Quantities for backfilling in foundation trenches including compaction, it will be deemed to be included in the unit prices for excavation.

2.4.9 Trench Excavation

In trenching for laying pipes, cables or other buried materials, the Contractor shall excavate the trench to a bottom width of at least 0.60 m plus the diameter of the material to be installed, except for materials of 50 mm or less in diameter, in which case the bottom width of the trench shall be at least 0.50 m. Both sides of the trench shall be either sloped or planked, braced and strutted in accordance with the soil conditions encountered and the safety regulations to be observed. The above mentioned rules shall not apply should the Contractor use methods other than trenching for the laying of continuous flexible conduit, piping or cable. However, such methods shall be used with the written approval of the Engineer

2.4.10 Cable Trenches Excavation

Cables buried in the ground shall be laid as follows: The cable trench shall be excavated approx. 110 cm deep. The cable(s) shall be laid on to a layer of clean sand approx. 10 cm deep. Over the cable, another layer of approx. 10 cm of clean sand shall follow protected by bricks or a similar material. A yellow plastic warning band shall be laid above this earth layer. The excavation shall then be refilled by soft earth in layers of approx. 20 cm high; perfectly rammed. All such work (excavation, refilling, provision of sand and tape) shall be performed by the Contractor.

A safety distance of 30 cm to other services, such as water pipes, communication cables, gas and oil pipes, etc., shall be maintained. Control and power cables shall be laid separately not exceeding their permissible bending radius.

The Contractor shall be responsible for any damage caused by him to any buildings, and shall be responsible also for making good such damages or soiled areas of any building affected by it's works.

The following conditions shall apply for the use of cable trenches:

- Cables lying in open trenches for more than two weeks shall be protected against ultra violet radiation.
- Open trenches shall be properly secured by red warning tapes both sides along the trench.
- Cable trenches shall be cleaned from dirt, sand; etc., before closing.
- Trenches shall be closed as soon as possible to avoid damage, and excessive ingress of dirt.
- Trenches shall be protected from inflow of surface water, and shall be drained by suitable measures.

2.5 MEASUREMENT

The measurement for respective class of excavation shall be made in cubic meter (cu.m.) or as mentioned in bill of quantities for the quantity acceptably excavated, limited to the dimension shown in the sanctioned plan or as directed by the Engineer. Dimensions shall be measured nearest to one centimeter, and individual quantities shall be calculated correct to two places of decimals of a cubic meter.

The excavation to dimension in excess of the above shall not be measured nor paid for and if so ordered by the Engineers the Contractor shall have to fill up the excess depth with cement concrete or masonry of foundation grade without extra payment.

Driving of sounding bars or inserting small drill holes to explore the nature of substratum up to a total length of 1 meter distributed in 2 or 3 places in each foundation if necessary shall be considered incidental work and shall not be paid for separately.

Removal of slips and blows in the foundation trenches shall not be measured nor paid for. If it is necessary in the opinion of the Engineer to carry foundation below the levels shown on the plans, the excavation for the first 1.5 meters of the additional depth shall be included in the quantity for the particular classification at the tendered rate. The excavation below this additional depth of 1.5 meters shall be paid for as extra work at rate to be decided under general conditions of Contract unless the contractor is willing to accept payment at tendered rates. For all depths less than the designed depth plus 1.5 meters the excavation shall be paid for at tendered rates.

2.6 RATES AND BASIS OF PAYMENT

The rate for the item of excavation shall include the following:

a) cleaning site.
b) Setting out works, profiles etc. according to the sanctioned plan or as ordered by the Engineers and setting up Bench Marks and other reference marks.
c) Providing and subsequently removing shoring and shuttering or cutting slopes except when separately provided for in the Contract.
d) Bailing and pumping out water when separate provision does not exist for in the contract.
e) Excavation and removal of all materials of whatever nature dry or wet and necessary for the construction of foundation including materials like explosives, removal of blows and slip sand use of tools, plant and equipment necessary for satisfactory completion of the

items and preparing bed for foundation.

f) Sorting out of useful excavated materials, conveying them up to the specified lead clear beyond the structure and stacking them neatly for backfilling or reuse and disposing useless materials as directed by the Engineers.

g) Backfilling the trenches alongside masonry or concrete with approved material up to the natural ground level.

h) Necessary protection including labour, materials and equipment to ensure safety and protection against risk or accident.

i) Supply of facilities for inspection, testing and measurement at any time by the Engineers.

j) Compensation for injury of life and damage to property if any caused by the Contractor's operation connected with this item.

k) Small drill holes to explore the nature of substratum if necessary.

The payment for respective class of excavation shall be made at the Contract rate per cubic meters for the quantity acceptably excavated, limited to the dimension shown in the sanctioned plan or as directed by the Engineer.

3. EARTHWORKS IN FILLING

3.1 SCOPE

This section of the Specification covers the selection, placing and compaction of backfills, the supply and placing of fill materials in earth filling in foundation trenches, under floors and general filling in landscaping other than road works.

3.2 GENERAL

Backfill and surface course shall be constructed to the lines and grades shown on the Drawings, or as otherwise directed by the Engineer.

The permissible maximum deviation of the finished outside slope surface or boundaries of the embankments from the lines and grades shown on the Drawings shall be plus or minus 150 mm, measured horizontally and minus nothing plus 150 mm measured vertically.

3.3 EXECUTION OF BACK FILLING

3.3.1 Topsoil

Topsoil shall be removed from the areas to be filled. The topsoil shall either be taken to designated spoil areas or stockpiled for re-use under other division of works.

3.3.2 General Requirement

Foundations and structures shall be backfilled with approved material compacted in layers as per Engineer’s instruction by suitable equipment until optimum stability and backfill density has been obtained to the satisfaction of the Engineer. Compacting shall be carried out with special care by means of pneumatic or mechanical tampers or other compactors of a type previously approved by the Engineer to avoid damage to structures.

Surfaces receiving fill layers shall, if smooth, be previously scarified to obtain a good key between the new fill layer and the subgrade. Backfilling of foundation work with rock shall be carried out only after foundations have been inspected by the Engineer and the method has been particularly directed.

If payment is not provided for under a special item in the Bill of Quantities for backfilling including compaction, it will be deemed to be included in the unit prices for excavation.

Fill shall not be deposited under water without the Engineer's permission. This permission will

normally not be granted for cohesive soils or for fill of any kind where the standing water, in the opinion of the Engineer, can be pumped out or diverted. Permission may be granted to place rock fill by random dumping in areas where the depth of water is greater than 50 cm but the methods and quality of the fill material shall be subject to approval and when the fill level is 50 cm above the water surface it shall be compacted until there is no discernible settlement under the equipment used for placing or compacting fill. Thereafter, normal backfilling and compaction shall be resumed.

Where swamps, marshes, bogs or other similar wet areas have to be traversed by the Works, they shall be drained as directed by the Engineer according to the materials and conditions encountered. Prior to the formation of backfilling, embankments, fills, etc., any unsuitable materials occurring on the Site shall be removed to such depths and widths as may be directed by the Engineer and the resultant excavations shall be properly backfilled with suitable and approved excavated materials and shall be deposited and compacted to the satisfaction of the Engineer.

Where backfilling is to be placed on steep sloping ground, the surface of the ground shall be benched in steps or trenches as directed by the Engineer according to the materials and conditions encountered. Prior to the formation of backfilling, embankments, fills, etc., any unsuitable materials occurring on the Site shall be removed to such depths and widths as may be directed by the Engineer and the resultant excavations shall be properly backfilled with suitable and approved excavated materials and shall be deposited and compacted to the satisfaction of the Engineer.

Where backfilling is to be placed on steep sloping ground, the surface of the ground shall be benched in steps or trenches as directed by the Engineer, or where the ground is wet or spongy or likely to be detrimentally affected by water, the Contractor shall remove all unsuitable material and if necessary under-drain the Site as may be directed by the Engineer before benching or trenching is carried out.

Satisfactory material shall be used in bringing fill to the required lines and grades. The material shall be free from roots and other organic matter, trash. debris and stones larger than 80 mm in any dimensions. Material as specified above for fill and backfill shall be obtained from the required excavation on site, if acceptable, or from borrows sources. Unsatisfactory material on surfaces or in excavated areas to receive fill shall be removed and replaced with satisfactory material. No fill material shall be placed on muddy areas or on surfaces which have not been approved. Fill shall be placed in horizontal layers not exceeding 300 mm in loose depth for non-cohesive soils and 200 mm for cohesive soils. Start in the deepest area, progress approximately parallel to the finished grade and compact each layer of fill with equipment to achieve the following percentages of maximum density at optimum moisture when cohesive soils are tested in accordance with ASTM D 1557 or the following percentages of relative density when non-cohesive soils are tested in accordance with ASTM D 2049.

Location	% Max. Density (ASTM D 1557)	% Ref. Density (ASTM D 2049)
Under Building Slabs on Grade	95	75
Under Paved Areas	95	75
Under Structural Members	90	60
General Grading	90	60

In case of cohesive soil, material shall not be compacted when the moisture content varies by more than 3 % from the optimum moisture content. Moisture content shall be maintained by wetting or drying manipulation. Compaction operations shall be suspended when satisfactory results cannot be obtained because of rain or other adverse conditions.

3.3.3 Trench Backfilling

Trenches shall not be backfilled until all required tests are performed and until the installed systems comply with all requirements.

The trenches shall be carefully backfilled with the excavated material approved for backfilling. The fill materials shall consist of sand or gravel, free from large clods of earth and free from stones larger than 25 mm, deposited in 150 mm layers and thoroughly and carefully tamped by hand until the pipe has a cover of not less than 300 mm, care being taken not to disturb the pipe or drain. Backfilling above this level can be carried out using mechanical means as approved by the Engineer.

Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified at the Contractor's expense.

3.3.4 Filling

Filling shall be made with approved selected material from excavation or other predominantly granular material and free from slurry, mud, organic or other unsuitable material matter and capable of compaction by ordinary means. Filling in trenches and foundations shall be placed in 15 cm layers and compacted at optimum moisture content by mechanical means where possible. Alternatively, where allowed or approved by the Engineer fill shall be placed in layers and saturated with sufficient water or otherwise compacted to produce maximum compaction. Filling around pipes and cables shall be carefully placed. Fine material shall cover the pipe or cable completely before the normal infilling is placed. All filled areas shall be left neat, smooth and well compacted, the top surface consisting of the normal Site surface soil, unless otherwise directed. The Contractor shall be responsible for the reinstatement of any surfaces or structures which may move or otherwise be affected by settlement of backfill.

3.3.5 Random Back Filling

The Contractor shall place and compact random backfill to the lines, grades and dimensions in the locations shown on the drawings or directed by the Engineer. The types of material used for backfill shall be subject to the approval of the Engineer. So far as practicable backfill material shall be obtained from required excavation.

Backfill shall be placed carefully in the vicinity of any structures so as not to damage the structure. The material used for backfill within 1 m of structures shall not contain rocks larger than 75 mm in maximum dimension.

The material shall be deposited in horizontal layers not more than 150 mm thick after being compacted, and shall be brought to the moisture content required for the purpose of compaction, as determined by the Engineer, and the moisture content shall be uniform throughout each layer. Where earthfill is used, the density of the compacted backfill shall be not less than 90 percent of the maximum dry density obtained by compaction in accordance with ASTM D698. Where previous sand and gravel granular soils are used, the backfill shall be compacted to not less than 70 percent relative density as defined in the ASTM D2049.

Except where concrete is to be placed, refill of excavation performed outside the established pay lines for excavation shall be placed in the same manner as specified for the adjacent backfill, and such refill shall be placed at the expense of the Contractor.

Where directed by the Engineer, material shall not be placed in any section of the fill until pockets of weak or otherwise unsuitable material have been removed and the surface compacted as described in this Article.

3.3.6 Compaction

Prior to constructing the selected material, the previously constructed subgrade shall be cleaned of all foreign material. Surfaces of subgrades shall meet the specified compaction and surface tolerances. Ruts or soft yielding spots that may appear in the subgrade, areas having inadequate compaction, and deviations of the surface from specified requirements shall be corrected by

loosening, removing and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. Alternative blading and rolling shall be performed until a smooth, even and uniformly compacted finish is obtained.

Approved materials shall be placed along the edges of each layer in sufficient quantity to allow at least 0.60 m of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of the layer.

The surface shall show no deviations in excess of ± 30 mm when tested with a 3 m straight-edge applied parallel with and at right angles to the centreline of the area. Deviations exceeding this amount shall be corrected by loosening, adding or removing material, reshaping, and compacting as directed.

When the course is constructed in more than one layer, the smoothness requirements specified above shall apply to the top layer. The surface of underlying layers shall be finished to a reasonably even contour.

The completed thickness of the layer shall be within 10% of the thickness shown in the Project Documents, but must not deviate more than 30 mm, whatever is less. Where the measured thickness of the layer deviates from the smaller value, the Contractor shall correct such areas by scarifying, adding mixture of proper gradation, re-blading, and re-compacting as directed.

3.3.7 Hardcore Compaction

Hardcore shall not be placed until the subgrade has been prepared, tested and approved.

Hardcore shall be wet-down to approximately optimum moisture content after being placed on the subgrade and before compaction. Material shall be placed in layers not exceeding 100 mm thick when compacted to specified density.

After the hardcore has been graded and compacted the surface shall be thoroughly wet-down and slush rolled with an approved roller until all aggregates are thoroughly embedded. Hardcore shall be compacted for the full depth of the base course to within 95% of its maximum density as determined by ASTM D2049.

Compaction shall be by means of approved vibrating or pneumatic compaction equipment.

Total compacted thickness shall be a minimum of 150 mm. The whole compaction operation is subject to the Engineer's approval.

3.3.8 Final Grading

The Contractor shall make due allowance for consolidation and shrinkage in filling and shall make good any settlement which might occur until the end of the Defects Liability Period. The filling shall be paid for as the net compacted volume according to the levels and slopes indicated on the drawings or agreed upon in writing by the Engineer.

3.3.9 Silt Control

During all grading and earthworks operation, provide and maintain to the Engineer's satisfaction, control system to prevent fine soil materials (particularly clays and fine silts) eroded by surface run-off from entering ant storm drainage system.

Construct "silt fence" from approved geotextile material, supported by stakes spaced to securely hold the fence in position. The geotextile shall be buried a minimum 200mm in compacted ground at the base of the fence to prevent the loss of material under the fence. The height shall be sufficient to prevent overtopping. Location and layout shall be approved by the Engineer. The Contractor shall maintain the silt fences throughout the construction until no longer required or until the Engineer requests their removal.

Geotextile material shall be Terrafix (270R) non-woven geotextile, or equivalent. It shall be free of holes, tears or punctures and shall contain stabilizers or inhibitors to resist deterioration by ultra-violet radiation. Geotextile fabric shall be installed on the upstream side of the fence support

stakes. Overlap shall be secured and a minimum 450mm wide.

Remove accumulated sediment when it reaches a depth of one-half of the height of the silt fence, in a manner that prevents sediment escape downstream. Remove all sediment prior to fence removal. Remove the silt fences at the completion of the Works, or when directed or approved by the Engineer. Restore the area to its original or final use condition as appropriate.

No additional payment will be made to the Contractor for providing silt fences. Rate of providing silt fence shall be covered under the rate of excavation or filling.

3.3.10 Tests

Throughout the filling works the Contractor shall perform the Modified Proctor Density tests to determine the maximum densities at optimum moisture conditions and the percent compaction of materials for which minimum percent compactions are specified. The compaction test shall be conducted in accordance with ASTM D 1557 for cohesive soils and ASTM D 2049 for non-cohesive.

In addition to the foregoing tests, the Contractor shall carry out field density tests on the compacted fill materials in accordance with the standards mentioned as above. At least one set of density determination consisting of three tests per 200 square metres (or any lesser area) shall be carried out in each layer, including original ground surface on which filling is to be constructed. If the result of any test shows that the minimum specified density has not been achieved, further compaction shall be executed to the area concerned and the layer re-tested. Unless the test results are satisfactory, the addition of another layer shall not be allowed.

The cost of density testing shall be included in Contract Unit Price for each applicable material. No separate measurement or payment shall be made for these specified tests.

3.4 MEASUREMENT

The quantities of the various classes of earth filling shall be measured for payment under the contract shall be limited to the lines, grades, slopes and dimensions shown on the Drawing or as determined by the Engineer.

Filling and backfilling compacted in place outside the building envelope shall be measured in cubic metres or cubic foots as mentioned in Bill of Quantities by the average end area method as computed from the original and final cross-sections of the completed work. Filling and back filling within the building envelope shall be measured taking average depth of filling as per the drawings. Where due to changed conditions, or the nature of a particular operation, or for any other reason, it is impossible or impractical to measure the quantities by means of average end areas, the Engineer shall compute the quantities by a volumetric method, if in his opinion, it is the best suited method to obtain an accurate determination.

No separate measurement for payment shall be made for excavation made on borrows, quarries, temporary works or in places outside the scope of permanent works specified in the contract.

3.5 RATES AND BASIS OF PAYMENT

The contract unit rates shall be the full and the final compensation to the Contractor. The rate for the item of filling shall include the following:

a) cleaning site.

b) Setting out works, profiles etc. according to the sanctioned plan or as ordered by the Engineers.

c) Arrangement of land as a source of supply of materials as much as needed.

d) Quality control and compaction testing.

e) Execution of all relevant operations described above in this Section and necessary to complete the item as per this specification.

f) Necessary protection including labour, materials and equipment to ensure safety and

protection against risk or accident.

g) Supply of facilities for inspection, testing and measurement at any time by the Engineers.

j) Compensation for injury of life and damage to property if any caused by the Contractor's operation connected with this item.

k) Providing silt control barrier.

The payment for respective class of filling shall be made at the Contract rate per cubic meters for the quantity acceptably excavated, limited to the dimension shown in the sanctioned plan or as directed by the Engineer.

4. STONE SOLING UNDER FOUNDATION AND FLOOR

4.1 SCOPE OF WORK

The work covered under this specification includes all type of soling work by rubble stones laid under floors / foundations, hand packed, including all material, labour and equipment to complete the work in strict accordance with specification mentioned below and applicable drawings.

4.2 GENERAL

Stone soling work under foundation and floor shall be constructed to the lines and grades shown on the Drawings, or as otherwise directed by the Engineer.

Surface and the materials under this specification shall be approved by the Engineer prior to proceeding permanent work.

4.3 RUBBLE STONE

The rubble stone shall be of best variety of black trap/granite/basalt or other approved variety of stone. The stone shall be hard, durable, free from defects and weathering and of required size and shall be approved by the Engineer before incorporation in the work. The size of the rubble stone shall not be less than the soling thickness.

4.4 EXECUTION OF SOLING

4.4.1 Preparation of Surface

The bed on which rubble soling is to be laid shall be cleared of all loose materials, leveled, watered and compacted and got approved by the Engineer before laying rubble soling. Cable or pipe trenches if shown in the drawing and as required by the Engineer shall be got done before the soling is started.Topsoil shall be removed from the areas to be filled.

All soft places in the subgrade should be excavated and filled with. The topsoil shall either be taken to designated spoil areas or stockpiled for re-use under other division of works.

4.4.2 Rubble Soling

Over the prepared surface, the stone shall be set as closely as possible and well packed and firmly set. The stones shall be of full height and shall be laid so as to have their bases of the largest area resting on the sub-grade. Soling shall be laid in one layer of specified thickness of soling with a tolerance of 25mm.

After packing the stones properly in position, the interstices between them shall be carefully filled with quarry spoils or stone chips of larger size possible to obtain a hard, compact surface. Spreading of loose spoils or stone chips is prohibited.

The entire surface shall be examined for any protrusions and the same shall be knocked off by a hammer and all interstices shall be filled with approved quarry spoils or stone chips or quarry sand. Excess quarry spoil or stone chips if any over the surfaces shall be removed. Unless other wise specified, the quarry spoil or stone chips shall be supplied by the contractor at his own cost

from the selected area. The surfaces shall then be watered and consolidated with mechanical or sufficiently heavy tampers as approved by the Engineer. After compaction, the finished surface shall be in required slope or level and dense base and the surface shall present clean look. Adequate care shall be taken by the contractor while laying and compacting the rubble soling to see that concrete surfaces in contact with soling are not damaged. The surplus/loose quarry spoil or stone chips shall be removed and the surface shall be made fit for concreting or any other subsequent activity shown in the drawings.

If, in the opinion of the Engineer, the stone soling is defective and unsatisfactory due to any reason, he may instruct the contractor to remove the soling over the defective portion and relay the same correctly as per specification at no extra cost to the Employer.

4.5 MEASUREMENT

The quantities of the stone soling shall be measured for payment under the contract shall be limited to the lines, grades, slopes and dimensions shown on the Drawing or as determined by the Engineer.

Stone soling compacted in place shall be measured in cubic metres or as mentioned in Bill of Quantities. The linear dimension shall be measured up to two places of decimals of a metre and cubical content worked out correct to the two places of decimals. No separate measurement shall be done for quarry spoil or stone chips or quarry sand used to fill the interstices.

4.6 RATES AND BASIS OF PAYMENT

The rate shall include the cost of materials and labour required for all the operations described above.

The stone soling works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

5. ANTI-TERMITE TREATMENT

5.1 SCOPE OF WORK

The scope of work is to set up a chemical barrier against attack by subterranean termites while the building is under construction. The scope of pre constructional anti-termite treatment covers the soil treatment with approved chemicals in water emulsion in foundation trenches for columns, plinth beams, plinth filling, at junction of walls and floor, in expansion joints etc. in stages as detailed in this specifications and drawings. Unless otherwise stipulated, the anti-termite treatment shall be carried out as per IS 6313 (part II) 1981 and / or as directed by the Engineer.

5.2 GENERAL

The pre constructional soil treatment is required to be applied during the construction stages of the sub-structure up to plinth level. The contractor has to be watchful of the various stages of sub-structure works and arrange to carry out the soil treatment in time after proper coordination with the Engineer and other contractors if any, working at site.

The formation of chemically treated soil barrier shall be accomplished in stages as the building construction work progresses and due care shall be exercised to ensure that each stage of treatment is well integrated with that previously applied so that no unprotected avenues of entry are left open to the termites.

5.3 EXECUTION OF ANTI-TERMITE

5.3.1 General

All work shall in general be executed as specified in IS: 6313 Part II-1981 and as per approved specification of the agency having special know-how for the job.

All necessary work to ensure uniform distribution and proper penetration of treatment of treating solution shall be done according to the instruction of the Engineer.

Soil treatment shall not be done when it is raining or when the soil is wet with rain or subsoil water. Once formed, the treated soil barrier shall not be disturbed.

Barrier shall be complete and continuous under the whole of the structure to be protected. All foundations shall be fully surrounded by in close contact with the barrier of treated soil. Each part of the area treated shall receive the prescribed dosage of chemicals.

5.3.2 Site Preparation

In order to ensure uniform distribution of the chemical emulsion and to assist penetration, the following site preparation shall be carried out:

a) Remove all trees, stumps, logs or roots from the building site.

b) Remove all concrete form work if left anywhere, leveling pegs, timber off-cuts and other building debris from the area to be treated.

c) If the soil to be treated is sandy or porous, preliminary moistening will be required to fill capillary spaces in soil in order to prevent the loss of emulsion through piping or excessive percolations.

d) In the event of water logging of foundation, the water shall be pumped out before application of chemical emulsion and it should be applied only when the soil is absorbent.

e) On clays and other heavy soils where penetration is likely to be slow and on sloping sites, where run-off of the treating solution is likely to occur, the surface of the soil should be scarified to a depth of 75mm at least.

f) All sub-floor leveling and grading should be completed. All cutting trenches and excavations should be completed with backfilling in place, borrowed fill must be free from organic debris and shall be well compacted. If this is not done supplementary treatments should be made to complete the barrier.

5.3.3 Chemicals

Chemical for anti-termite treatment shall be “Premise made by Bayer Environmental Science or equivalent or superior” and shall be water emulsion type. The product proposed shall be from the manufacturer’s product approved by USEPA (United State Environmental Protection Agency).

5.3.4 Soil Treatment

Chemical emulsions described in 5.3.2 shall be applied uniformly at the prescribed rate in all stages of the treatment. A suitable hand operated compressed air sprayer should be used to facilitate uniform dispersal of the chemical emulsion.

In the event of water logging of foundation, the water shall be pumped out and the chemical emulsion applied when the soil is absorbent.

5.3.4.1 Treatment in Foundation Trenches

In case of normal wall load bearing structures, columns pits, wall trenches and basement, the treatment shall be at 5 litres per sq.m. or surface area of the bottom and sides to a height of at least 300mm. After the foundation work, the sides shall be treated at 7.5 litres per sq.m. of vertical surface of substructure on each side. After the earth filling is done, treatment shall be done by rodding the earth at 150mm centers close to wall surface and spraying the chemical with the above dose i.e. 7.5 litres per sq.m. In case of framed structure, the treatment shall start at a depth of 500mm below ground level. From this depth the backfill around the columns, beams and R.C.C. basement walls shall be treated at 7.5 litres per sq.m. of the vertical and at 5 litres per sq.m. for the horizontal surface at the bottom in the trenches or pits.

5.3.4.2 Treatment in Backfilling

The treatment shall start at a depth of 500 mm below the ground level, except when such ground level is raised or lowered by filling and cutting. In such case, the depth of 500 mm shall be determined from the new soil level resulting from filling or cutting. Soil in immediate contact with vertical surface of the structure shall be treated with chemical emulsion at the rate of 5 liter per sq.m.

The top surface of the filled earth within plinth walls shall be treated with chemical emulsion at the rate of 5 litres per sq.m. of the surface area before sub-base to floor is laid. If filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes up to 50 to 75mm deep at 150 mm centers both ways shall be made with crow bars on the surface to facilitate saturation of the soil with the emulsion.

5.3.4.3 Treatment at the Junction of Walls and Floor

Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surfaces from ground level (where it has stopped with the treatment described upto the level of the filled earth surface. To achieve this, a small channel 30 x 30 mm shall be made at all the junctions of wall and columns with the floor (before laying the sub-grade) and rod holes made in the channel upto the ground level 1.50 mm apart and the iron rod moved backward and forward to break-up the earth and chemical emulsion poured along the channel @7.5 ltrs per sq.m. of the vertical wall or column surface so as to soak the soil right to the bottom. The soil should be tamped back into place after this operation.

5.3.4.4 Treatment of Soil along External Perimeter of the Building

After the building is complete, the earth along the external perimeter of the building should be rodded at intervals of 150 mm to a depth of 300 mm. The rods should be moved backward and forward parallel to the wall @ 7.5 liter per sq.m. of vertical surfaces. After the treatment, the earth

should be tamped back into place. Should the earth outside the building be graded on completion of building, this treatment should be carried out on completion of such grading.

In the event of filling being more than 300 mm, the external perimeter treatment shall extend to the full depth of filling upto the ground level so as to ensure continuity of the chemical barrier.

5.3.4.5 Treatment of Soil under Apron along External Perimeter of the Building

After clear and compaction of apron at external perimeter of building the earth along external perimeter of the building shall be treated with chemical emulsion at a rate of 7.5 liter per running meter. Holes shall be made upto 450 mm depth at 300 mm interval shall be made to adjacent to wall to facilitate passing chemical emulsion.

5.3.4.6 Treatment of Wall Retaining Soil above Floor Level

Retaining walls like the basement walls or outer walls above the floor level retaining soil need to be protected by providing chemical barrier by treatment of retained soil in the immediate vicinity of the wall, so as to prevent entry of termites through the voids in masonry, cracks and crevices etc. above the floor level. The soil retained by the walls shall be treated @ 7.5 liter per sq. m. of the vertical surface so as to effect continuous outer chemical barrier, in continuation of the one formed under 4.3.4.1.

5.3.4.7 Treatment of Soils surrounding Pipes, Waste and Conduits

When pipes, wastes and conduits enter the soil inside the area of the foundations, soil inside the area of the foundations, soil surrounding the point of entry shall be loosened around each, of such pipe, waste or conduit for a distance of 150 mm and to a depth of 75 mm before treatment is commenced. When they enter the soil external to the foundations, they shall be similarly treated for a distance of over 300 mm unless they stand clear of the walls of the building by about 75 mm.

5.3.4.8 Treatment of Expansion Joints

The soil beneath these joints should received special attention when the treatment under 5.3.4.2 is

carried out. This treatment should be supplemented by treating through the expansion joint after the sub-grade has been laid @ 2 ltrs per linear meter.

5.3.5 Precautions during Treatment

1. Utmost care shall be taken to see that the chemical barrier is complete and continuous. Each part of the area shall receive the prescribed dosage of chemical emulsion.
2. The treatment should not be carried out when it is raining or when the soil is wet with rain or sub-soil water.
3. Once formed, the treated soil barrier shall not be disturbed. If by chance, treated soil barriers are disturbed, immediate steps shall be taken to restore the continuity and completeness of the barrier system.

5.3.6 Precautions for Health Hazards and Safety Measures

The anti-termite chemicals can have an adverse effect upon health when absorbed through the skin, inhaled as vapours or spray mist or swallowed. Persons handling or using these chemicals should be warned of these dangers and advised that absorption through the skin is the most likely source of accidental poisoning. They should be cautioned to observe carefully all the safety precautions particularly when handling these chemicals in the from of concentrates.

These chemicals are usually brought to the site in the form of emulsifable concentrates. The containers should be clearly labeled and should be stored carefully out of the reach of children and pets animal. They should be kept securely locked.

Particular care should be taken to prevent skin contact with concentrates. Prolonged exposure to dilute emulsions should also be avoided. Workers should wear clean clothing and should wash

thoroughly with soap and water especially before eating. In the event of severe contamination, clothing should be removed at once and the skin washed with soap and water. If chemicals splash into the eyes they shall be flushed with plenty of water and immediate medical attention should be sought.

Care should be taken in the application of chemicals / soil toxicants to see that they are not allowed to contaminate wells or springs and other sources of drinking water.

All other safety precautions shall be taken as recommended by the manufacturer.

5.4 GUARANTEE OF WORKS

The contractor has to furnish the guarantee for 10 (ten) years from the date of completion of work, starting that in case of reappearance of termites within the building area due to defective materials or workmanship or due to any other reasons, the contractor will carry out the necessary post constructional treatment to keep the entire area free from termite, once again, without any extra cost to the Client during the guarantee period.

5.5 MEASUREMENT

The measurement of anti-termite described under article 5.3.4.1, 5.3.4.2, 5.3.4.3, 5.3.4.4, 5.3.4.7 and 5.3.4.8 shall be measured as single item in square meter on the basis of plinth area of the building. Nothing extra shall be measured. The operation described under 5.3.4.5 shall be measured in linear meter and operation described under 5.3.4.6 shall be measured in square meter of the vertical surface area.

5.6 RATES AND BASIS OF PAYMENT

The rate shall include the cost of all materials and labour required in all operations described above including making holes and refilling and making good the same.

The anti-termite treatment works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these

Specifications.

6. BRICK MASONRY WORKS

6.1 SCOPE

This Specification covers the construction of brick masonry units in foundation and superstructure in general and the erection of half brick, full brick and above thick wall for building, retaining walls and free-standing walls such as noise attenuation, dwarf and feature walls for landscaping or similar structures.

6.2 REFERENCE DOCUMENT

The work specified in this section shall be in accordance with the following standards, or approved equal, except as they are modified and supplemented herein:

S.No.	IS No.	Subject
1.	IS 1077	Common burnt clay building bricks.
2.	IS 1200 (Part 3)	Method of measurements of brick works
3.	IS 2212	Code of practice for brick work. (1st Revision)
4.	IS 3495	Method of test for burnt clay building bricks
5.	IS 5454	Methods of sampling of clay building bricks

6.3 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications affecting work of this trade.

6.4 GENERAL REQUIREMENT

The scope of work covered by this Chapter shall be deemed to comprise the furnishing and installation of all brickwork, structural clay-tile and solid partition walls shown on plans and as specified. It shall also include the supply of the appertaining materials and structural parts, scaffolding, off loading on site and all operations in connection with masonry works, unless otherwise specified in the Bills of Quantities.

Materials and structural parts, which the Contractor shall supply and install and which thereafter will be incorporated in the structure, shall be new and unused. They shall comply with the regulations regarding quality and dimensions. Materials and structural parts that are not standardised shall be used only with the approval of the Engineer.

The materials shall be protected from rain and inclement weather all to the satisfaction of the Engineer. The cost of covering materials shall be deemed to be included in the unit prices for the brickwork and masonry.

6.5 SAMPLES/SUBMITTALS

Representative samples of bricks to be used shall be submitted to the Engineer and his approval taken before bulk purchase. Bricks shall be fully representative of the range of colours and quality to be supplied for the work. The samples shall be kept with the Engineer for future reference and comparison. All bricks supplied shall conform to these approved samples in all respects.

All bricks shall have to be approved by the Engineer. Any bricks not up to the specification must be removed from the site immediately at Contractor's own cost.

6.6 MATERIALS

6.6.1 Cement

Cement shall be ordinary Portland cement as described in Concrete Work.

6.6.2 Sand

Sand for mortar shall be naturally occurring sand as described in Concrete Work.

6.6.3 Water

Water shall be as described in Concrete Work.

6.6.4 Bricks

6.6.4.1 Types of Bricks

Usually, the following three types of bricks shall be used for the work:

a.	Machine-made bricks	These bricks shall be machine made ones produced from any standard brick factory producing such bricks, subject to the approval of the Engineer.
b.	Chimney bricks	These shall be product of any brick kiln or the best available local bricks.
c.	VSBK bricks	These shall be product of brick kiln under the technical assistance and approved by VSBK.

6.6.4.2 Quality

Burnt clay bricks shall confirm to the requirements of IS 1077, and shall be of the best quality locally available. The bricks shall be local made or other manufacturer approved by the Engineer. Bricks used for the works shall be first class quality. They shall be of uniform deep red, thoroughly burnt, regular in shape and size and shall have sharp and square edges and parallel faces to ensure uniformity in the thickness of the courses of brick work. They shall be sound, hard, homogeneous texture and emit a clear ringing sound on being struck.

Bricks shall be free from cracks, chips, flaws, stones or lumps of any kind. They shall be free from salt which affect the mortar of the masonry. They shall not show any sign of efflorescence either dry or subsequent to soaking in water.

6.6.4.3 Storage

Bricks shall not be dumped at site. They shall be carefully stacked in regular layers even as they are unloaded. Bricks selected for different situation for use in the work shall be stacked separately. The supply of bricks shall be arranged that at least two weeks' requirement of bricks is available at site at any time.

6.7 EXECUTION

6.7.1 Preparation of Mortar

Mortar shall be as specified in the Drawing, Bills of quantities or schedule of items for the particular work which may differ from case to case and as per the size, shape and thickness of the wall.

Cement and sand (or any binding and supporting materials) shall be mixed dry thoroughly on clean approved platform or in a mechanical mixer and water shall then be added to obtain a mortar of the consistency of a stiff paste. Care being taken to add just sufficient water for the purpose.

Mortar shall be used as soon as possible, after mixing and within 1/2 hours after cement is mixed wet. Mortar unused for more than 1/2 hours shall be rejected and removed (mixes of lime putty and sand can be kept for a period of 72 hours, provided it is kept damp and not allowed to dry).

The well mixed mortar shall be transported from the mixing platform to the site of work in such a manner as to prevent formation of laitance or segregation.

Mortars for full brick or more thick wall shall be in cement mortar of mix 1:5 (1 cement : 5 sand) and half-brick wall shall be constructed using 1:4 (1 cement : 4 sand) mortar.

6.7.2 Scaffolding

Double scaffolding having two sets of vertical supports shall be provided as directed by the Engineer. The supports shall be sound and strong and of steel tubular construction unless otherwise by other approved means. The vertical posts shall be tied together with horizontal pieces over which the scaffolding planks be fixed. The three sides of the scaffolding should be covered with l.0 m wide plyboards to protect the materials from dropping off while working.

Scaffolding shall be strong to withstand all dead, live and impact loads which are likely to come on them. Scaffolding shall be provided to allow easy approach to every part of the work.

6.7.3 Soaking Bricks

Bricks, shall be soaked in water before use for a period that is sufficient for the water just to penetrate the whole depth of the bricks. Any dirt, sand and dust shall be removed from the surface of the bricks. Bricks shall not be too wet at the time of use, as they are likely to slip in the mortar bed and there will be difficulty in ensuring plumbness of the wall. When bricks are soaked, they shall be removed from the tank sufficiently early so that at the time of laying they are skin dry. Such soaked bricks shall be stocked on a clean place, where they are not again spoil by dirt, earth etc.

6.7.4 Bond

“English Bond” shall be used in the construction of full brick and thicker walls unless otherwise specified in the drawing. For half brick thick wall, “stretcher bond shall be used throughout the length of the wall.

Quoin bricks shall be laid header and stretcher in alternative courses, bond being obtained by placing a closer next to the quoin header. The arrangements of quoin in a course shall generally be symmetrical. Holes for required size shall be left in the brick work during laying only, for fixing pipes, service lines, passage of water etc. After they are fixed, the extra hollow left in the holes shall be filled with 1:3 cement mortar or 1:3:6 cement concrete, and the face neatly made up with bricks in cement mortar. When iron fixtures etc. are to be laid in the brick work, shall be entirely covered with not less than 10 mm of 1:3 cement mortar.

6.7.5 Laying Bricks

Bricks shall be laid on a full bed of mortar evenly applied on the wetted surface of the old brick work. If any dirt or earth is on the wall, they shall be cleaned by wire brush and washed down with water jet. When laying, the bricks shall be slightly pressed so that the mortar can get into all the pores of the brick surface to ensure proper adhesion. Cross joints and wall joints shall be properly flushed and packed with mortar so that no hollow spaces are left. All brick work shall be in plumb, square and true to dimensions as shown in drawings. All brickwork shall be built tightly against columns floor slabs or other structural parts around window and door frames with proper distance to permit cancelled joints.

All loose materials, dirt and set lumps of mortar which may be lying over the surface on which brick work is to be freshly started, shall be removed with a wire brush and surface wetted. Bricks shall be laid on a full bed of mortar, when laying, each brick shall, be properly bedded and set in position by gently pressing with the handle of a trowel. Its inside face shall be buttered with mortar before the next brick is laid and pressed against it. Joints shall be fully filled and packed with mortar such that no hollow space are left inside the joints

All quoins shall be accurately constructed and the height of brick courses shall be kept uniform. This will be checked using graduated wooden straight edge or storey rod indicating height of each course including thickness of joints. The position of damp proof course, window sills, bottom of lintels, top of the wall etc. along the height of the wall shall be marked on the graduated straight edge or storey rod. Acute and obtuse quoins shall be bonded, where practicable in the same way as square quoins. Obtuse quoins shall be formed with squint showing three quarters brick on one face and quarter brick on the other.

No part of the wall during its construction shall rise more than one metre above the general construction level. Where the masonry of one part must be delayed, wall left at different levels

shall be raked back at an angle of 45 degrees or less with the horizontal. Toothing shall not be permitted as an alternative to raking back. For half brick partition to be keyed into main walls, indents shall be left in the main walls.

In case of walls one brick thick and under, one face shall be kept even and in proper plane, while the other face may be slightly rough. In case of walls more than one brick thick, both the faces shall be kept even and in proper plane.

To facilitate taking service lines later without excessive cutting of completed work, sleeves shall be provided, where specified, while raising the brick work. Such sleeves in external walls shall be sloped down outward so as to avoid passage of water inside.

Top of the brickwork in coping and sills in external walls shall be slightly tilted. Where brick coping and sills are projecting beyond the face of the wall, drip course/throating shall be provided where indicated.

6.7.6 Thickness/Finishing of Joints

The mortar joints shall be approximately 10mm thick with a tolerance of (±) 2mm and broken vertically. All exposed brick faces shall have the joints flush to the surface. The Contractor shall finish the joints as flush pointing in the same rate of the exposed brick works. Additional amount will not be paid for the pointing the exposed brick work. Joints shall be raked out to a depth of 10mm to receive plaster.

6.7.7 Reinforcing and Anchorage

Anchors in the form of flats or rods from beams and columns and any other anchoring and reinforcement as shown on drawing shall be adequately embedded in the masonry.

For half-brick walls, two bars of 6 mm diameter shall be used longitudinally at every fifth course of brick work. The first reinforcement shall be placed on the top of the bottommost course. The bars shall be fully embedded in the mortar and the ends shall be properly bonded in the vertical joints of brick work or to the main wall as directed by the Engineer. Laps for the reinforcement shall be provided of minimum length of 45 times the diameter of bar.

6.7.8 Architectural Features

All projecting architectural features, such as string courses, cornices etc. shall be effectively bonded by tailing into the brick work to ensure stability. Such architectural features shall be set straight and true as shown in the drawing with finished joints (as far as possible).

6.7.9 Movement and Control Joints

Provide movement and control joints in brickwork as shown in the drawings. Joints (sealant on expanded closed cell foam rod) shall be provided in walls to each side of brick columns cladding, at the head of walls where floor constructions shall not be permitted to bear on walls, between laid-up bricks walls and all works where concrete is placed with brickwork, at the line of beams in walls extending higher than one storey, and generally as required and instructed by the Engineer and as detailed and shown on drawings.

Closed cell foam rods shall be carefully placed in open joints to allow for the correct depth of sealant as recommended by the sealant manufacturer. Where not otherwise recommended, sealant shall be in a ratio of 2:1 (width : depth). Joints shall be thoroughly cleaned and primed as and when recommended by the manufacturer. Sealant shall be applied by experienced personnel to achieve an even, well formed joint with a slightly concave surface. Excess sealant shall be immediately removed by means of suitable to the sealant and base material and as recommended by the sealant manufacturer.

6.7.10 Built-in Items

Where holes are required to be left in brickwork to accommodate other work, they shall be of minimum size according to the coursing. When pipes or other installations are fixed, the holes

shall be filled with 1:3 cement mortar and face bricks cut and neatly laid around the pipe or fixture. Steel or iron fixtures are to be entirely covered in not less than 10mm of 1:3 cement mortar. All

excess mortar is to be neatly and carefully removed from all exposed surfaces.

All fixtures, pipes, outlets, hold fasts or other item to be built into the brickwork shall be embedded in mortar or cement concrete in their correct position as the work proceeds.

The Contractor shall construct all brickwork in full cooperation with other trades of work.

6.7.11 Protection and Curing

Brickwork shall be protected from rain by suitable covering when mortar is green. Completed work shall be protected from mortar droppings or other damage from work under way by suitable non-staining coverings.

The brick work shall be constantly kept moist on all faces for a minimum period of seven days. Brick work done during the day shall be suitably marked indicating the date on which the work is done so as to keep a watch on the curing period.

Care must be taken to protect brick edges during and after construction.

6.7.12 Cleaning

All mortar left on the face of the brick shall be cleaned off on the same day that the brickwork is laid. At the completion of the brickwork, just prior to the sealer application, the whole area of fairface brickwork shall be rubbed down with brushes and apply a solution of 5% muratic acid mixed with water on the brick surface and rub down with bristle brush and thoroughly washed with clear water.

6.8 MEASUREMENT

Measurement for payments shall be done either in running meter, square meter or cubic meter as indicated in the Bill of Quantities. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq mtrs and the cubic contents shall be worked out to the nearest 0.01 cubic metres. Deductions of all openings, any concrete works in the brickwork shall be done to arrive at the net quantity. However, nothing extra shall be paid for making such openings etc. No deductions shall be done for hold fasts. Unless specified otherwise, nothing extra shall be admissible for cutting of bricks to suit RCC structure, walls in any shape other than straight or any cutting necessary for shaping the walls to the structural design requirements. Extra payment shall, however, be permissible for providing quarter brick thick brickwork, brick on edge, brick in soldier course, springs etc. for exposed brickwork and for brickwork in arches as per item. Cutting in brickwork shall be admissible only for civil works.

6.9 RATES AND BASIS OF PAYMENT

The rate shall include the cost of materials and labour required for all the operations described above except the vertical reinforcement and its encasement in cement mortar or cement concrete. The rate shall also include the following :

(a) Raking out joints or finishing joints flush as the work proceeds;

(b) Preparing tops of existing walls and the like for raising further new brick work.

(c) Rough cutting and waste for forming gables, splays at eaves and the like.

(d) Leaving holes for pipes upto 150 mm dia. and encasing hold fasts etc.

(e) Rough cutting and waste for brick work curved in plan and for backing to stone or other types of facing.

(f) Embedding in ends of beams, joists, slabs, lintels, sills, trusses etc.

(g) Bedding wall plates, lintels, sills, roof tiles, corrugated sheets, etc. in or on walls if not covered in respective items and

(h) Leaving chases of section not exceeding 50 cm in girth or 350 sq cm in cross-section.

(i) Brick on edge courses, cut brick corners, splays reveals, cavity walls, brick works curved on

plan to a mean radius exceeding six metres.

(i) Cost of forming and finishing of brick joints in fairfaced brickwork to give the appearance of flush pointing.

(k) Providing single or multi-stage scaffolding.

(l) Providing and fixing anchors between brick wall and R.C.C columns as shown in drawings.

The brick works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

7. CONCRETE WORK

7.1 SCOPE OF WORK

The work in this section includes all concrete work for all-purpose.

7.2 MATERIALS

The materials used in the works shall be of the qualities and kinds specified. Materials delivered to the works shall be equal to the approved samples, which shall be deposited with the Engineer's Representative at least 30 days before it is required for use in work. Engineer's Representative should check the quantity of all necessary materials, for any casting. Delivery shall be made sufficiently in advance of constructional requirements to enable further samples to be selected and tested if so desired by the Engineer's Representative. No material shall be used in the works until approved. Materials failing to comply with the approved samples and specification shall be immediately removed from the works at the Contractor's Cost.

7.2.1 Water

Water used in mixing concrete shall be free from injurious amounts of oils, acids, alkalis, organic materials or other deleterious substances. It should be clean as drinking water.

7.2.2 Cement

The cement shall be ordinary Portland cement of approved brand and manufactured and shall comply in all respects with the I.S. 269 - 1967 for ordinary Portland cement. It shall be delivered on the site in packages with an unbroken seal fixed by the makers and plainly marked with the name of brand and the manufacture. The cement shall be freshly manufactured and none of the cement bag should be set, lumped or underweight and older than 12 weeks from the week of manufacture.

7.2.3 Storage of Cement and Weekly Statement of Stock

It shall be obtain in a dry place, in regular piles and not exceeding eight bags high and in such a manner that it will be efficiently protected from moisture and contamination, and the consignment can be used up in order in which they are received. Different types of cement shall be kept to clearly marked separate storage facilities.

The Contractor shall make a weekly return to the Engineer of the various consignment of cement in stock, showing on a daily basis what quality has been received and issued during the week, and in what portions of the works the cement has been used.

7.2.4 Aggregate

All aggregates shall conform to I.S. 383 - 1970. Aggregate shall, where possible, be derived from a source that normally produces aggregate satisfactory for concrete, and if requested by the Engineer's Representative the Contractor shall supply evidence to this effect. If he is instructed to do so, the contractor shall supply samples of the aggregate for the purpose of making preliminary concrete test cubes as hereinafter specified.

Aggregate shall consist of naturally occurring sand and gravel or stone crushed or uncrushed, or a combination thereof. They shall be hard, strong, dense, durable, clean and free from veins and

adherent coating. As far as possible, flaky and elongated pieces should be avoided.

Aggregate shall not contain any harmful materials, such as iron pyrites, coal, mica, shale or similar laminated materials, clay, alkali, soft fragments, organic impurities etc. in such quantity as to affect the strength or durability of the concrete or in addition to the above for reinforced concrete, any material which attack the reinforcement. Aggregate, which are chemically reactive with the alkalis of cement, are harmful, as cracking of concrete may take place. This aggregate shall be protected from spilling oil, Mobil, diesel over it on site.

7.2.5 Fine Aggregates (Sand)

The fine aggregate shall be natural sand or sand derived by crushing suitable gravel or stone and shall be free from coagulated lumps. Sand derived from a stone unsuitable for coarse aggregate shall not be used as the fine aggregate.

The fine aggregate shall conform to the requirements of I.S. 383 - 1970. Fine aggregate shall not contain more than 3% of material removable by decapitation test, nor more than 1% dry lumps. The total of coal, clay lumps, shale, soft fragments and other deleterious substance shall not be more than 5%.

The percentage of clay clumps shall be determined by examining the various fractions that remain after the material has been tested for grading. Any particles that can be broken with fingers shall be classified as clay lumps and the total percentage of clay lumps shall be determined on the basis of the total original weight of the sample. The fine aggregate shall be well graded from fine to coarse and shall meet the following gradation requirements:

Table - 1

Gradation for Fine Aggregate

Percentage by Weight Passing							
Sieve Designation	10 mm	4.75 mm	2.36 mm	1.18 mm	0.6 mm	0.3 mm	0.15 mm
Grading Zone I	100	90-100	60-95	30-70	15-34	5-20	0-10
Grading Zone II	100	90-100	75-100	55-90	35-59	8-30	0-10
Grading Zone III	100	90-100	85-100	75-90	60-79	12-40	0-10

Blending will be permitted in order to meet the gradation requirements for the fine aggregate.

7.2.6 Coarse Aggregate

The coarse aggregate shall be crushed stone aggregate. The pieces of aggregates shall be angular. Friable, flaky and laminated pieces, Mica, shale shall only be present in such quantities as not to affect adversely the strength and durability of the concrete as ascertained by tests on concrete cubes. After twenty-four hours immersion in water, a previous dried sample shall not have gained in weight more than 5% and not more than 10% if it is to be used in plain concrete or elsewhere as described. The coarse aggregate shall conform to the requirements of I.S. 383 - 1970. The percentage of wear at 500 revolutions of Los Angeles Rattlor Test shall not be more than 50%. The coarse aggregate shall meet the gradation of 2. Moreover it should conform previous specification on coarse aggregate.

Table - 2
Gradation for Coarse Aggregate

Percentage by weight passing					
Sieve Designation	80 mm	40 mm	20 mm	10 mm	4.75 mm
40 mm & down	100	95-100	30-70	10-35	0-5
20 mm & down		100	95-100	25-55	0-10

If it is considered necessary, the Engineer's Represent may instruct it to be washed screened and graded at no extra cost in case of fine and coarse aggregate.

All RCC work shall be carried out in strict accordance with these specifications, I.S. Specifications and the working drawings. Any discrepancies in the dimensions on the drawings or any points not clear to the Contractor shall be brought to the notice of the Engineer's Representative or clarified in advance before proceeding with the work.

The Contractor shall allow for all wastage in all materials. He shall also allow for all tests of concrete materials and if required produce manufacturer's certificate for cement and steel unless issued by the Owner.

No concrete work shall be cast in the absence of the Engineer's Representative. The Contractor's Engineer shall personally check that both the formwork and reinforcement have been correctly placed and fixed and satisfy himself that all work preparatory to casting is completely ready, before requesting the Engineer's Representative for final inspection and approval.

7.2.7 Storage of Aggregate

The Contractor shall provide means of storage the aggregate at each point where concrete is made such that

i. Each nominal size of coarse aggregate and the fine aggregate shall be kept separated at all times.

ii. Contamination of the aggregate by the ground or other foreign matter shall be effectively prevented at all times.

iii. Each heap of aggregate shall be capable of draining freely.

7.2.8 Admixtures

The use of admixtures to improve the workability is allowed only if there is proven evidence that neither the strength nor the other requisite qualities of concrete and/or steel accessories grout, etc. is impaired by their use. The use of admixtures containing calcium chloride, fluorides, nitrates and sulphate is prohibited. The decision of Engineer on all matters relating to the use of admixtures shall be final.

Admixtures shall be stored in suitable waterproof building. Any material which has deteriorated or which has been contaminated whether during transit to the site, at the site or otherwise, shall not be used in the work and shall be immediately removed from the site and replaced at the expense of the contractor.

7.3 DESIGN MIX

Concrete mixes for various specified design strengths shall be worked out by the contractor.

The mix proportions shall be selected to ensure that the workability of the fresh concrete is suitable for the conditions of handling and placing, so that after compaction it surrounds all reinforcement or tendons and ducts and completely fills the formwork. When the concrete is

hardened its quality shall be such as to comply with the strength, durability and other requirements taking into account the conditions to which it will be exposed.

Any standard method of mix design may be used. For determining the "required average strength" the specified minimum shall be taken as one in ten. Unless the contractor can prove from his past experience that he is capable of achieving a high degree of control a "FAIR" control should be assumed in the initial mix design. Before arriving at the average strength values due regard shall be given to the criteria acceptance" of site concrete. The mixes designed by the contractor shall be used on works only after obtaining a written approval of the Architect Represent. It is to be understood that the mix design shall be entirely the responsibility of the contractor and such approval by the Architect Representative shall not relieve him of his responsibility in respect thereof.

7.4 MEASUREMENT AND PROPORTIONING OF CONCRETE MATERIALS

The aggregate shall be measured by volume in a gauge box of correct and approved size based on the weight of the material or by other approved accurate means. The gauge box or other container shall be filled with the aggregate without compacting to a predetermined uniform depth, accurate allowance being made for bulking due to moisture content of the fine aggregate, if required on site.

The cement shall be measured by weight, one or more complete bags containing 50 kg. Being used for a single batch of concrete and as the size of the mixer shall permit this to be done. One weighing machine shall be placed in standby condition on casting day and if Engineer's Representative feels that any concrete bag contains less than 50 kg, he can measure the weight of it and will direct contractor to fulfill necessary weight of cement from contractor's side.

The normal proportions of cement and aggregate shall comply with the quantities specified below for the concrete described for each part of the work. The specified quantities shall be altered if instructed after examination of the aggregate materials in samples or in bulk in order to obtain the dense concrete with approved materials. Any such alterations within the range of 1 part of fine aggregate to 1 - 1/2 parts of coarse aggregate and 1 part of fine aggregate to 2 - 1/2 parts of coarse aggregate shall be made without any alteration in the charge made by the Contractor.

7.5 WATER CEMENT RATIO

The w/c ratio should be according to IS 456 : 2000. In general, w/c ratio of the concrete mix shall be kept minimum as far as possible during casting to reduce pores and hence to increase durability. For nominal mix concrete, maximum quantity of water per 50 kg of cement shall be 30 litres. As moisture contain of fine and coarse aggregate varies, for workability of concrete mix, the Engineer's Representative may vary the water quantity and once the water quantity to be placed for one bag of cement concrete mix is fixed by the Engineer's Representative, the Contractor shall follow it strictly. As information to the contractor, the Engineer's Representative will depute one checking supervisor to the mixing batch.

7.6 CONCRETE GRADE AND STRENGTH

Concrete Proportions

The minimum cement content of mixture shall be as below:

Grade	Minimum cement content in Kg/cu.m.
M 20	360

7.7 CONTROL OF CONCRETE

(i) **Preliminary Tests**

The contractor shall be called upon to submit representative samples of materials to be used for

concrete in order that they may be tested at a laboratory and the suitability of materials established. All expenses in connection with the above materials, tests shall be borne by the contractor.

(ii) **Works Cube Tests**

During the progress of the work 15 cm. cubes shall be made as per I.S. 456-1964 as necessary and tested in accordance with I.S. 516-1959.

7.8 MEASUREMENT OF CONSISTENCY

The consistency shall be determined by making trial mixtures with dried aggregate. The consistency of the trial mixture of approved consistency shall be measured as instructed.

The slump of approved trial mixture shall be measured and this slump shall not be exceeded throughout all batches of concrete made from the same materials mixed in the same proportions as the trial mixtures and used in these parts of the works as instructed. In no case, however, shall the slump exceed 50 mm. for concrete in slabs, or exceed 25 mm. for consolidated by mechanical vibration. The slump test shall be made on concrete actually being placed in the works at the commencement of each grade of concrete placing and such other times as instructed.

The apparatus used for the slump test shall be standard cone. When cone is filled, it shall be raised vertically clear of the concrete and the measurement of the slump shall be measured. Care shall be taken to prevent vibration of the sample being tested. If the Engineer's Representative requires the use of other means for testing the consistency of the concrete it shall be done as instructed without any extra charge. For this standard I.S. Method shall be followed.

7.9 CONCRETE MIXING

The cement and aggregates shall be thoroughly mixed together in the specified proportions by volume or weight in a batch type mechanical mixer, unless another type of mixer is approved. The water shall be admitted to drum of the mixer only when all the cement and aggregates constituting one batch be in the drum. The concrete shall be mixed until the mixer is of uniform color and in no case for less than one minute. If the drum rotates at lower speeds, the minimum period shall be increased inversely proportional to that speed. The period of mixing shall be measured from time when all the materials and water are in the drum. The entire contents of the drum shall be discharged before materials for the succeeding batch are fed into the drum. Materials spilled from the skip or other container shall not be used. No partly set or frozen concrete shall be used in the work. Partly set concrete shall not be remixed with the cement or aggregate of the next batch.

7.10 DISTRIBUTION OF CONCRETE

The concrete shall be distributed from the mixers to the position of placing in the works by approved means that do not cause separation or otherwise impair the quality of the concrete. While transporting concrete over slabs and over beams by any suitable means, the contractor shall conform that the tied bar that is upper bar and lower bar shall not get distorted or displaced from its original place.

7.11 PREPARATIONS FOR PLACING CONCRETE

Before the concrete is placed the shuttering shall be trued - up and any water accumulated therein shall be removed. All saw dust, chips, nails, and other debris shall be washed out or otherwise removed from within the formwork. The reinforcement shall then be inspected for accuracy of fixing. Immediately before placing the concrete the formwork shall, except in frosty weather, be well wetted and inspection opening closed.

7.12 PLACING CONCRETE

The interval between adding the water to the dry mix and completion of the concrete placing

operation shall not exceed 20 minutes nor, when an approved admixture that accelerates the initial setting of the cement be used, exceed ten minutes or as directed by Engineer's Representative.

Except where otherwise approved for slabs and large sections concrete shall be placed in the formwork by shovels or other approved implements and shall not be dropped from height more than 5 ft. nor handled in a manner to cause separation. Accumulations of hardened concrete dropping on the reinforcement shall be avoided. Concrete shall be sorted along the formwork to

that position.

Each layer of concrete while being placed shall be consolidated by approved methods of ramming, ramming, or mechanical vibrations to form a dense surface free from honey combing and tolerably free from watermarks and air holes or other blemishes. The concrete shall be tamped against the face of the formwork so as to produce dense fair surface. The number and type of mechanical vibrations shall be approved before consolidating by vibration. Placing and consolidation of concrete shall be done in such a manner as not to disturb concrete already placed, and reinforcement projecting from concrete already placed shall not be vibrated or jarred. For concreting reinforced concrete walls and other structures having least lateral dimensions of 13 mm. or under, each layer of concrete while being placed shall be properly consolidated by approved methods of mechanical vibrations produced by internal or external mechanical vibration.

The laying of concrete over slabs should be of require and uniform thickness after vibration. This can be confirmed by dipping wooden pegs of required length. The level of all slabs should be in level unless otherwise specified and directed by Engineer's Representative. If required, the Engineer's Representative will check the thickness and give order to the contractor to fill up the newly vibrated slab concrete surface. Any slab thickness after construction, if found of less thickness than specified, the contractor will be responsible for above job.

Any water accumulating on the surface of the newly placed concrete shall be removed by approved means and no further concrete shall be placed thereon until such water is removed. No fresh concrete shall be brought into contact with the concrete containing cement of different type. Unless otherwise approved or instructed, concrete shall be placed in a single operation to the full depth of slabs, beams, and members similar thereto and shall be placed in horizontal layers not exceeding 0.50m. Deep in walls, columns until completion of the part of the work between construction joints as specified hereafter or of a part of approved extent. At the completion of a specified or approved part of a construction, joints of the form and in the position herein after specified shall be made. If a temporary cessation of concrete placing be unavoidable elsewhere, a construction joint shall likewise be made.

7.13 PLACING CONCRETE IN EXTREME WEATHER

Work shall be done according to clause 20.1.6 of I.S. 456- 1964.

Vibration

(a) **Appearance**

The concrete that is to be compacted by vibration should appear anything from earth dry to slightly glistening. The mix should have the appearance of lacking in fines.

(b) **Vibrators**

The contractor must use vibrator on beams and slabs to compact the newly laid concrete. Generally two types of vibrator shall be used.

i) Needle or Immersion type of Vibrator

Casting of all beams and columns shall be compacted by means of needle type of vibrator. 2" dia. needle type vibrator shall be used over beam section more than 350 mm x 400 mm and rest of section need only 1" dia. needle type vibrator.

ii) Flat bottom Vibrator for Slabs

The contractor shall require flat bottom type of vibrator to compact all concrete over slabs. No immersion type of vibrator will be allowed to compact the concrete over slab.

Moreover, the contractor shall require at least two numbers of vibrators for one casting and he should keep one in a standby position. In case vibrator got damaged or not in working condition

during casting the vibrator shall be immediately replaced. If the contractor shall fail to replace another vibrator during casting, no further casting of concrete will be permitted. The contractor shall in that case, immediately remove the remaining concrete mix from the site of work.

(c) **Placing**

Segregation is likely to take place when the concrete is tipped into the formwork and this should be avoided. The concrete mix should not contain surplus water and sand, which will develop segregation under influence of vibrator compaction. The distribution of new concrete should be uniform over the whole section and the surface kept horizontal all the time thus ensuring the movement of concrete is downward only. Vibrators shall not be used as a spreading or distributing agent.

The vibrators shall be of rotary out of balance immersion type or the Electro-magnetic type and operate at a frequency of not less than 4,000 cycles per minute. The vibration shall be of such a power - input as to produce an acceleration of 1 to 3 m/sec. in the mass of the compacted concrete. The vibrators shall be provided for continuous operation.

(d) **Disposition of Vibrators**

Internal vibrators shall be disposed within the mix, when placed, so as to maintain the whole of the concrete under treatment in an adequate state of agitation such that de-aeration and effective compaction may be attained at a rate commensurate with the supply of concrete from the mixers. Insertion of vibrators at about 450 mm. centre to centre is considered sufficient.

(e) **Period of Vibration**

Vibration shall continue during the whole period occupied by placing the concrete, the vibration being adjusted so that the centre of vibration approximates to centre of the mass being compacted at the time of placing. The concrete should not be over vibrated and the period of insertion of internal vibrator should be about 15 seconds at any point.

(f) **Compactness**

The concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate so as to form a glistening and even surface except for slight irregularities where the coarse aggregate breaks this smooth surface. When this condition has been attained the vibrators shall be withdrawn slowly.

The vibrator must not be placed against the steel or the formwork, the minimum distance being 8 mm. The compressor must be placed in such a position that formwork, reinforcement and recently laid concrete are subjected to the minimum amount of vibration.

7.14 CONSTRUCTION JOINTS

Construction joints shall be made in the positions hereinafter specified or elsewhere as approved. Such joints shall be truly vertical or horizontal as the case may be, except that in an inclined or curved members the joint shall be strictly at right angles to the axis of the member.

Construction joints shall be made horizontally at the top of the foundations and horizontally 8 mm. below the lowest beam soffit at the head of columns. Concrete in the ribs and slabs of small tee, all beams shall be placed in one operation, but, for large beams concrete in the rib up to a level

2.5 mm. below the slab soffit shall be placed first. Concrete in haunches or splays on the beams or braces and concrete in the head of adjoining portion of the columns shall be placed at the same time as that in the beams or braces. Concrete in splays at the junction of walls and slabs shall be placed at the same time as that in the slab. Construction joints in the length of a beam shall be avoided where practicable, but where joints are unavoidable they shall be made as previously approved by the Engineer's Representative. Construction joints in slabs shall be made parallel to

the main reinforcement, and where required at right angles to the main reinforcement, they shall be made at a place previously approved by the Engineer's Representative.

Before placing new concrete against concrete already set, the face of the old concrete shall be cleaned and scum removed. The face shall be roughened and any loose aggregate removed there from. Immediately before placing the new concrete the face of the old concrete shall be thoroughly wetted and a coating of neat cement grout applied. The new concrete shall be well rammed against the prepared face before the grout sets. Construction joints will not be paid separately.

7.15 PROTECTION AND CURING OF CONCRETE

Immediately after placing or finishing, concrete surface not covered by forms shall be protected from loss of surface moisture for at least seven days when the average daily temperature is at least 21oC, where Portland cement has been used. Protection from loss of surface water shall be done by any of the following methods where applicable to the type of work involved:

i) By water covering.
ii) By covering of surfaces with water impervious paper.
iii) By application of approved impervious membrane.

Surfaces from which forms have been removed before the curing period has elapsed shall be protected as specified for surfaces not covered by forms. Membrane cutting shall not be used on surfaces required to receive additional concrete or concrete fill, nor on cement finish coats that are to receive dust proofing or hardening treatments, or during hot weather.

Water curing shall be performed by keeping the concrete surface wet by pounding, by continuous spraying or by covering the surface with an approved water-saturated covering such as 2.5 mm. of sand or sawdust, or by one or more layers of burlap. The exposed concrete surfaces shall be saturated with water throughout the full-stipulated curing period. Where forms remain in place during the curing period, they shall be kept sufficiently wetted with clean water to reduce cracks and to prevent joints from opening from opening in the forms.

The impervious membrane-curing compound shall be an approved non-bituminous, colorless, liquid sealing compound in atomized form so as to preserve the natural color of the concrete. The curing compound shall be applied as soon as surface water has disappeared from concrete surfaces with approved pressure spraying equipment in accordance with the manufacturer's directions and in sufficient thickness to form an effective water seal. No compounds shall be used which will adversely affect the subsequent installation of finished flooring.

Joints of sheet membrane used for curing shall be lapped at least 150 mm. and sealed with waterproof tape as recommended by the manufacturer. Polyethylene sheet shall be considered the water-impervious paper for purposes of interpretation of this item. No liquid curing compound may be used without specific written approval of Engineer regarding type, manufacturer, location and extent of use and application procedures.

7.16 FINISHES

The concrete surface shall in general be smooth finish. However, immediately after stripping form work, minor defects and honey combed areas shall be patched and holes filled before the concrete is thoroughly dry, patch areas shall be chipped away to 2.5 mm. depth, with regular edges perpendicular to the surface. Area to be patched shall be thoroughly wet including the areas at least 150 mm. wide entirely surrounding them, just prior to placing the patching mortar. Mortar shall have the same material and proportions as used for the concrete, without coarse aggregate.

A sufficient quantity of white cement shall be substituted for part of the ordinary cement so that the patching mortar, when dry, will match the surrounding concrete. Water in the mix shall be kept to a minimum and mortar shall be retempered without adding water and shall be allowed to stand for one hour prior to use during which time it shall be mixed to prevent setting. The mortar shall be thoroughly compacted into place, screeded so as to leave the patch slightly higher than surrounding surfaces, left undisturbed for one to two hours to permit initial shrinkage and finished to match the adjoining work. Where patches exceed 2.5 mm. deep, they shall be trimmed and wet as specified, after which the opening shall be filled to within 2.5 mm. of the surface. After sufficient shrinkage time has elapsed, the patching shall proceed as described above. Patches shall be kept wet for five days. Tie holes left by the withdrawal of rods, or holes left by removal of ends of ties shall be filled solidly with mortar. For holes passing entirely through the wall, plunger-type grease gun or other device to force mortar through the wall, starting at the back face shall be used. When a hole is completely filled, excess mortar shall be struck off with a cloth flush with the surface. Holes not passing entirely through walls shall be filled solidly with mortar. Any excess mortar shall be struck off with a cloth on the wall surface. The surface of non-shuttered faces concrete work other than slabs shall be smoothed with a wooden float (or if approved with a steel trowel) to give a finish equal to that of the rubbed down shuttered faces. Concealed concrete faces shall be left; as it is except that honeycombed surfaces shall be made good.

The top faces of slabs not intended to be surfaced shall be leveled and floated to a smooth finish at the levels or falls shown on the drawings or elsewhere.

The floating shall not be executed to the extent of bringing excess fine material to the surface. Ribbed surfaces of slabs shall where instructed be formed at the time of taming and leveling. Indentation in slab or stair surfaces shall be formed by approved implements giving the depth and patterns instructed. The top faces of slabs intended to be covered with screed, granolithic or similar surfacing shall be left with a spade finish.

The soffit of slabs and faces of walls intended to be rendered shall be roughened by approved means to form a key. Concrete surfaces to take finishes other than those specifically referred to herein shall be prepared in an approved manner to suit the finish as instructed.

7.17 TEST ON STRUCTURE

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

a) The site - made concrete test cubes failing to attain the specified strength.
b) Over - loading during construction of the works or part thereof.
c) The shuttering being prematurely removed.
d) Concrete improperly cured.
e) Any other circumstances attributable to alleged negligence on the part of the contractor, which in the opinion of the Engineer's Representative may result in the works or part thereof being less than the expected strength.
f) Any reason other than the foregoing.

If the loading test be instructed to be made solely or in part for the reason mentioned above, The test shall be made at the contractor's own cost, if the test be instructed to be made for one or more of the reasons from (a) to (e) inclusive, and

If the test were instructed to be made for the reason (f), the contractor shall make the test and shall be reimbursed for all cost relating thereof irrespective of the result of the test.

For the purpose of the load test on floors, roofs and similar structures and their supports, the test lead shall be equivalent to 1 and 2/3 times the superimposed load for which the works or part thereof to be tested have been designed. The test load shall not be applied within 90 days (or 28 days if rapid hardening Portland cement be used) of the completing of placing of the concrete in the part of the works to be tested, and the latter shall not be supported during the test by shuttering or other non-permanent support. Means shall be taken to ensure that in the event of a

failure under the test temporary support of the loaded member shall be immediately available. The test shall proceed strictly as instructed. For the loading test on floors, roofs or similar structures the result shall be deemed satisfactory if upon removal of the test load the residual deflection does not exceed one - quarter of the maximum deflection after 24 hours loading. If the residual deflection

exceeds this amount the test loading shall be repeated, and the result shall be deemed to be satisfactory if the residual deflection after removal of the second test load does not exceed one-quarter of the maximum deflection occurring during the second test.

If the result of the loading test be not satisfactory, the Engineer's Representative shall instruct that part of the works concerned shall be taken down or removed and reconstructed to comply with this specification, or that such other remedial measures shall be taken as to make the works secure. If the test be instructed to be made for one or more of the reasons (a) to (e) inclusive as herein before specified, the contractor shall take down or remove and reconstruct the defective work or shall take the remedial measures instructed at his own cost.

7.18 MEASUREMENT

In the case of concrete, the dimensions for measurement shall be the concrete, excluding any finish. Dimensions shall be measured nearest to a cm except for the thickness of slab which shall be measured correct to 0.5 cm. The areas shall be worked out nearest to 0.01 Sq. mt. The cubical contents shall be worked out to nearest 0.01 cubic metre or cubic foot as mentioned in the Bill of Quantities.

No deductions shall be made for the followings:

- Ends of dis-similar materials (e.g. Joists, beams, post, griders, rafter, purlins, trusses, corbels steps etc.) upto 500 sq cm in cross-section.
- Opening upto 0.1. sqm.
- The volume occupied by reinforcement.

The volume occupied by water pipes, conduits etc. not exceeding 25 sq cm each in cross sectional area. Nothing extra shall be paid for leaving and finishing such cavities and holes.

In calculating the contents of any R.C.C. member, for measurement proposes the dimensions adopted shall be structural concrete members exclusive of any finish.

It shall be measured in cu.m. of work done as per drawing. Unless specified otherwise, nothing extra shall be paid for any shape, size and position.

7.19 RATES AND BASIS OF PAYMENT

Every class of concrete shall be paid as per respective contract unit rate.The rates for items shall include cost of all materials consumed in the work at all levels, shape, sizes, hire charges of materials, tools and plant, labour, insurance, transport, services, accommodation, supervision, storage, protection, sampling, testing etc. all complete.

Rate of lean concrete (1:4:8 and 1:3:6) shall include the cost of formwork. Formwork in lean concrete shall not be measured separately.

8. REINFORCEMENT

8.1 SCOPE

This specification covers supplying, bending, placing in position, binding, etc., of the steel reinforcing bars of any grade.

8.2 MATERIAL

All reinforcement bar shall be Fe 500, which should comply with IS Standards. Nos. 432-1966, 1139-1966 and IS 1786-1966.

Reinforcement shall be free from pitting due to corrosion, loose rust, mill scale, paint, oil, grease, adhering earth, or other materials that may impair the bond between the concrete and the reinforcement or that may in the opinion of the Engineer's Representative cause corrosion of the reinforcement or disintegration of the concrete.

8.3 CERTIFICATES AND TESTS FOR REINFORCEMENT

For each consignment of bar reinforcement used in the works, the Contractor shall, if required, supply a certificate giving the ultimate strength, yield stress and elongation and the result of the cold bend test for each type and each size of bar. Tests for the purpose of obtaining the information shall conform to relevant I.S. specification.

The reinforcements supplied for which the makers test sheets or other records be not available, or where in the opinion of the Engineer's Representative materials has been subject to corrosion or other bad effects, the Engineer's Representative shall select as many test pieces as he deems necessary, and the Contractor shall supply and deliver the test pieces free of cost without reimbursement and pay the cost of preparing and testing them as well. This test shall perform in his own lab (contractor's lab) in presence of Engineer's Representative or whichever lab the contractor take, shall be tested in presence of Engineer's Representative.

8.4 DIMENSIONS OF REINFORCEMENT

The size of reinforcement bar described in the working drawings or elsewhere shall be the minimum and the rolling margin and other tolerances shall be wholly above this size. The length of a reinforcement bar shall be not less than the length on the drawing or elsewhere and shall be not more than 50 mm. in excess of that length. Bar bending schedule shall be prepared by the Contractor and submitted for approval of the Engineer's Representative. Such schedules shall be prepared based on reinforcement details, prior to the execution of the work. Nothing extra shall be paid for this.

8.5 BENDING REINFORCEMENT

Reinforcement bars shall be bent by approved means producing a gradual and even motion. Bars shall comply with the dimensions described in the drawings. Overall dimensions of bent or internal dimensions of bending or the like shall be within a tolerance of 30 mm. Any discrepancies or inaccuracies found by the Contractor in the drawings or other documents shall be immediately reported to the Engineer whose interpretation and requirements relating there to shall be accepted. The internal radius of bends shall be not less than twice the size of the bars unless described to the 7contrary on the bending lists or elsewhere in the drawing. Hooks and other and anchorage bends for tor steel shall be bent to an internal radius of the twice diameter of the bar. This internal radius of the Bends of corners of binders or stirrups or links shall be half.

8.6 FIXING REINFORCEMENT

Reinforcement shall be accurately fixed and by approved means maintained in the position described in the drawings. Bars intended to be in contact shall be securely wired together at all such points with 16 gauge soft iron tying wire. Binders, stirrups and links shall tightly embrace the bars with which they are intended to be in contact and shall be securely wired or, if approved, spot-welded thereof.

Reinforcement shall be lapped, joined or spliced only at the positions described. Splices and the like found to be necessary elsewhere should be formed only if and as instructed. Lapping shall be provided as shown in the drawing and as permitted. Where practicable bars in each member shall be assembled and fixed in the form of a rigid cage or skeleton before placing in the moulds or formwork. For this all lapping bar on beams and slabs shall be scattered i.e. as far as possible minimum number of laps shall be permitted in one section of slab and only one lap will be permitted at one section in case of beams. In case of columns the lapping of bar shall be permitted only at the centre zone of column.

8.7 LAPPING LENGTH

The lap length shall be equal to the development length. For Fe- 500 (f y = 500 N/mm2), the lapping length should be as follow, unless otherwise mentioned in the drawings;

Concrete Grade	Tension Bars	Compression Bars
M 20	60 Dia	60 Dia
M 25	50 Dia	50 Dia
M 35	47 Dia	47 Dia

Immediately before concreting, the reinforcement shall be checked for position, cleanliness, and freedom from rust or retarding liquid. Means shall be taken to ensure that reinforcement remains correctly in position with required cover during the placing and consolidating of the concrete.

Reinforcement projecting from work being concreted or already concreted shall not be bent out or its correct position for any reason unless approved and shall be protected from deformation or other damage. Reinforcement left projecting for bending with future extensions shall be thoroughly coated with cement grout wash or encased in concrete or otherwise protected from corrosion as instructed.

8.8 COVER OF CONCRETE AND SPACING OF BARS

Unless otherwise described, the clear cover of concrete to the reinforcement shall be as follows:

i) Horizontal, Vertical or Inclined Slabs
15 mm. or the size of the bars whichever is greater.

ii) Lintels
20 mm. or the size of the bar whichever is greater.

iii) Beams
25 mm. or the size of the main bars whichever is greater. Binders and the like 15 mm. minimum.

iv) Column
Cover for main bars for columns not exceeding 20 mm. diameter shall be 40mm. or the size of the main bars whichever is greater. 15 mm minimum for rectangular binders or links or helical binding.

ii) Footing

50 mm. or the size of the main bar whichever is greater.

v) Chairs and Support's for Reinforcing Bars

Chairs of appropriate depth in suitable form shall be installed on all top bars in case of slab. The shape of chair shall be approved by Engineer's Representative. The spacing for slab top bar chairs will be such that during casting time, the reinforcement shall not get disturbed.

iii) Concrete chair block for bottom bars

All bottom bars in slabs shall be raised as accordance with cover for concrete by means of small concrete blocks tied with binding wires. These blocks shall be placed at sufficient intervals during casting time, to maintain the cover for reinforcement.

In case of beams, the bottom blocks as well as side reinforcement shall be provided with concrete chair blocks so that the reinforcement shall not get disturbed during casting.

8.9 MEASUREMENT

Reinforcement for concrete will be measured for payment by weight in ton or kg, as the case may be, in the bill item for the relevant type of reinforcement qualities. The measurement shall be taken in two places of decimal.

The quantity of reinforcing bars shall be the calculated weight as shown on the drawings and in accordance with shop drawings/bar schedules approved by the Engineer or in accordance with the written instructions of the Engineer, complete in place and accepted. Spacer bars, Chairs provided in reinforcement work shall not be measured. Laps and splices will only be measured for the length exceeding 10 meters. The unit weight used will be the weight determined according to the table given below or Clause 6.2 of IS 1786.

Annealed steel wire required for binding or tack welding shall not be measured, its cost being included in the rate of reinforcement.

Where tack welding is used in lieu of binding, such welds shall not be measured.

Cross Sections Area and Mass of Steel Bar

Nominal Size mm	*Cross sectional Area Sq.mm*	*Mass per metre Run Kg.*
6	*28.3*	*0.222*
8	*50.3*	*0.395*
10	*78.6*	*0.617*
12	*113.1*	*0.888*
16	*201.2*	*1.580*
20	*314.3*	*2.470*
25	*491.1*	*2.470*

8.10 RATES AND BASIS OF PAYMENT

The rate for reinforcement shall include the cost of labour and materials required for all operations described above such as preparation of shop drawings & bar bending schedule, testing, cleaning of reinforcement bars, straightening, cutting, hooking bending, binding, providing spacer bars and chairs, placing in position, binding wires etc. as required or directed including tack welding on crossing of bars in lieu of binding with wires.

The reinforcement steel shall be paid as per the contract unit rate.

9. FORMWORK

9.1 SCOPE

This specification covers supplying, fabrication and eraction of form works in all concrete works and rammed earth wall.

9.2 MATERIAL FOR FORMWORK

All surface of the formwork shall be of plywood only, which shall give uniform and fairface surface after removal.

All propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel.

Form work shall be 19mm thick water-resistant best quality shuttering plywood, fiberglass-reinforced plastic or any other material that will result in concrete and rammed earth wall with the required fairfaced finish and within the specified tolerance. Plywood or equivalent shall be used where specified to obtain smooth surface for exposed concrete work. Struts shall generally be mild steel tubes.

Porous form material shall be treated or coated to prevent absorption of water from the fresh concrete and to prevent discolouration or chemical deterioration of the concrete surface. All form material shall be free of raised grains, torn surfaces, worn edges, patches and other defects that

would impair the appearance of the concrete surface.

Bamboo, small diameter posts, etc. shall never be used unless specially approved by the Engineer in specified cases. The use of aluminum form material in contact with concrete shall not be allowed.

Temporary formwork shall be constructed of timber, plywood, steel, plastic or other approved materials.

Slabs or blocks shall have an exposed surface of the specified quality; they shall have positive anchorage to the structure, and the joints between them shall have positive anchorage to the structure, and the joints between them shall be made tight with mortar or by such other means as will prevent the leakage or grout from the concrete.

9.3 DESIGN

Formwork shall be designed and constructed for removal so that the concrete and rammed earth can be properly placed and thoroughly compacted. Formwork shall be firmly supported and adequately strutted, braced, or tied. It shall be capable of adjustment to the lines and dimensions of the finished concrete and rammed earth surface and it shall be sufficiently strong to resist without distortion, the pressure of concrete during its placing and compaction, and other loads to which it may be subjected. It shall not be liable to suffer distortion under the influence of the weather. When concrete is to be vibrated, special care shall be taken to ensure that the formwork will remain stable and the joints tight. The safety and adequacy of centering and shuttering shall be the sole responsibility of the Contractor. The Contractor shall if required supply to the Engineer drawings and calculations for the formwork he proposes to use, for the concrete work.

9.4 DEFLECTION AND CAMBER

The Contractor shall make allowance for any settlement or deflection of the formwork that is likely to arise during Construction, so that the hardened concrete conforms accurately to the specified line and level. The Contractor shall also make allowance in the formwork for any camber specified by the Engineer to allow for the elastic deflection of structural members and deflection due to creep of the concrete. In the absence of any specified camber, the soffit of all beams and slabs shall be given a camber equal to 1/240 of the span length to ensure that the structure has the prescribed shape after removal of the forms.

9.5 SUPPORTS

Formwork shall be constructed so that the formwork to the sides of members can be removed without disturbing the soffit formwork or its supports. Props and supports shall be designed to allow the formwork to be adjusted accurately to line and level and to be erected and removed in an approved sequence without injury to the concrete. Supports shall be carried to construction, which is sufficiently strong to afford the necessary support without injury to any portion of the structure. This may mean in some cases that it is carried down to the foundations or other suitable base. Props and bracing shall be provided for the temporary support of composite construction where separately specified.

9.6 JOINTS AND EDGES

All joints in the formwork shall be close fitting to prevent leakage of grout from the concrete. At construction joints, formwork shall be tightly secured against previously cast or hardened concrete to prevent the formation of stepping or ridges in the concrete. Formwork shall be constructed to provide straight and true angles, arises or edges. Where cambers are shown on the Drawings, the fillets shall be accurately cut to size to provide a smooth and continuous chamfer. Formwork panels shall have true edges to permit accurate alignment at sides and provide a clean line at construction joints in the concrete, which shall be fixed with their joints either vertical or horizontal, unless otherwise specified.

9.7 SUNDRIES

Formwork shall be provided to the top surface of concrete where the slope or the nature of the work requires it. Provision shall be made for forming holes and chases for services and for building in pipes, conduits and other fixings, as shown on the drawings. The material and position of any ties passing through the concrete shall be to the Engineer's approval. Except where corrosion of a metal tie is unimportant it shall be possible to remove a tie so that no part of it remaining embedded in the concrete shall be nearer to the finished surface of the concrete than the specified thickness of cover to the reinforcement. Any holes left after the removal of ties shall be filled with concrete or mortar of approved composition.

9.8 CLEANING AND TREATMENT OF FORMWORK

Spaces to be occupied by concrete shall be free from all rubbish, chipping, shavings, sawdust, dirt and tying wire etc., before concrete is placed. The formwork to be in contact with the concrete shall be cleaned and treated with suitable non-staining form oil or other approved material. Care shall be taken that oil or composition is kept away from contact with the reinforcement or with concrete at any construction joints. Surface retarding agents shall not be used except with the permission of the Engineer's Representative. Formwork shall be thoroughly cleaned after each use. Damaged or distorted formwork shall not be used.

9.9 PAINTING ON FORMWORK

The concrete repellent painting on all contact surface of the formwork shall be of approved non-bituminous colorless form oil so as to preserve the natural color of the concrete. The repellent compound shall be applied so as to effect quick removal of form work. It shall be applied as per the manufacture's direction. No compound shall be used which will adversely affect the concrete work or surface. No form repellent compound may be used without specific written approval of Engineer regarding type, manufactures, location and extent of use and application procedures.

9.10 REMOVAL OF FORMWORK

All formwork shall be removed without shock or vibration that might damage the concrete. Before the soffit and props are removed, the surface of the concrete shall be exposed where necessary in order to ensure that the concrete has hardened sufficiently. In no circumstances shall formwork be struck off until the concrete reaches cube strength of at least three times the stress to which the concrete may be subjected at the time of striking. Suitable curing methods should immediately follow the removal of the formwork.

The following minimum times shall elapse before removal of formwork in normal weather condition and circumstances. In cold weather a longer period may be necessary before striking.

i. Vertical Formwork to columns, walls, beams :24 hours
ii. Removal of props under slabs:
    Spanning up to 4.5 M: 7 days
    Spanning over 4.5 M: 14 days
iii. Removal of props under beams:
    Spanning up to 6 M: 14 days
    Spanning over 6 M: 21 days
iv. Removal from Rammed Earth Wall vertical surface: 2 days

The times given for the removal of props are based on the assumption that the total live load plus dead weight to be supported at the time of removal is not more than one half the total design loads. For horizontal members where the loading is a higher proportion of the total design load these times may need to be increased.

9.11 MEASUREMENT

Measurement of payment for form work shall be made of the area, in square meters or the unit mentioned in the Bill of Quantities of concrete surface formed to the neat lines as shown on the drawings or as required by the Engineer. Dimensions of the form work shall be measured correct to a cm.

No deductions from the shuttering due to the openings/ obstructions shall be made if the area of each openings/ obstructions does not exceed 0.4 square metre. Nothing extra shall be paid for forming such openings.
Form work of elements of arches, arch ribs, domes, spiral staircases, well steining, shell roofs, curvilinear folded plates & curvilinear eaves board, circular shafts & chimneys shall not qualify for extra rate for circular work.

Formwork used in lean concrete (1:4:8 and 1:3:6) in foundation and flooring shall not be measured. Rates of such formwork shall be included (inbuilt) under respective concrete rate.

9.12 RATES AND BASIS OF PAYMENT

Rate shall include for all necessary material and labour required to design, supply, fabricate, erect and remove the form work at any height, size.

No separate payment shall be made for form work required for construction and contraction joint or required for construction overbreak. The cost of such form work is deemed to be included in appropriate unit costs of other works.

The formwork shall be paid as per the contract unit rate. Rates for formwork shall include the cost of submission of details, transportation and use of all materials for formwork and falsework, erection including provision of supports (single or multiple staging), fillets and chamfers 75 mm and less in width, bolts, ties, fixings, cutting to waste, drilling or notching the formwork for reinforcement where required, working around pipes, ducts, conduits and waterstops, temporary openings, cleaning, dressing, removal of formwork and falsework, filling bolt holes and any remedial work including all incidental works required to complete the work as per Specification.

10. ALUMINUM DOORS & WINDOWS

10.1 General Scope

This specification covers furnishing of all labor, materials, services and equipment necessary for the construction of doors and windows using aluminum frames and glass infill panels in accordance to drawings. Special attention shall be given to the Specification of Doors and Windows work for Aluminum Works a Glazing Works.

10.2 Related Work

The Contractor shall become familiar with other Specifications of the specifications affecting work of this trade.

10.2.1 Submittals

- Submit samples of aluminum sections, glazing stops, jointing details, glazing details, reinforcement details.
- Provide manufacturer's technical data, brochures for each type of specified component required, including detail drawings and installation instructions.
- Submit the shop drawings for each type of partition prepared by using suitable sections based on architectural drawings, adequate to meet the requirement/specifications and by taking into consideration varying profiles of aluminum sections being extruded by approved manufacturers. The shop drawings shall also show the details of fittings and joints. Before start of the work, all the shop drawings shall be got approved from the Engineer.
- The Contractor shall construct a full scale mock-up for partition works in its final location for review by the Engineer before proceeding with the remainder of the Work.

10.2.2 Materials

All materials and structural components to be supplied and installed by the Contractor and, therefore, ultimately incorporated in the work shall be new and unused, unless otherwise specified. They shall be suitable for their intended purpose and appropriately matched to each other.
All materials and structural components not standardized shall be used only with the approval of the Engineer.

10.2.2.1 Aluminum Sections

Aluminum extrusion shall be 6063-T5 with Acrylic-Polyester hybrid powder coating. Aluminum sections used for partitions shall be suitable for use to meet architectural designs to relevant works and shall be subject to approval of the Engineer for technical, structural, functional and visual considerations. The aluminum extruded sections shall conform to IS 733 and IS 1285 for chemical composition and mechanical properties. The stainless steel screws shall be of grade AISI 304.
Aluminum partition shall be of sizes, sections and details as shown in the drawings. The details shown in the drawings may be varied slightly to suit the standards adopted by the manufacturers of the aluminum work, with the approval of Engineer. Before proceeding with any fabrication work, the contractor shall prepare and submit, complete fabrication and installation drawings for each type of partition for the approval of Engineer and nothing extra shall be paid on this account.

10.2.2.2 Aluminum Sheet

Aluminum Sheets for use as panels shall be 1.25 mm thick aluminum alloy sheet conforming to IS 737. Aluminum alloy sheet for use in general paneling work shall be of types and thickness as specified and conforming to the requirement of IS 737. Aluminum sheets shall be of approved make and manufacturer, Aluminum panel may be prefabricated units' manufacture on modular or non-modular dimension.

10.2.2.3 Glass

The glass shall be clear float glass or toughened as specified in drawings or Bill of Quantities and should be approved by the Engineer. It shall be clear, float transparent and free from cracks. The glass shall conform to the IS 14900. The thickness of glass shall be as shown in the drawing or as specified in Bill of Quantities.

10.2.2.4 EPDM Gaskets

The EPDM Gaskets shall be of size and profile as shown in drawings and as called for, to render the glazing, doors, windows, ventilators etc. air and water tight. Samples of gaskets shall be submitted for approval and the EPDM gasket approved by Engineer shall only be used. The contractor shall submit documentary proof of using the above material in the work to the entire satisfaction of Engineer-in-Charge. The EPDM gasket shall meet the requirements as given in Table below:

S.No.	Description	Standard Follow	Specification
1	Tensile strength Kg.f/cm2	ASTM-D 412	70 Min.
2	Elongation at break %	ASTM-D 412	250 Min.
3	Modulus 100% kgf/cm2	ASTM-D 412	22 Min.
4	Compression set % at 0 CC 22 Hrs	ASTM-D 395	50 Max.
5	Ozone resistance	ASTM-D 1149	No visible cracks

10.2.3 Execution

10.2.3.1 Fabrication

The partition frames shall be constructed from clean extruded sections and shall be free from distortions and imperfections. Actual measurement of openings left at site for different type of partitions shall be taken. The fabrication of the partitions shall be done as per the actual sizes of the opening left at site. The frames shall be truly rectangular and flat with regular shape corners fabricated to true right angles. The frames shall be fabricated out of section which have been cut to length, mitered and jointed mechanically using appropriate machines. Mitered joints shall be corner crimped or fixed with self-tapping stainless steel screws using extruded aluminum cleats of required length and profile. All aluminum work shall provide for replacing damaged/ broken glass panes without having to remove or damage any member of exterior finishing material.

10.2.3.2 Fixing of Frames

The holes in concrete/masonry/wood/any other members for fixing anchor bolts/fasteners/screws shall be drilled with an appropriate electric drill. Partition frames shall be placed in correct final position in the opening and fixed to providing proper backing using stainless steel screws of star headed, counter sunk and matching size groove of required size at spacing not more than 250 mm c/c or dash fastener. All joints shall be sealed with approved silicone sealants.
In the case of composite partitions (having door openings, openable windows etc.), the different units are to be assembled first. The assembled composite units shall be checked for line, level and plumb before final fixing is done. Engineer in his sole discretion may allow the units to be assembled in their final location if the situation so warrants. Snap beadings and EPDM gasket shall be fixed as per the detail shown in the shop drawings.
Where aluminum comes into contact with stone masonry, brick work, concrete, plaster or dissimilar metal, it shall be coated with an approved insulation lacquer, paint or plastic tape to ensure that electrochemical corrosion is avoided. Insulation material shall be trimmed off to a clean flush line on completion.
The contractor shall be responsible for the partitions, doors, windows etc. being set straight, plumb, level and for their satisfactory operation after fixing is complete.
Partition wall frames shall be supplied complete with all fixing components including lugs, cramps, straps, shims, woodscrews etc. and the Contractor shall be responsible for ensuring that full details of fixing requirements and spacing are supplied to site in time to allow for plugs, sockets, grounds and other fixing points to be located and built in where required.
Fixing components shall either be of non-ferrous metal or shall be suitably protected to prevent the risk of electrolytic corrosion of the aluminum.

10.2.3.3 Glazing

Partitions including windows and doors shall be fitted with approved clip-on glazing beads or solid glazing beads with countersunk screws. The size and position of beads shall to suit the particular types of glass required.
Clip on glazing beads shall not be used in exposed locations.
All beads shall be fixed internally.

10.2.3.4 Painting

The surface of the aluminum frames which will be covered with glazing putty shall be coated with one coat of zinc chromate primer, or any other suitable primer.
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10.2.3.5 Cleaning and Protection

All aluminum work shall be cleaned or protected as necessary so that it is in a clean and perfect condition and free from corrosion and scratches or other blemishes, when the building is handed over. Any cement or lime split or otherwise deposited upon the surface shall be immediately washed off.

10.2.4 Measurement

Length and breadth shall be measured correct to a cm. for the completed works. Area shall be worked out to nearest 0.01 sq.m
The rate shall include the cost of materials and labour required in all the operations described above. The rate shall also include the following:

- Cost of all fixing accessories required to complete the work.
- Bolts, clips, screws, fasteners, glazing putty, gaskets, beads etc.
- Cost of infill panels (glass or other materials).
- Cost of reinforcing materials.

The aluminium partition works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per the Specifications.

10.2.5 Installation

Frames shall be erected square and plumb in line and securely anchored in the construction. Doors shall be hung in place and left in satisfactory working order.

Frames located in masonry walls shall be erected prior to the wall construction and shall be well braced to

prevent distortion by construction of the enclosing walls. Adjustable steel anchors shall be properly secured to the wall construction.

Frames installed in concrete walls shall be shimmed and caulked as detailed and attached to walls with screws into expansion shield.

Windows shall be installed without forcing or distortion and with level sills and heads and plumb jambs.

After installation and glazing, each window shall be checked for proper operation and adjusted as necessary. Metal surfaces shall be cleaned and stains or discoloration of the finish shall be removed.

All surfaces to receive glazing materials shall be thoroughly cleaned and kept free of all dirt, loose particles, oil, grease, wax, protective coatings, water or moisture. The contractor shall be responsible for a weather tight and satisfactory installation.

All broken, cracked, damaged or poorly set glass shall be removed and replaced. Glass shall be thoroughly cleaned on both faces and all label removed immediately prior to acceptance of the work

11. CEMENT CONCRETE FLOORING, FLOOR SCREED AND SKIRTING

11.1 GENERAL SCOPE

This specification covers cement concrete floor neatly finished in general and ordinary or colour crete floor finish with or without cement concrete wearing coat and dado and skirting without concrete wearing coat in particular.

All work under this sub-chapter shall comprise all labour, equipment, and the supply of the appurtenant materials and structural components including off-loading and storage at the site required for performing flooring works, unless otherwise specified.

Flooring shall be carried out in accordance with the finishing schedules given on the drawings or specified elsewhere or as directed by the Engineer.

11.2 REFERENCE DOCUMENT

The work specified in this section shall be in accordance with the standards referred herein after, or other equivalent internationally accepted standards.

11.3 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications affecting work of this trade.

11.4 SAMPLES/SUBMITTALS

The Contractor shall prepare a full mock-up for evaluation of surface preparation techniques and application workmanship for the approval of the Engineer. The Contractor should not proceed with remaining work until workmanship and finished appearance are approved by the Engineer.

11.5 MATERIALS

11.5.1 General Requirement

All materials and structural components to be provided temporarily by the Contractor and not, therefore, ultimately incorporated in the work may be used or unused at the Contractor's choice, unless otherwise specified.

All materials and structural components to be supplied and installed by the Contractor and, therefore, ultimately incorporated in the work shall be new and unused, unless otherwise specified. They shall be suitable for their intended purpose and appropriately matched to each other.

All materials and structural components not standardized shall be used only with the approval of the Engineer.

The floorings shall be such as to provide a permanent surface that can be walked on. They shall not give rise to any unreasonable inconvenience. Deviations in colour as against the samples may only be slight.

11.5.2 Cement

Cement shall be as specified in Cement Concrete Works.

11.5.3 Sand

Cement shall be as specified in Cement Concrete Works.

11.5.4 Coarse Aggregate

Coarse aggregate used in cement concrete floors and beds shall be of approved colour and comply with IS 383 and IS 2386.

The grading of coarse aggregate when determined by testing shall be within the limits as given for 10mm single sized coarse aggregate in Division 4 – Concrete Works.

11.5.5 Cement Pigment

Cement pigment to be mixed with Portland cement to provide coloured cement concrete shall confirm to BS 1014. The colour shall be as scheduled for coloured cement concrete and neat cement finish plaster.

11.6 EXECUTION

11.6.1 Cement Concrete

Cement concrete of specified mix grade shall be used and it shall generally conform to the specifications under Division - 4.

11.6.2 Preparation of Surfaces

The surface of concrete floors to receive screeds shall be roughened by removing the laitance with a stiff broom and stippling immediately after the initial set of concrete. Floors shall be thoroughly swept and hosed down with clean water before the screed is laid. Base surfaces shall be wire brushed and watered for 3 to 4 hours. Immediately before laying the screed, a neat cement grout of creamy consistency shall be brushed over the sub-floor. The cement grout shall be mixed immediately before being used.

11.6.3 Laying

11.6.3.1 Base Concrete

Flooring shall be laid on base concrete where so provided. The base concrete shall be provided with the slopes required for the flooring. Flooring in verandah, Courtyard, kitchens & baths shall have slope as mentioned in the drawings and as decided by the Engineer. Floors in water closet

portion shall have the proper slope to drain off washing water. Further, necessary drop in flooring in bath, WC, kitchen near floor traps ranging from 6 mm to 10 mm will also be provided to avoid spread of water. Necessary margin to accommodate this drop shall be made in base concrete. Plinth masonry off set shall be depressed so as to allow the base concrete to rest on it.

The flooring shall be commenced preferably within 48 hours of the laying of base concrete. The surface of the base shall be roughened with steel wire brushes without disturbing the concrete. Immediately before laying the flooring, the base shall be wetted and a coat of cement slurry @ 2 kg of cement spread over an area of one sqm so as to get a good bond between the base and concrete floor.

If the cement concrete flooring is to be laid directly on the RCC slab, the top surface of RCC slab shall be cleaned and the laitance shall be removed and a coat of cement slurry @ 2 kg of cement spread over an area of one sqm so as to get a good bond between the base and concrete floor.

11.6.3.2 Thickness

The thickness of floor shall be as specified in the description of the item.

11.6.3.3 Laying Flooring

i. ***Panels:*** Flooring of specified thickness shall be laid in the pattern including the border as given in the drawings or as directed by the Engineer. The border panels shall not exceed 450 mm in width and the joints in the border shall be in line with panel joints. The panels shall be of uniform size and no dimension of a panel shall exceed 2 m and the area of a panel shall not be more than 2 sqm. The joints of borders at corners shall be mitered for provision of strips.

ii. ***Laying of Flooring with Strips:*** Cement concrete flooring shall be laid in one operation using glass/aluminum/PVC/brass strips/stainless steel strips or any other strips as required as per drawing or instructions of the Engineer, at the junction of two panels. 4 mm thick glass strips or 2 mm PVC strips or 2 mm aluminum or brass strips shall be fixed with their tops at proper level, giving required slopes. Use of glass and metallic strips shall be avoided in areas exposed to sun. Cost of providing and fixing strips shall be included in the item rate.

Cement concrete shall be placed in the panels and be leveled with the help of straight edge and trowel and beaten with thapy or mason's trowel. The blows shall be fairly heavy in the beginning but as consolidation takes place, light rapid strokes shall be given. Beating shall cease as soon as the surface is found covered with a thin layer of cream of mortar. The evenness of the surface shall be tested with straight edge. Surface of flooring be true to required slopes. While laying concrete, care shall be taken to see that the strips are not damaged/disturbed by the labourers. The tops of strips shall be visible clearly after finishing with cement slurry.

iii. ***Laying of Flooring without Strips:*** Laying of cement concrete flooring in alternate panels may be allowed by the Engineer in case strips are not to be provided.

a. ***Shuttering:*** The panels shall be bounded by angle iron or flats. The angle iron/flat shall have the same depth as the concrete flooring. These shall be fixed in position, with their top at proper level giving required slopes. The surface of the angle iron or flats, to come in contact with concrete shall be smeared with soap solution or non-sticking oil (Form oil or raw linseed oil) before concreting. The flooring shall butt against the unplastered masonry wall.

b. ***Concreting:*** The concreting shall be done in the manner described under 16.6.3.3 ii. The angle iron/ flats used for shuttering shall be removed on the next day of the laying of cement concrete. The ends thus exposed shall be repaired, if damaged with cement

mortar 1 : 2 (1 cement : 2 coarse sand) and allowed to set for minimum period of 24 hours. The alternate panels shall then be cleaned of dust, mortar, droppings etc. and concrete laid. While laying concrete, care shall be taken to see that the edges of the previously laid panels are not damaged and fresh mortar is not splashed over them. The joints between the panels should come out as fine straight lines.

11.6.4 Finishing

The finishing of the surface shall follow immediately after the cessation of beating. The surface shall be left for some time, till moisture disappears from it or surplus water can be mopped up. Use of dry cement or cement and sand mixture stiffening the concrete to absorb excessive moisture shall not be permitted. Excessive trowelling shall be avoided.

Fresh cement shall be mixed with water to form a thick slurry and spreaded @ 2 kg of cement over an area of one sq.m. of flooring while the flooring concrete is still green. The cement slurry shall then be properly processed and finished smooth by trowelling or using power trowel as directed by the Engineer.

The edges of sunk floors shall be finished and rounded with cement mortar 1:2 (1 cement : 2 coarse sand) and finished with a floating coat of neat cement.

The junctions of floor with wall plaster, dado or skirting shall be rounded off where so specified.

The men engaged on finishing operations shall be provided with raised wooden platform to sit on so as to prevent damage to new work.

Wherever colour crete is specified, such work shall be applied only in the neat finish coat and finished similarly.

11.6.5 Curing

The curing shall be done for a minimum period of ten days. Curing shall not be commenced until the top layer has hardened. Covering with empty gunnies bag shall be avoided as the colour of the flooring is likely to be bleached due to the remnants of cement dust from the bags.

11.6.6 Precautions

Flooring in lavatories and bath room shall be laid only after fixing of water closet and squatting pans and floor traps. Traps shall be plugged while laying the floors and opened after the floors are cured and cleaned. Any damage done to W.C.'s squatting pans and floor traps during the execution of work shall be made good.

During cold weather, concreting shall not be done when the temperature falls below 4°C. The concrete placed shall be protected against frost by suitable covering. Concrete damaged by frost shall be removed and work redone. During hot weather, precautions shall be taken to see that the temperature of wet concrete does not exceed 38° C. No concreting shall be laid within half an hour of the closing time of the day, unless permitted by the Engineer. To facilitate rounding of junction of skirting, dado and floor, the skirting/dado shall be laid along with the border or adjacent panels of floor.

11.6.7 Cleaning and Protection

The flooring shall be cleaned in after completion of the works. Flooring shall be protected until completion of project by a covering of heavy-duty building paper before foot traffic is permitted. Boardwalks shall be placed over flooring in areas where subsequent building operations might damage the floor.

11.6.8 Skirting

Skirting shall be finished as finishing coat of the floor unless otherwise specified. The skirting work shall include racking and cleaning of base, watering, applying plaster work and neat finish. The level, line and corners shall be done carefully to get even, plumb and uniform surface through uniformity. The skirting work shall be done simultaneously with floor work or as directed by the Engineer. The top edge of the skirting shall be chamfered to prevent dust collection.

11.7 MEASUREMENT

Length and breadth shall be measured before lating skirting, dado or wall plaster. Measurement for payments shall be done in running meter for skirting and square meter for flooring or as indicated in the Bill of Quantities. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 m^2. No deduction shall be made nor extra paid for voids not exceeding 0.20 m^2.

The flooring done either with strips (in one operation) or without strips (in alternate panels) shall be treated as same and measured together.

11.8 RATES AND BASIS OF PAYMENT

The rate shall include the cost of all materials and labour involved in all the operations described above including application of cement slurry on RCC slab or on base concrete including roughening and cleaning the surface, the cost of dividing strips, etc. Nosing of steps where provided shall be paid for separately in running metre. Nothing extra shall be paid for laying the floor at different levels in the same room or courtyard and rounding off edges of sunken floors. In case the flooring is laid in alternate panels, nothing extra shall be paid towards the cost of shuttering used for this purpose.

The concrete flooring and floor screed shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

12. FLOOR FINISHES

12.1 SCOPE

This specification covers floor finishes of cement concrete neatly finished ordinary or colored, terrazzo floor cast in site ordinary or colored, precast terrazzo floor ordinary or colored, ceramic tile glazed or non glazed, clay flooring tiles, dividing strips etc.

12.2 MATERIAL

i) Cement, sand, stone aggregate, lime, water etc. shall be a specified in concrete works.

ii) Surkhi: It shall be crushed from well-burnt bricks/brick bats finely powdered passing through 1.5-mm mesh.

iii) Terrazzo aggregates: The aggregates used in terrazzo topping shall be marble aggregate of the sizes as per finish requirement. The aggregates shall be mixed in proportion as specified of require colored and sizes.

iv) Colour cement: The colour cement shall be ‘Colorcrete’ of Snowcem India Ltd. Bombay or any other reputed company.

v) Ceramic tiles: The ceramic tiles shall be glazed or non-glazed or non-glazed of specified sizes, pattern and color from any reputed company. The sample of tiles is to be approved by the Consultant for color, pattern and size, which are to be kept for future reference.

vi) Clay flooring tiles: The Clay flooring tiles shall be wire cut machine made brick tiles from “Brick and Tile Factory” at Harisiddhi and Bhaktapur. These shall be well burnt and of uniform color. Sample of tiles is to be approved by the Consultant, which are to be kept for future reference.

vii) Dividing strips: The dividing strips shall be glass or as specified 4 mm lesser than the depth

of floor finish.

viii) Parquet flooring: This shall be of seasoned wood of specified size and thickness and of pattern as specified in the drawings.

12.3 CEMENT MORTAR

All flooring work shall be laid with specified mortar of good workable consistency. Cement mortar shall be prepared by mixing cement and sand in the specified proportions. The mixing shall be done in a mechanical mixer or by hand mixing as directed by the Engineer. Water shall be added as required during mixing. Care shall be taken not to add more water than what is actually needed to bring the mortar to the consistency of a stiff paste.

Only the quantity of mortar, which can be used within 2 hours of its mixing shall be prepared at a time. Mortar unused for more than 2 hours shall be rejected and removed from the site of work.

12.4 SURFACE PREPARATION

Sub-grade concrete or RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. Specified mortar bedding shall then be spread, tamped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set.

12.5 WORKMANSHIP

12.5.1 Cement Concrete Floor Finish

The floor shall be laid in specified thickness in panels of uniform size not exceeding 1.50 Sq.m. The dividing strips shall be placed in proper level and pattern laid with cement mortar to give a neat look. The concrete mixed in specified proportion shall be laid within the panels and finished with a floating coat of neat cement in one operation. This neat cement shall be ordinary gray cement or of colored cement as required. Dry cement shall not be used for the finishing coat. In case the flooring is not provided with dividing strips, the panel shall be laid in alternate panels finished neatly individually. Proper curing shall be done at least for 7 days and protected.

12.5.2 Terrazzo Floor Finish Cast-in-Situ

The terrazzo topping of specified finished thickness shall be laid over an under layer of cement concrete 1:2:4 (1 Cement: 2 Sand: 4 Stone aggregate) the whole being taken as terrazzo one item of terrazzo floor finish. Dividing strips shall be laid in required pattern prior to laying of under laying of cement concrete in 4-mm thickness. The terrazzo topping of white cement, marble powder and marble chips mixed in specified proportion shall be laid to achieve a final finished terrazzo floor finish after grinding the terrazzo toping. The top surface shall be ground smooth in several operations with corburundum stone or grinding stone finally finishing with oxalic acid. The surface shall be finally cleaned rubbed with approval wax polish to give a glazing surface before hand over. The curing of work shall be at least 7 days.

12.5.3 Pre-Cast Terrazzo Floor Finish:

The pre-cast terrazzo tiles shall be specified size, thickness and pattern of approved quality. The tiles shall be laid over a setting green mortar bed of not more than 12 mm thick over a rough base surface. Tiles shall be properly soaked in water prior to laying in position. The joints shall be maintained uniformly as shown in the drawings or instructed by the Consultant. The joints shall be grouted fully and finished neatly with a plastic mix of white cement. The top surface shall be finished smooth by grinding with corburundum stone or grinding machine. Finally the smooth surface shall be rubbed with approved wax polish to give a glazing surface before hand over. Curing of work shall be at least 7 days. Cracked or broken tiles shall be rejected.

12.5.4 Ceramic Tiles

Cement slurry of paste like consistency shall be spread over the bedding at the rate of 3/4 cu.ft. of cement/100 sq. ft. over an area, which would accommodate about 25 tiles and the tiles, shall be washed clean before laying.

Tiles shall be fixed in the above cement grout one after another, each tile being gently tapped with a wooden mallet till it is properly bedded and in level the adjoining tiles. The joints between different tiles shall be kept as thin as possible and in perfect straight line and to suit the required pattern as shown in the drawings. The surface of the flooring as laid shall be true to levels and slopes. Tiles, which are fixed in the floor adjoining the wall, shall enter not less than 1/2" under the plaster, skirting or dado.

All joints shall be cleaned of the gray cement grout with a wire brush to a depth not exceeding 3/16" on the following day of laying the tiles and all the dust and loose mortar removed and cleaned. The joints shall then be flush pointed with non shrinkable grout to match the shades of the tiles and there after the floor shall be kept wet for a minimum period of 7 days.

The entire surface of the floor, after curing, shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden mallet.

12.5.5 Clay Floor Tiles

The clay floor tiles shall be laid over lime Surkhi green mortar of specified mixed and joints maintained properly shall be grouted with lime Surkhi. Broken or cracked tiles shall be rejected.

12.5.6 Dividing Strips

The dividing strips shall usually be of glass. Each strip shall be of full length as that of a single panel. There shall be no joint of the strip except of junction only. The top edges of the strip shall be smoothly finished without projections. The strips in required pattern shall be laid to plane, slope, and level held in position by cement mortar. These shall be checked prior to laying of concrete in panels. Proper care shall also be exercised during laying of concrete to avoid any dislocation, breakage of the strips.

12.5.7 Cement Punning

The base surface shall be properly watered and cleaned of dust and dirt. A screed of c/s in the specified ratio shall be laid over it. Upon which punning shall be done.

Before applying cement sand punning, the first coat should be swept clean of any dust or loose particles. The average thickness of punning shall not be less than 3 mm. The pattern of the surface should be as per instruction of the Site Engineer. The coat shall be finished by rubbing it with a steel trowel and any depression shall be filled in and rubbed to a shining surface. All corners and edges shall be rounded. The Contractor shall prepare a sample square metre of the punning as per instruction of the Site Engineer until the quality, texture and finish required is obtained and approved by the Site Engineer, after which all punning executed shall conform with the respective approved sample. All punning shall be finished smooth, even and truly level and as per instructions of the Site Engineer. The punning shall be kept wet for 7 days.

12.5.8 Marble Floor

The marble slabs shall be of as specified in the description of the item. The contractor shall get the samples approved by the Engineer before starting the work. The size of the Marble slabs shall be as specified or as shown in the drawings or as ordered by the Engineer. The thickness shall be 20-25 mm as specified in the description of the item. The slabs shall be hand or machine cut (as specified) to the required shape and dimensions. They shall be fine chisels dressed on all sides to the full depth so that a straight edge laid along the side of the stone shall be fully in contact with it. The top surface of each slab shall also be fine chisel dressed to remove all wariness. All sides and top surface of the slabs shall be machine rubbed or table rubbed with coarse sand before paving. All angles and edges of slabs shall be true, square and free from shipping and the top surface shall be perfectly true and plain.

The bedding for the slabs shall be with cement mortar 1:2 cement 2 sand) or as specified in the description of the item. The average thickness of bedding mortar shall be 12-18 mm the thickness at any place under the slabs shall not be less than 12 mm.

Cement slurry of paste like consistency shall be spread over the above bedding at the rate of

1cu.ft. of cement/100 sq. ft. of area. The edges of the slabs already paved shall be buttered with match the shade of the marble slab. The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and closer to the adjoining slab with as fine a joint as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off. The surface of the flooring as laid shall be true to levels and slopes and the flooring shall be cured for a minimum period of 7 days. Slabs, which are fixed in the floor adjoining the wall, shall enter not less than 12 mm under the plaster, skirting or dado.

If there is any unevenness at the meeting edges of slabs, the same shall be removed by fine chiseling in a slant. The surface shall then be polished and finished flushed except that cement slurry with or without pigments shall not be applied on the surface before each polishing.

12.5.9 Polished Machine Cut Stone Flooring

The stone flooring shall be of slabs of machine cut, machine polished and stone of specified thickness of approved quality free from cracks and flakes, of uniform color and shall have an even surface. The edges shall be straight. The stone shall be 30 cm. x 30 cm. and properly dressed square and laid as directed with fine joints not exceeding 1.0 mm. They shall be firmly bedded flush in cement mortar 25 mm. thick, cement floated with no hollows between. The floor shall be well washed and pointed with cement and sand (1 to 1) flush with the surface of the stone. After laying, the flooring shall be polished and all unevenness removed.

The surface of the base slab shall be struck off reasonably true at a level not less than 60 mm. (2 3/4") below the required finished level. The mortar base for the tiles shall be 20 to 30 mm. thick with cement float. Keeping required jointing thickness the slabs/ tiles shall laid to proper level and line work. The joints to be filled in by neat cement/color cement slurry, and allowed to set. The stone for flooring shall be machine cut and machine polished. The Contractor shall submit

samples for all the tiles for approval before using the same. The work must be protected from any kind of damage till handing over the building.

12.5.10 Granite Flooring

The granite slabs shall be of as specified in the description of the item. The contractor shall get the samples approved by the Engineer before starting the work.

The size of the marble slabs shall be as specified or as shown in the drawings or as ordered by the Engineer. The thickness shall be 20-25 mm as specified in the description of the item. The slabs shall be hand or machine cut (as specified) to the required shape and dimensions. They shall be fine chisels dressed on all sides to the full depth so that a straight edge laid along the side of the stone shall be fully in contact with it. The top surface of each slab shall also be fine chisel dressed to remove all wariness.

All sides and top surface of the slabs shall be machine rubbed or table rubbed with coarse sand before paving. All angles and edges of slabs shall be true, square and free from shipping and the top surface shall be perfectly true and plain.

The bedding for the slabs shall be with cement mortar 1:2 cement 2 sand) or as specified in the description of the item. The average thickness of bedding mortar shall be 12-18 mm the thickness at any place under the slabs shall not be less than 12 mm

Cement slurry of paste like consistency shall be spread over the above bedding at the rate of 1cu.ft. of cement/100 sq. ft. of area. The edges of the slabs already paved shall be buttered with match the shade of the granite slab. The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and closer to the adjoining slab with as fine a joint as possible. Subsequent slabs shall be laid in the same manner.

After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off. The surface of the flooring as laid shall be true to levels and slopes and the flooring shall be cured for a minimum period of 7 days. Slabs, which are fixed in the floor adjoining the wall, shall enter not less than 12 mm under the plaster, skirting or dado. If there is any unevenness at the meeting edges of slabs, the same shall be removed by fine chiseling in a slant. The surface shall then be polished

and finished flushed except that cement slurry with or without pigments shall not be applied on the surface before each polishing.

12.6 MEASUREMENT

The work shall be measured in sq. metres. Length and breadth shall be measured between the finished faces of skirting, dado, or wall plaster correct to 0.01m. No deduction shall be made nor extras paid for any opening in the floor up to 0.01 Sq. m. Steps and treads of stairs paved with granite stone slabs shall also be measured under the item of granite. The rate shall include the cost of all materials, plant and labour involved in all the operations described **above.**

13. MILD STEEL TUBULAR TRUSS

13.1 SCOPE

This specification covers providing, fabricating, assembling, erecting in position tubulur truss / mild steel metal truss.

13.2 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications affecting work of this trade.

13.3 GENERAL REQUIREMENT

The scope of work covered by this division shall be deemed to comprise the furnishing and installation of all mild steel roof trusses as shown in drawings and as specified. It shall also include the supply of the appertaining materials and structural parts, scaffolding, off loading on site and all operations in connection with truss works, unless otherwise specified in the Bills of Quantities.

Materials and structural parts, which the Contractor shall supply and install and which thereafter will be incorporated in the structure, shall be new and unused. They shall comply with the regulations regarding quality and dimensions. Materials and structural parts that are not standardised shall be used only with the approval of the Engineer.

The materials shall be protected from rain and inclement weather all to the satisfaction of the Engineer.

13.4 SAMPLES/SUBMITTALS

Before manufacturing / fabrication truss and its member the manufacturer / contractor shall produce shop drawing showing each components of member frame and joining detail. This drawing shall be backed by an appropriate calculation for taking into consideration the wind forces, earthquake force and appropriate static loadings.

13.5 MATERIALS

Structural steel section shall be as per IS specification, and steel tubes used in the truss shall be hot finished tubes confirming to the requirements of specified in IS 1161 - 1968 and IS 807 - 1968. Tubes shall be of grade heavy or medium unless instructed.

Tubes shall be designated by their nominal bore. These shall be light, medium or heavy as specified depending upon the wall thickness. The standard size and weights of tubes are listed in manufacturer's weight chart or standard steel weight chart. Hollow sections shall be as per IS 4923.

Tubes shall be clean finished and reasonably free from scale. They shall be free from cracks, surface flaws, laminations and other defects. The ends shall be cut clean and square with axis of tube, unless otherwise specified.

Minimum Thickness of Metal: Wall thickness of tubes used for construction exposed to weather shall be not less than 4 mm and for construction not exposed to weather it shall be not less than 3.2 mm where structures are not readily accessible for maintenance, the minimum thickness shall be 5 mm.

13.6 EXECUTION

13.6.1 Fabrication

The fabrication of truss using steel tubes shall be done in accordance with IS 800. Welding shall be done with reference to the IS 820 and IS 816.

The component parts of the structure shall be assembled in such a manner that they are neither twisted nor damaged. The members of the truss shall be assembled and welding done according to the detailed drawing. All materials before assembly shall be straightened, if necessary, unless required to be of a curvilinear form and shall be free from twist. All fabrication and welding is to be done in an approved workshop. The joint details shall be generally as per S.P-38 of B.I.S publication.

13.6.2 Straightening

All material before being assembled shall be straightened, if necessary, unless required to be of curvilinear form and shall be free from twist.

13.6.3 Bolting

Washers shall be specially shaped where necessary, or other means used, to give the nuts and the heads of bolts a satisfactory bearing.

In all cases where the full bearing of area of the bolt is to be developed, the treaded portion of the bolt shall be not within the thickness of the parts bolted together and washers of appropriate thickness shall be provided to allow the nut to be completely tightened.

Edges should be dressed to a neat and work-man like finish and be free from distortion where parts are to be in a contact metal-to-metal.

13.6.4 Caps and Bases for Columns

The ends of all the tubes, for columns transmitting loads through the ends, should be true and square to the axis of the tubes and should be provided with a cap or base accurately fitted to the end of the tube and screwed, welded or shrunk on. The cap or base plate should be true and square to the axis of the column.

13.6.5 Sealing of Tubes

Where the end of a tube is not automatically sealed by virtue of its connection by welding to another member, the end shall be properly and completely sealed. Before sealing, the inside of the tube should be dried and free from loose scale.

13.6.6 Flattened Ends

In tubular construction, the ends of tubes may be flattened or otherwise formed to provide for welded, riveted or bolted connections provided that the methods adopted for such flattening do not injure the material. The change of section shall be gradual.

13.6.7 Painting

All tubes and part thereof shall unless specified otherwise, shall be painted with two coats of red oxide paint before erection at site.

13.6.8 Hoisting and Erection

After the members are cut into the required length, and welded to form a truss system by providing fish plate, anchor plates etc. fully butt welded, the fabricated members shall be assembled in ground to form a full scale truss for inspection by the Engineer. The truss then be lifted to the required level and position where pre-fixed holding down bolts are prepared to receive such truss in position and alignment. All the bolts and nuts including holding down bolts are well tightened using required washers.

Tubular trusses shall be hoisted and erected in position carefully, without damage to themselves, other structure, equipment and injury to workman.

The method of hoisting and erection proposed to be adopted shall be got approved from the Engineer-in-charge. The contractor shall however be fully responsible, for the work being carried out in a safe and proper manner without unduly stressing the various members. Proper equipment such as derricks, lifting tackles, winches, ropes etc. shall be used.

13.7 MEASUREMENT

Measurement for the payment shall be done in weight as mentioned in the Bill of Quantity. The work as fixed in place shall be measured in running metres correct to a centimeter on their weights calculated on the basis of standard tables correct to the nearest kilogram unless otherwise specified.

Weight of cleats, brackets, packing pieces bolts nuts, washers distance pieces separators diaphragm gussests (taking overall square dimensions) fish plates, etc. shall be added to the weight of respective items unless otherwise specified. No deduction shall be made for skew cuts. Welding weight shall not be measured.

13.8 RATES AND BASIS OF PAYMENT

The rate shall include the cost of labour and materials involved in all the operations described above including application of one coat of approved steel primer, i.e. red oxide zinc chrome primer conforming to IS 2074.

The Mild Steel Truss works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

14. CORRUGATED GALVANIZED IRON (CGI) SHEET ROOFING

14.1 SCOPE

This specification covers fixing of various types of sheet roofs in general and corrugated galvanized iron sheets (CGI) (Plain / Corrugated) over the purlins on the roofs in particular.

14.2 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications affecting work of this trade.

14.3 GENERAL REQUIREMENT

The scope of work covered by this Chapter shall be deemed to comprise the furnishing and installation of all CGI Sheet roofing as shown in drawings and as specified. It shall also include the supply of the appertaining materials and structural parts, scaffolding, off loading on site and all operations in connection with truss works, unless otherwise specified in the Bills of Quantities.

Materials and structural parts, which the Contractor shall supply and install and which thereafter

will be incorporated in the structure, shall be new and unused. They shall comply with the regulations regarding quality and dimensions.

The materials shall be protected from rain and inclement weather all to the satisfaction of the Engineer.

14.4 SAMPLES/SUBMITTALS

The Contractor shall furnish the samples of CGI sheet (12" x12") from the different manufacturers along with the physical properties and test results for the approval of the Engineer.

Before proceeding to the roofing work, the Contractor shall prepare and submit to the Engineer the sheet laying drawings for his review and approval.

14.5 MATERIALS

The minimum thickness of base metal of Galvanised sheets shall not be less than 0.52 mm and shall conform to IS:277 / ASTM A 525 M / AS 1397 with hot dip zinc coating of minimum 275 gms/m2 coating mass (total of both sides) with an additional organic coating. Exterior organic coating shall be of SMP (silicon modified polyester) or of fluoropolymer PVDF (polyvinyldine fluoride paint containing at least 70% high build Kynar 500 resins in the dry paint film) having 20 microns nominal dry film thickness over 5 microns corrosion inhibitive epoxy primer. Inner side organic coating shall be 5 microns polyester back coat over 5 microns corrosion inhibitive epoxy primer. Colour should be as per Owner / Consultants choice. Coating shall be guaranteed for at least 20 years.

The sheets shall be free from cracks, split edges, twists, surface flaws etc. They shall be clean, bright and smooth. The galvanizing shall be non-injured and in perfect condition. The sheets shall not show signs of rust or white powdery deposits on the surface. The corrugations shall be uniform in depth and pitch and parallel with the side.

In general, steel sheets shall be fixed with hexagonal head self drilling screws with EPDM seals. Fasteners shall have a protective polymer coating covering the entire fastener surface, the head as well as the shank, over a 8 micron zinc electroplating. Polymer coated screws should be as per AS 3566, Class 3.

For self drilling / self tapping screws, high rpm (2000-2500 rpm) drivers with high amperage (4- 7 amps) shall be used to achieve the proper torque to secure fastening. Drill bits shall be cleared out

after the completion of drilling of sheets.

If required, J bolts L bolts etc. shall be made of standard manufactures of the specified size and shaped. Such iron work should be painted with one coat of anticorrosive paint followed by a coat of epoxy paint before fixing in the position.

14.6 EXECUTION

14.6.1 Laying and Fixing

The sheets shall be laid and fixed in the manner described below, unless otherwise shown in the working drawings or directed by the Engineer.

The sheets shall be laid on the purlins to a true plane, with the lines of corrugations parallel or normal to the sides of the area to be covered unless otherwise required as in special shaped roofs.

The sheets shall be laid with a minimum lap of 15 cm at the ends and 2 ridges of corrugations at each side. The above minimum end lap of 15 cm shall apply to slopes of 1 vertical to 2 horizontal and steeper slopes. For flatter slopes the minimum permissible end lap shall be 20 cm. The minimum lap of sheets with ridge, hip and valley shall be 20 cm measured at right angles to the

line of the ridge, hip and valley respectively. These sheets shall be cut to suit the dimensions or shapes of the roof, either along their length or their width or in a slant across their lines of corrugations at hips and valleys. They shall be cut carefully with a straight edge chisel to give a smooth and straight finish.

Sheets shall not generally be fixed into gables and parapets. They shall be bent up along their side edges close to the wall and the junction shall be protected by suitable flashing or by a projecting drip course, the later to cover the junction by at least 7.5 cm.

The laying operation shall include all scaffolding work involved.

Sheets shall be fixed to the purlins or other roof members such as hip or valley rafters etc. with Steel sheets shall be fixed with hexagonal head self drilling screws with EPDM seals. Fasteners shall have a protective polymer coating covering the entire fastener surface, the head as well as the shank, over a 8 micron zinc electroplating. Polymer coated screws should be as per AS 3566, Class 3. The length of the self tapping/self drilling screws shall be varied to suit the particular requirements. There shall be a minimum of three screws placed at the ridges of corrugations in each sheet on every purlin and their spacing shall not exceed 30 cm.

Where slopes of roofs are less than 21.5 degrees (1 vertical to 2.5 horizontal) sheets shall be joined together at the side laps by galvanized iron bolts and nuts 25 × 6 mm size, each bolt provided with a bitumen and a G.I. limpet washer or a G.I. limpet washer filled with white lead. As the overlap at the sides extends to two corrugations, these bolts shall be placed zig-zag over the two overlapping corrugations, so that the ends of the overlapping sheets shall be drawn tightly to each other. The spacing of these seam bolts shall not exceed 60 cm along each of the staggered rows. Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the underside, while the sheets are on the ground.

14.6.2 Ridges, Hips and Valley

Ridges and hips of CGI sheet roof shall be covered with ridge and hip sections of plain GI sheet with a minimum lap of 20 cm on either side over the CGI sheets. The end laps of the ridges and hips and between ridges and hips shall also be not less than 20 cm. The ridges and hips shall be of 60 cm overall width plain GI sheet, 0.6 mm or 0.8 mm thick as given in the description of the item and shall be properly bent in shape.

Ridges shall be fixed to the purlins below with the same 8 mm dia G.I. hook bolts and nuts and bitumen and G.I. limpet washers which fix the sheets to the purlins.

Similarly, hips shall be fixed to the roof members below such as purlins, hip and valley rafters with the same 8 mm dia G.I. hook bolts and nuts and bitumen and G.I. limpet washers which fix the sheets to those roof members. At least one of the fixing bolts shall pass through the end laps of ridges and hips, on either side. If this is not possible extra hook bolts shall be provided.

The end laps of ridges and hips shall be joined together with CGI sheet by galvanized iron seam bolts 25 x 6 mm size each with a bitumen and G.I. washer or white lead as directed by the Engineer. There shall be at least two such bolts in each end lap.

Surface of C.G.I. sheets of ridge and hip sections and the roofing sheets which overlap each other shall be painted with a coat of approved primer and two coats of approved paint suitable for painting GI Sheets before they are fixed in place.

The edges of the ridges and hips shall be straight from end to end and their surfaces should be plane and parallel to the general plane of the roof. The ridges and hips shall fit in squarely on the sheets.

The sheets shall be laid and fixed in the manner described below, unless otherwise shown in the working drawings or directed by the Engineer.

14.7 MEASUREMENT

14.7.1 CGI Sheet Roofing: The length and breadth shall be measured correct to a cm. Area shall be worked out in square meter (square foot) correct to two places of decimal.

The superficial area of roof covering shall be measured on the flat without allowance for laps and corrugations. Portion of roof covering overlapping the ridge or hip etc. shall be included in the measurements of the roof.

No deduction in measurement shall be made for opening upto 0.4 sqm and nothing extra shall be allowed for forming such openings. For any opening exceeding 0.4 sqm in area, deduction in measurements for the full opening shall be made and in such cases the labour involved in making these openings shall be paid for separately. Cutting across corrugation shall be measured on the flat and not girthed. No additions shall be made for laps cut through.

14.7.2 Ridge, Hips, Valley and Barge: The measurements shall be taken for the finished work in length along the centre line of ridge or hip, as the case may be, correct to a cm. The laps in ridges and hips and between ridges and hips shall not be measured.

14.8 RATES AND BASIS OF PAYMENT

14.8.1 CGI Sheet Roofing: The rate shall include the cost of all the materials and labour involved in all the operations described above including a coat of approved steel primer and two coats of approved steel paint on overlapping of CGI sheets. This includes the cost of roof sheets, galvanized iron J or L hooks, washers, bolts and nuts,

14.8.2 Ridge, Hips, Valley and Barge: The rate shall include the cost of all labour and materials specified above, including painting, cost of seam bolts and any extra G.I. hook bolts, nuts and washers, required.

The CGI Sheet Roofing, Ridge, Hips, Valley, Barge, etc., works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

15. PRE-FINISHED GI GUTTER

15.1 SCOPE

This specification covers supplying, fabricating and fixing of coloured Galvanised Iron (G.I.) pre-finished gutters of various shapes as shown in the drawings and descriptions of item with all required fixing accessories.

15.2 GUTTERS

Gutter shall be fabricated from prefinished colour coated plain G.I. Sheets of 22 gauge.

Eaves gutters shall be of the shape and section specified in the description of the item. The overall width of the sheet referred to therein shall mean the peripheral width of the gutter including the rounded/profiled edges. The longitudinal edges shall be turned back to the extent of 12 mm and beaten to form a rounded/squared edge as shown in the drawing. The ends of the sheets at junctions of pieces shall be hooked into each other and beaten flush to avoid leakage.

15.3 SLOPE

Unless otherwise specified, gutter shall be laid with a minimum slope of 1 in 120.

15.4 LAYING AND FIXING

Gutter shall be supported on and fixed to M.S. flat iron brackets bent to shape and fixed to the

required slope. The maximum spacing of brackets shall be 1.20 metres.

Where these brackets are to be fixed to the sides of rafters, they shall be of 40 × 3 mm section bend to shape and fixed rigidly to the sides of rafters with 3 Nos. 10 mm dia bolts, nuts and washers. The brackets shall overlap the rafter not less than 30 cm and the connecting bolts shall be at 12 cm centres.

Where the brackets are to be fixed to the purlins, the brackets shall consist of 50 × 3 mm M.S. flat iron bent to shape with one end turned at right angle and fixed to the purlin face with 2 Nos. of 10 mm dia bolts nuts and washers. The bracket will be stiffened by provision of 50 × 3 mm. M.S. flat whose over hung portion bent to right angle shape with its longer leg connected to the bracket with 2 Nos. 6 mm dia M.S. bolts, nuts and washers and its shorter leg fixed to face of purlin with 1 No. 10 mm dia, bolt, nut and washer. The over hang of the vertical portion of the bracket from the face of the purlin shall not exceed 22.5 cm with this arrangement. The spacing of the brackets shall not exceed 1.20 metres.

The gutter shall be fixed to the brackets with 2 Nos. G.I. bolts and nuts 6 mm dia, each fitted with a pair of G.I. and bitumen washers. The connecting bolts shall be above the water line of the gutters.

For connection to down take pipes, a proper drop end or funnel shaped connecting piece shall be made out of G.I. sheet of the same thickness as the gutter and riveted to the gutter, the other end tailing into the socket of the rain-water pipe. Wherever necessary stop ends, angles etc., should be provided.

15.5 FINISH

The gutters when fixed shall be true to line and slope and shall be leakproof. There should not be any hammer marks on the finished surface and shall be true in shape as shown in the drawing.

15.6 MEASUREMENT

Measurements shall be taken for the finished work along the centre line of the top width of the gutter connection to a centimeter. The hooked lap portion in the junctions and gutter lengths shall not be measured. The number of brackets which are fixed to purlins with stiffener flats should be measured separately under section – of this division.

15.7 RATES AND BASIS OF PAYMENT

The rate shall include the cost of all labour and materials specified above, including all specials such as angles, junctions, drop ends or funnel shaped connecting pieces, stop ends etc., flat iron brackets and bolts and nuts required for fixing the latter to the roof members.

The GI pre-finished gutter works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

16. INSULATION IN ROOF USING RESIN BONDED ROCK WOOL

16.1 SCOPE

This specification covers supplying and fixing in position insulation layer in roof below CGI roofing using resin bonded rock wool conforming to IS:8183 or BS:3958 having density 48 kg/m3, 50 mm thick, wrapped in 200 G Virgin polythene bags fixed to roof supporting structure with metallic hangers/cleats of required size and wire mesh of 12.5 mm x 24g wire and mesh and with all required fixing accessories.

16.2 MATERIAL

Material shall be Water Repellant Grade Rockloyd Resin Bonded Rockwool slabs of density 48/64kglm^3 and thickness 50mm for roof underdeck insulation. Rockwool slab is non combustible-type tested as per BS 476 parl 4,5,6,7 and also water repellant grade when tested to BS 2972 parl 2. Rockloyd has thermal conductivity value 0.029 W/mK at 10º C. mean temperature and conforms to IS : 8183, BS :3958.

The material shall be mineral wool made from rock slag or glass processed from a molten state into fibrous form and shall be bonded with a suitable binder. Bonded mineral wool shall conform to specifications of group I of IS 8183.

The width of roll shall be 1500 mm wide and thickness 50 mm. Density shall be 24 kg/m3 and the roll shall have factory applied reinforced foil facing.

The insulating material (Twiga Insul) shall meet the following requirements:

- Temperature Range: -195^{0}C to +230^{0}C
- Chemical Stability: Chemically inert, rot proof and odorless
- Fire Safety: Non-combustible in accordance with BS 476 Part 4
- Biological: Inorganic, no growth of fungi and vermin
- Moisture Content: Less than 2% in accordance IS 3144 /BS 2972
- Water Absorption: Less than 2% in accordance IS 3144 /BS 2972
- Recovery after Compression: 95% in accordance with IS 8183 / BS 3958 Part 5
- Thermal Conductivity in W/MK for 50 mm thick 48kg/m^3 density shall have 0.029.

16.3 LAYING AND FIXING

50 mm thick insulating materials shall be installed just below the roof in the same slope of roof. Insulating board/roll shall be fixed by means of clits/hanger from roof truss. Hanger shall be 12 mm dia of required length and the size of Mild Steel cleats shall not be less than 50x50x3 mm spaced at 600 mm. The insulating board shall also be supported with 12 mm x 24 gauge wire mesh. The joints of the insulating boards shall be sealed with metallic tape.

The finished surface shall be free from any bulges, sags.

16.4 MEASUREMENT

Measurement for payments shall be made in square meter (square foot) for the completed work as indicated in the Bill of Quantities. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq. m.

16.5 RATES AND BASIS OF PAYMENT

The rate shall include the cost of all labour and materials specified above, including all specials such as hanging rods, cleats, wire mesh, metallic tape, etc.

The insulation works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

17. CEMENT PLASTER

These regulations apply to all parts of the work in which plaster will be used. The work shall include all necessary labour, materials, equipment and auxiliary works as required. Plaster shall be applied in accordance with the finishing schedule given on the drawings or specified elsewhere, or as directed by the Engineer.

All labours also include the supply of materials and building components necessary thereto, including unloading and storage at the site, if nothing different is specified.

The specification deals with plastering on all types of normal background. If not otherwise stipulated British Standards Code Bs : 5492 shall be applicable.

17.1 GENERAL SCOPE

This specification section covers cement plaster or lime plaster finishes to walls, columns ceilings and similar surfaces on background normally wet with, such as brick, or concrete (plain or reinforced). The cement plaster shall be 12 mm, 15 mm or 20 mm as specified in the item.

This specification covers furnishing of all labor, materials, services and equipment necessary for the completion of Cement Plastering works.

17.2 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications and affecting works of this trade and co-ordinate work between Divisions as required.

17.3 SCAFFOLDING

For all cement plastering work double scaffolding independent of work having two sets of vertical supports shall be provided. The supports shall be sound and strong and of steel tubular, wooden ballies, planks, trestles, G. I. Pipes, ply board and other scaffolding material. The vertical posts shall be tied together with horizontal pieces over which the scaffolding planks be fixed. The three sides of the scaffolding should be covered with l.0 m wide ply-boards to protect the materials from dropping off while working.

17.4 MOCK-UP

The Contractor shall prepare mock-up panel (size 2500 mm x 2000 mm or as instructed by the Engineer) of plaster of all types of plaster work for the approval of the Engineer prior to commencement of the works.

When only one coat of plaster is specified, the base shall be prepared as specified for undercoat and one coat of plaster shall be directly apply as finish coat.

17.5 CARE OF TOOLS & ACCESSORIES

All tools shall be cleaned by scraping and working at the end of each day's work, or after use with different materials. Metal tools shall be cleaned and greased after each operation. All tools shall be examined and thoroughly cleaned before plastering begun.

17.6 MATERIALS

Materials and building components which the Contractor has to supply and build in, i.e. they go into the permanent works, must be new and unused. They must comply to standards and dimensions.

17.6.1 Cement

The cement shall be ordinary Portland cement of approved brand and manufacture and shall comply in all respects with the IS 269 for ordinary Portland cement of 33 grade and IS 8112 for ordinary Portland cement of 43 grade. It shall be delivered on the site in packages with an unbroken seal fixed by the makers and plainly marked with the name of brand and the manufacturer. It shall be stored in a dry place in regular piles not exceeding ten bags high kept over wooden timber and planks with sufficient walking space in such a manner that it will be

efficiently protected from moisture and contamination and that the consignments can be used up in the order in which they are received. Set cement shall be immediately removed from the work and replaced by the Contractor at his own expense.

If desired, tests shall be made by taking samples of cement from stores or elsewhere from the works. The selection of samples and procedure for testing shall comply with the appropriate Indian Standard.

17.6.2 Sand

Sand shall consist of silicious material having hard, strong, durable, uncoated particles, free from undesirable amounts of dust, lumbs, soft, or flaky particles or other deleterious substances. The amount of different undesirable substances shall not exceed the percentage limits by weight as specified in relevant I.S. Codes but in no case, the total amount of all undesirable substances shall exceed five percent by weight. All fine aggregate (sand) shall conform to IS 1542 specification for sand for plaster.

For under coat plaster the fine aggregate (sand) shall confirm to grading IV. For finishing coat work the fine aggregate (sand) shall confirm to grading zone V shall be used.

17.6.3 Water

Water for plastering work shall not be salty or blackish and shall be clean drinking water, reasonably clear and free from objectionable quantities of silt and traces of oils, acid and injurious alkali, salts, organic matter and other deleterious material which will weaken the concrete. Water shall be obtained from the sources approved by the Engineer. Sources of water shall be maintained at such a depth and the water shall be withdrawn in such a manner as to exclude silt, mud, grass or other foreign materials. Containers for transport, storage and handling of water shall be clean.

The quality of water shall be tested for pH Value Limits of Acidity, Limits of Alkality, Percentage of solids, Chlorides, Suspended matter, Sulphates, Inorganic and solids in accordance with IS 3025.

17.6.4 Lime

The lime shall comply with IS 712. All impurities, ashes, or pieces improperly burnt shall be screened or picked out before slaking. The lime shall be slaked with water not less than one week or more than two weeks before use. The slaked lime shall be screened through IS 240 sieve for first coat and IS 120 sieve for second and third coat of plaster.

The slaked lime shall be stored in a weather proof and damp proof closed shed with impervious storey and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. The lime shall be used when fresh, i.e. within 14 days of its removal from kiln.

All lime that has been damaged by rain, moisture, dirt, air slaking or any other cause shall be rejected and all rejected material shall be removed from the site forthwith.

Sample of lime shall be approved by the Engineer who shall keep it in his site office for reference. Field test of lime shall be in accordance with IS 1624.

17.6.5 Admixtures and Colouring Agent

If admixtures, sealing coats and the like are used or special processes or materials applied, the maker's or supplier's instructions shall be strictly observed. Such instructions for application shall become part of the contract upon approval of the Engineer.

17.6.6 Wall Lathing

Wall lathing shall be executed whenever masonry joints to concrete structures appear or where recesses have to be covered. Metal lath shall be ribbed lath, expanded metal with 10 mm mesh weighing not less than 1.8 kg per square meter and shall comply with BS 1369. Binding wires shall be 20 gauge soft iron.

The metal lath shall be securely attached to the wall structure covering the joints of concrete/blocks at least 15 cm to either side.

17.6.7 Lathwork of Metal

Lathwork of wire netting, expanded metal and building steel lathwork shall be of commercial quality and of a thickness suitable to its purpose. They shall be of non-corroding material and be suitable to meet all stresses being imposed upon them and excluding any undesirable movements.

Binding wire shall be annealed and non-rusting or rust-protected for work in damp rooms. It shall be at least 0.9 mm thick, and for expanded metal lathwork at least 1.2 mm thick.

The nails for use in damp rooms shall be non-rusting or rust- protected. Galvanized staples of the same length may also be used instead of the nails.

17.6.8 Mortars

a. Cement Mortar

The mortar for cement plaster shall be as specified in the Drawing, Bills of quantities or schedule of items for the particular work.

Cement and sand (or any binding and supporting materials) shall be mixed dry thoroughly on clean approved platform or in a mechanical mixer and water shall then be added to obtain a mortar of the consistency of a stiff paste. Care being taken to add just sufficient water for the purpose.

Mortar shall be used as soon as possible, after mixing and within 1/2 hours after cement is mixed wet. Mortar unused for more than 1/2 hours shall be rejected and removed (mixes of lime putty and sand can be kept for a period of 72 hours, provided it is kept damp and not allowed to dry).

The well mixed mortar shall be transported from the mixing platform to the site of work in such a manner as to prevent formation of laitance or segregation.

b. Lime Mortar

The mortar shall consist of such proportions of slaked lime and sand as may be specified in the item measured by volume. If moist sand is used, necessary, allowance shall be made for bulking.

The lime mortar shall be prepared by wet process, in the power driven mill. The slaked lime is to be first placed in the mill in an even layer and ground for 180 revolutions with a sufficiency of water. Water shall be added as required during grinding, care being taken not to add more water than will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand in specified proportion and finely chopped jute fibre at the rate of one pound of jute fibre for every 0.1 cu.mt of lime sand mixture are then to be added evenly and the mixture ground for another 180 revolutions for each stone shall be 90 for each part of the grinding. The mortar shall be stirred continuously during the grinding process.

c. Pure Fat Lime Paste for Finishing

Lime shall be slaked and mixed with sufficient water to form a thick paste. It shall be reduced to a fine paste by grinding. It shall then be passed through a fine sieve (3 mm mesh) to remove all unslaked particles and foreign matters and allowed to mellow under water for at least 10 days in large slaking tanks. The surplus water on the top shall be allowed to run-off. The slaked lime paste thus formed shall be used for finishing

17.7 EXECUTION

17.7.1 General

Plastering shall be carried out by skilled workers in a workmanlike manner to the satisfaction of the Engineer.

Surfaces shall be prepared and cleaned by removing loose particles, dust adhering to mortar, grease, oil, efflorescence and other foreign matters, roughened if necessary and shall be moistened adequately before the plaster is applied.

Plaster shall be mixed by a fuel or power driven mixer to quantities required for immediate use.

The material of the composition for the various type of plaster shall be added either by volume or by weight as approved by the Engineer.

The composition of the plaster shall be suited to the purpose of the plastering, the suction capacity, and the surface roughness of the plaster background, and, in the case of exterior plaster, to the climate.

Prior to the start of its operations under this division, the Contractor shall verify that all conditions are suitable for the timely and effective carrying out of its work. Where unsuitable conditions are found, they shall be reported in writing to the Engineer and corrected as instructed by the Engineer. In particular, the Contractor shall verify that such conditions as the following do not exist:

- extensive unevenness
- efflorescence
- stress and settlement cracks
- over smooth surfaces
- over moist surfaces
- oily surfaces (e.g. from formwork oil).

Any underlying coats shall be stronger or at least equal in its consistency than the covering coat.

Any work rejected through non-compliance with the specifications shall be replaced at the Contractor's expense.

The Contractor shall do all cutting or other work as required for the installation of works herein specified, and all cutting and fitting of the work to accommodate the work of other trades including mechanical and electrical trades.

The Contractor shall perform touching-up work specified herein or caused by other trades. It shall repair cracks, marks and defects, irrespective of the cause, and leave all metal furring, lathing and plastering in first class conditions.

Particular care shall be taken to protect adjoining surfaces and material from any damage by plastering operations. The Contractor shall be responsible for and shall repair any damage to other objects caused by plaster work. Further, all precautions shall be taken to avoid too rapid drying of the plaster.

Plaster having hollows and inadequately bond or showing cracks due to unduly fat mixes or improper curing, or plaster being defective in any other respect shall be removed and properly replaced at the Contractor's expense.

17.7.2 Coordination of Plaster Work

Plaster work shall, after consultation with the Engineer and any erection contractors involved, be started and executed to ensure that construction and erection schedules will be met and mutual obstructions avoided. The Engineer's instructions shall be carried out at all times.

17.7.3 Preliminary Works

- All materials for plastering shall be kept readily available at the site.

- Plastering operation shall not be started until and necessary fixings such as wooden doors and windows, and services etc. are completed and all pipe and conduits to be embedded in the wall or plaster are installed.
- A preliminary inspection shall be made to ensure that the surfaces are in a suitable condition for plastering, particularly as regards their plainness and dryness. If dubbing out is necessary, it should be done in advance, so that an adequate time interval may be permitted before the application of the first under coat.

17.7.4 Sequence of Operation

Plastering shall be started from the top and worked down towards the floor or ground. All putlog holes, chipped off corners and surfaces shall be filled in advance of the plastering. To ensure even thickness and a true surface, plaster about 15 cm x 15 cm shall be first applied, horizontally and vertically, at not more than 2 meters intervals over the entire surface to serve as gauge. The surface of these gauged areas shall be truly in plane of finished plaster surface.

17.7.5 Surface Preparation

a. Cleanliness:

The loose layer of dust on masonry shall be brushed away before the plaster is applied. A stiff bristle brush or wire brush may be used or, to be more effective, brushing may be combined with blowing of compressed air. Laitance on a freshly cast concrete surface shall be removed, The contaminated layer formed on concrete surface due to formation of soap by the reaction of resins with calcium hydrate or due to moulds oils shall be removed by brush.

Special care shall be taken in repairing for re-rendering an old plaster coat. Old layers of the plaster coats shall be completely removed and made good. Crumbled and frost-damaged parts shall be cut out and patched. Any trace of algae or moss formation shall be removed. If the background contains soluble salts, particularly sulphates, the application of plaster shall be done only after the efflorescence of the salt is complete, and efflorescence is thoroughly removed from the surface.

b. Roughness:

The roughness of the background may generally improve the bond of the plaster. A smooth surface may be roughened by wire brushing if it is not hard, or by hacking or bush-hammering if it is hard. Alternatively, to obtain a rough surface, a mortar may be forcibly dashed on to the surface (spatter dash treatment) by suitable means on to a hard surface like concrete. On a soft smooth surface, a thin coat of cement slurry 1:1 (cement and sand) may be applied for the purpose. After roughening the surface, care shall be taken to moisten the surface sufficiently before plastering, as otherwise the freshly exposed surface may tend to absorb considerable amount of water from the plaster. In addition to general roughness in the masonry, the joints shall also be raked to a depth of about 10 mm for providing key to plaster.

c. Surface Damping

The surface shall not be soaked but shall only be damped before applying the plaster. If the surface becomes dry in a spot, such areas shall be moistened again to restore uniform suction. A fog-spray shall be used for this purpose.

d. Evenness

The background shall be even in order to avoid variations in the thickness of plaster. Any unevenness must be levelled before the plaster is applied. Local projections in brickwork shall be removed. For one coat thick plaster work, the local projection shall not exceed 12 mm of the general surface as determined by the periphery of the surface concerned, and local depression shall not exceed 19 mm. For two coats of plaster, a local projection shall not exceed 12 mm and local depression 12 mm.

17.7.6 Application of Undercoat

The undercoat shall be approximately 12mm thick and carried to the full length of the wall or to the natural breaking points like doors, or windows. Before the undercoat hardens, it shall be deeply worked to provide mechanical key for the finishing coat.

Masonry walls on which plaster is to be applied directly, shall be clean and dry with the joints raked to a depth of at least 10 mm. Before applying the undercoat, the surface shall be damped evenly to control suction. The undercoat shall be trowelled hard and tight, forcing it into surface depressing to obtain a permanent bond.

On monolithic walls, the undercoat shall be dashed on unless the surface is sufficiently rough to ensure adequate bond for it when applied with a trowel. Rough surfaces that permit successful application with the trowel are produced by mechanical roughening. The dashing of the undercoat shall be done using a strong whipping motion at right angles to the face of the wall, or it may be applied with a plaster machine or cement gun.

The undercoat shall be kept damp for at least two days immediately following its application. It shall then be allowed to become thoroughly dry.

On metal reinforcements, the plaster shall completely embed the metal. This may easily be accomplished with the large mesh type of reinforcement, the openings of which are large enough to permit plaster readily to pass through them.

17.7.7 Application of Finishing Coat

Before starting to apply the finishing coat, the second coat shall be damped evenly. Whenever possible, textures shall be applied from top to bottom in one operation to eliminate joining marks. The finishing coat shall be applied with a trowel to a thickness or approximately 6 mm and roughly leveled off.

When the surface has begun to harden, it shall be leveled off with a straight grained wood float. At a later period during drying out, when the face is quite stiff and there is no moisture on the surface, the float shall be worked with a circular movement bringing the sand in the plaster to the face and producing a uniform texture.

Alternatively, the facing shall be tapped gently with a wood float after the setting has commenced but before the plaster is dry, and care shall be taken that the tapping is even, uniform and is not overdone. As a final operation, to remove any float marks which may be left on the surface, a damp rubber sponge shall be applied with a circular motion on the face.

In all cases a perfectly smooth steel trowelled finish shall be achieved ready for paint finish.

17.7.8 Cement Plaster with Neat Cement Dado

The cement plaster shall be 12, 15 or 20 mm thick, finished with a floating coat of neat cement.

Specification for this item of work shall be as described for two coat plaster except for the additional floating coat which shall be carried out as below.

Whenever it is required, there shall be 3 mm thick film of neat cement finish of 1:1 mix or specified proportion. The neat cement finish, if required, shall be mixed with 3-12% of colour crete of specified colour and brand or as directed by the Engineer. The neat cement finish shall be applied after completely setting the final layer of cement plaster. The neat finishing layer or film shall be trowelled smooth. The rest of the specifications described for cement plaster shall be applied.

17.7.9 Moulded Bands of Cement Mortar

Moulded band is a plaster strip of uniform width but with varying thickness across its section formed over wall plaster for decorative purposes. The sectional periphery of the band is formed by a combination of straight lines or of curves or of combination of both the straight lines and curves.

Thickness: The higher thickness stipulated for the under coat in the description of the item shall refer to the upper limiting thickness of the under coat of the moulding at its most projected portion

from the wall plaster.

The thickness stipulated for the finishing coat is the uniform thickness of the finished peripheral surface of the moulded band from the under coat.

Mortar: The under coat shall consist of cement mortar 1:5 (1 cement : 6 coarse sand) and the top coat shall be of cement mortar 1:4 (1 cement : 4 fine sand) unless otherwise specified in the description of the item.

Application and Finish: Proper templates confirming to the sectional periphery of the moulded band as at the stages of the under coat and finished final coat shall be made and got approved and used at the proper stages in executing the bands to true and accurate profile. The lines of the bands as finally completed shall be truly parallel and straight and surface smoothly finished.

17.7.10 6 mm Thick Cement Plaster (Skim Coat) in RCC Surface

Where fairfaced formwork has been used for exterior or interior concrete ceilings for which plastering has been specified, the following shall be performed:

- Cleaning the ceiling from dust and loose particles.
- Smoothening the surface by chipping and grinding of protrusions from formwork seams.
- Application of a splash course of cement-sand slurry, mix ratio 1:2.
- Upon hardening of the splash course, application of a cement plaster of 6 mm thickness in 1:3 (1 cement : 3 fine sand) mortar which shall be smoothed even to render a surface ready for painting.

17.7.11 General Lath Work

Lathwork shall be fixed in such a way that it neither sags nor bends. The fastening shall be permanent. The affixing directions of the lathwork manufacturer's instruction shall be followed.

The lathwork shall be fastened in such a way that it overlaps at least 5 cm at the joints, or that it is only butt-jointed; a butt joint shall be covered on both sides with plaster fabric strips, strips of binding wire, etc., with an overlap of at least 5 cm.

Where structural components of steel and wood are to be covered by plaster, lathwork shall be used and fastened with an overlap of at least 5 cm; in addition, wood components shall be protected from moisture by means of asphalted paper or roofing felt.

17.7.12 Metal Lath/Chicken Wire Mesh

To prevent surface cracks appearing between junctions of columns/beams and walls, a 300 mm wide strip of metal lath or GI Chicken wire mesh shall be securely installed over the joints between the dissimilar sub surface. The mesh shall lap on each side of joint by at least 150 mm and fixed to masonry with masonry nails placed not more than 300 mm apart in the mortar joints. The mesh shall be attached to concrete surfaces by 19 mm grips and screws spaced not more than 300 mm apart. Concrete nails may be used in place of grips and screws only if nails can be securely fastened in the concrete.

17.7.13 Thickness of Plaster

Where the thickness required as description of item is 20 mm the average thickness of the plaster shall not be less than 20 mm whether the wall treated is of brick or stone. In case of brickwork, the minimum thickness over any portion of the surface shall not be less than 15 mm while in case of stonework the minimum thickness over the bushing shall not be less than 12 mm.

17.7.14 Curing

Each coat shall be kept damp continuously for at least two days. Moistening shall commence as soon as the plaster has hardened sufficiently and is not susceptible to injury. The water shall be applied by using a fine fog-spray. Soaking of wall shall be avoided and only as much water as can be readily absorbed shall be used. Excessive evaporation on the sunny or windward sides of the building in hot dry weather shall be prevented by hanging mat or gunny bags on the plaster and keeping them wet.

After the completion of the finishing coat, the plaster shall be kept wet for seven days and shall be protected during that period as mentioned above.

If the work perishes through the neglect of watering or any other default, and if the work is not done as specified, the work shall be removed and redone at the Contractor's expense.

Curing of the plaster shall be so done as to avoid or minimise overflow or seepage to the existing surface below.

17.7.15 Finish

The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

In all cases a perfectly smooth steel trowelled finish shall be achieved ready for paint receive.

17.7.16 Precaution

Plaster around pipes and other structural parts which are installed prior to application of plaster shall be neatly finished.

Installed erection parts shall be carefully protected by suitable covers.

Pipe openings, recesses, ducts and the like shall be suitably closed in order to avoid penetration by plaster mortar. Any soiled parts shall be cleaned before the mortar has set.

At places where plaster is connected to other materials, such as door frames or window casements, skirting or tiling a small setback of about 5 mm depth shall be provided, and the recess filled with an approved silicone mastic to seal the joint.

Corners and edges including those at doors and windows must be made either sharp-edged, chamfered or rounded according to requirements. Expansion joints of the structure shall be continued through the plaster in accordance with the Engineer's instructions, including a pertinent joint fillet, or sealed with approved silicone mastic

Any cracks which appear in the surface and all portions which sound hollow when tapped, or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the Engineer.

17.7.17 Protection and Cleaning

Clean up and properly dispose of all debris remaining on job site related to the installation of this trade.

The finished surface shall be protected until completion of project by taking appropriate protection measures.

17.8 AUXILLARY WORKS

All and any kind of works, materials, services, safety measures, etc., as well as, and if so requested by the Engineer, all tests and samples required for the completion of the Work shall be included in the scope of work and in the unit rates. The auxiliary works comprise but are not necessarily limited to the following:

(a) Measurements for the execution and payment of the works, including provision of the measuring equipment and the provision of labour.

(b) Provision of water, fuel and electricity from the mains on the site indicated by the Engineer to the points of use.

(c) Provision of all necessary equipment and tools and all necessary scaffolding.

(d) Transport of all materials and building components from the stores on the site to the points of use and possible return transport.

(e) Removal of all pollution resulting from the Contractor's operations and of the Contractor's debris.

(f) Safeguarding the Works against surface water, which shall normally be reckoned with and possibly its necessary removal.

(g) Protection of the works from heat, wind and rain.

(h) Protection of the works from cold.

(i) Supply of the operational materials.

(j) Preparation of the mortar and provision of all equipment necessary thereto.

(k) Production of the required samples in proper relation to the timing of the works

(l) Plastering in and plastering up of openings

(m) Customary measures of the trade for the protection of floors, doors, windows, coverings and other structural parts and furnishings from soiling and damage through the plastering work, including the necessary materials.

17.9 MEASUREMENT

Measurement for payments for single or two coat plastering, neat cement finished dado and skim coat plaster shall be made in square meter for the completed work and measurement of band and decorative plaster shall be made in linear meter as indicated in the Bill of Quantities. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq. m. Deductions shall be made for the opening exceeding area 1 sq.m. Corner beads and metal lath will not be measured separately.

17.10 RATES AND BASIS OF PAYMENT

The rate shall include the cost of materials, accessories, labour and other required accessories for all the operations described above. The unit rate shall include the followings:

- Examining and proper cleaning of the base plaster, of impurities or contaminating material. Irregularities of the base shall be smoothed and the base kept well, wetted before plaster work commences and, if necessary, a splash coat shall be applied.
- Providing single or multi-stage scaffolding.
- Preparing and submitting samples to specification or instructions issued by the Engineer.
- Assisting in tests.
- Providing required gauges and templates.
- Providing drips band, moulds, groove.
- Neat plastering around doors, windows, existing pipes, cables, structural parts and the like.
- Proving Corner beads and metal laths or chicken wire mesh.
- Making grooves, fillets, edges, expansion joints and the like, including supply and installation of plaster stops, corner fillets and silicone sealants, where required, if not separately called for in the Bills of Quantities.

- Cleaning of metal or wooden parts receiving plaster and covering by metal lathing or wiremesh, including supply.
- Roughening and hacking of concrete faces to form key so as to make the concrete texture visible on the entire surface.
- Protective measures for plaster work and finished plaster as well as curing for a minimum period of 10 days.
- Keeping water off surfaces until plaster mortar has sufficiently hardened.
- Overcoming possible difficulties in coordinating construction and erection work.
- Furnishing, erecting and dismantling of all necessary scaffolding.
- Cleaning of plastered and suspended ceiling surfaces immediately after completion of plastering as well as cleaning of all parts soiled by plastering, such as conduits, structural items, doors, windows and the like.

The plastering works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

18. WOODEN PLANKS/PLYWOOD CEILING COVERING

18.1 GENERAL SCOPE

This specification covers providing and fixing in position wooden/plywood ceiling and wooden eaves board using specified thick well seasoned sal wood planks with all required metal hangers, nuts, bolts, dash fasteners, wooden under faming, etc. all complete as shown in the drawings.

This specification covers furnishing of all labor, materials, services and equipment necessary for Wooden Ceiling Coverings in any level, height and shape with all supporting systems and appurtenant work, complete.

18.2 RELATED WORK

All work under this Division shall be properly coordinated with the work of other Divisions/Sections. Ventilation Slots, Lighting fixtures and outlets for the air-conditioning system shall be integrated into the suspended ceiling by means of special carriers and shaped metal frames matching the selected type of openings and meeting the additional load.

18.3 MOCK-UP

The Contractor shall provide full scale mock-up (more than 2 sq.m.) including edge details, finishing around openings and fixtures to demonstrate method of works, aesthetic and qualities of materials and execution.

Once approved, mock-ups will be the material and workmanship standard for this contract. Approved mock-ups installed locations may become part of the permanent work.

18.4 MATERIALS

18.4.1 General Requirement

Materials and building components which the Contractor has to supply and build in, i.e. they go into the permanent works, must be new and unused. They must comply with standards and dimensions.

18.4.2 Wooden Boards

Boards shall be of the class of timber and of finished thickness as specified in the description of

the item and shall be in accordance with the general specifications for wood work. Only selected boards of uniform width shall be used. Unless otherwise specified in the description of the item or shown in the drawings, the width of boards selected for use shall not be less than 100 mm nor more than 150 mm. The finished thickness of boards shall not be less than 20mm.

The specific width of boards once selected within these two limits shall be maintained throughout and shall not be varied except in the first and last lines of boards adjustment to the two ends, where remaining odd width shall be adjacent equally on both sides. The maximum length of the board in the finished work shall be 180 cm. The minimum length of board in the finished work shall be such that it will span at least two spacing of the supporting frame work except where shorter lengths are unavoidable, depending on the arrangements of the lines of heading joints which shall be carried out to the pattern ordered by the Engineer.

The boards shall be planed true on the exposed side.

18.4.3 Plywood

Plywood boards are formed by gluing and pressing three or more layers of veneers with the grains

of adjacent veneers running at right angles to each other. The veneers shall be either rotary cut or sliced and shall be sufficiently smooth to permit an even spread of glue. Face veneers shall be teak veneered and other side shall be ordinary finish with waterproofing property. Plywood shall be of waterproof plywood (BWP grade) as per IS 303 or Marine Plywood conforming to IS 710.

Adhesive used for bonding BWP grade of plywood boards shall be BWP type synthetic resins conforming to IS 848.

The thickness of all veneers shall be uniform, within a tolerance of ± 5 per cent. Corresponding veneers on either side of the centre one shall be of the same thickness and species. Plywood thickness shall be 12 mm with 7 numbers of ply.

Moisture content of the plywood boards when tested in accordance with IS 1734 (Part 1) shall not be less than 5 per cent and not more than 15 per cent. Plywood used for ceiling work shall have shear strength 135 N/mm2 and resistance to moisture shall be 100%.

18.4.4 G.I. Screws

Screws to be used shall be approved from the Engineer prior to installation. They shall be of the slotted counter sunk head type of length not less than the thickness of the board plus 20 mm. The designation number shall not be less than 9 for screws of length 40 to 50 mm and shall not be less than 6 for screws of length 25 to 35 mm.

18.4.5 Mild Steel (M.S.) Suspending Hangers

Mild Steel rods, straps, angles and flats shall be used for suspending the supporting framing (under framing). M.S. rod shall not be less than 12 mm in diameter, the thickness of M.S. straps, flats shall be more than 3mm thick and M.S. angle shall not be less than 25x25x3mm. Suspending hangers must be provided with level adjusting mechanism to maintain the ceiling in desired level. All M.S. suspending hangers shall be painted with two coats of anticorrosive paints prior to installing in position. Dash Fasteners, Expansion Bolts shall be 8 mm in diameter and 40 mm in length.

18.4.6 Timber for Under Framing

Timber frame of the class of timber and section specified in the description of the item or as ordered by the Engineer shall be provided. The width of the frame scantling shall not be less than 50 mm. The arrangements and spacing of the frame scantling shall be as per design furnished. The frame shall be given two coats of approved preservative paint before the boarding is screwed.

18.4.7 Coating System

Coating system shall be as specified in the description of item.

18.5 EXECUTION

18.5.1 Scheduling

Wooden Ceiling work shall be scheduled after completion of roofing works or after completion of any other work which would raise the moisture content of the ceiling or damage the finished surface of the ceiling.

18.5.2 Framing

The framing for fixing ceiling boards shall be carried out as shown in the drawings. The framing shall be suspended by means of a M.S. Suspension system as shown in the drawings or as directed by the Engineer. Prior to installing the boards wooden frame shall be treated with two coats of approved preservative paint.

18.5.3 Fixing Boards

a) Timber Board

The selected boards shall be fixed in shape and pattern shown in the drawings or as directed by the Engineer. The outer lines of boards shall be accurately fixed, parallel and close to the wall. Each subsequent plank shall be carefully jointed up. Unless stipulated otherwise in the description of the item, the longitudinal joints of the boards shall be half-lap joints with 6mm groove, and shall occur under the centre line of the supporting joint. Heading joints in adjacent boards shall not be placed over the same joists, those in alternate boards being arranged in the same line, except where the joints are to be concealed by headings. The boards shall be fixed to the frame scantling above with two screws at each of frames and one at every intermediate joist. The screws shall be counter sunk and the screw holes filled with putty or sloping out wax.

The unexposed faces of planks shall be painted with wood preservative before fixing.

b) Plywood Board

The board shall be selected for its suitability and groove of 6 mm wide at 150 mm c/c shall be cut in true and perfect line and dimensions. Then the plywood boards shall be fixed in shape and pattern shown in the drawings or as directed by the Engineer. The outer lines of boards shall be accurately fixed, parallel and close to the wall. Each subsequent board shall be carefully jointed up. Unless stipulated otherwise in the description of the item, the longitudinal joints of the boards shall be half-lap joints with 6mm groove which needs to be coordinated with the other groove made in the board. The boards shall be fixed to the frame scantling above with screws at spacing not exceeding 200 mm. The screws shall be counter sunk and the screw holes filled with putty or sloping out wax.

The unexposed faces of boards shall be painted with a coat of hot bitumen before fixing into position.

The exposed side of the board shall be truly level and plane without any local bulges or sags. The joints shall be truly parallel and/or perpendicular to the walls. The width of joints and groove shall be even and uniform. Care shall be taken to see that the uniformity of colour of the board is not spoilt during the fixing operations.

18.5.4 Ventilating Slots

Ventilating slots shall be provided at the locations shown in drawings. The ventilating slots shall be sliding type. Bird/insect screen shall be provided in ventilating slots.

18.5.5 Finishing

The exposed side of the boards shall be truly level and plane. The joints shall be truly parallel and/or perpendicular to the walls.

The exposed surface of the boards shall be sanded properly to achieve the smooth surface by removing all works marks. The screws head shall be concealed using appropriate putty. After final surface preparations have been completed, apply two coats of finish; use **Moisture curing polyurethanes** to produce a clear surface in a matt finish. When boards are dry, apply two coats of wax, unless otherwise instructed by the Engineer. Spread at rate of 0.07 Ltr/10 square meters. Within 15 to 30 minutes after wax application, polish ceiling surface with hand polisher.

18.6 MEASUREMENT

Length and breadth shall be measured correct to a cm. Areas shall be worked out to nearest 0.01 sq.m. The superficial area of the finished work ceiling shall be measured in square meters. No deduction in measurements shall be made for openings of areas upto 0.40 square meters. Nothing extra shall be payable either for any extra material or labour involved in forming such openings.

Unless otherwise specifically mentioned in the description of item, wooden ceiling of boarding fixed to curve surfaces in narrow widths shall be measured and paid for separately and shall include making the joints to proper splay.

18.7 RATES AND BASIS OF PAYMENT

The rate shall include the cost of all materials and labour involved in all the operations described above including all required materials, labours, equipments, scaffolding, providing ventilating slots with bird/insects screen, M.S. Suspending adjustable hangers and cleats, painting & polishing, protection, cleaning, etc.

The ceiling coverings shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

19. PAINTING WORKS

19.1 GENERAL

Painting and related works shall be performed by experienced and qualified professionals, capable of applying paints and/or coating in accordance with general practice and recognized standards, the paint manufacturer's instructions and in accordance with the present specifications.

The quality of paint shall meet the stipulated requirements of the site and the specifications hereunder.

All services shall include labour, tools and equipment, and the supply of materials and building components necessary thereto, including unloading and storage on the site, if nothing contrary is stipulated in the Specifications.

All necessary precautions shall be taken by the Contractor to protect personnel and property from hazards due to falls, toxic fumes, explosion or other harmful effects.

All painting and corrosion protection work, including that on the inside of buildings and vessels, shall be performed under strict safety conditions, primarily adequate ventilation and protection from open flames, sparks, direct rays of the sun, excessive heat. Areas where such work is performed shall be clearly marked with warning sign boards.

If the Contractor should desire to apply painting works to other Standards than those specified hereunder or the present specifications, it shall submit full details about preparation, type of materials, methods and sequences it proposes to use to comply with the requirements for the protection of the structures, machinery and equipment.

With regard to materials, the Contractor shall submit for the Engineer's approval full details of the materials it proposes to use, including the source of the basic raw materials, volatile matter content, nature of solvent, number of components, type of coat, coverage, time interval between coats and number of coats, toxic properties, physical properties, shelf life, pot life, etc.

It shall describe in detail the treatment it proposes to apply in order to give adequate protection during transport, site storage, and subsequent application. Paint shall be stored separately from thinners and solvents. In paint and solvent/thinners storage areas, warning sign boards shall be set up.

In addition to the above, the Contractor shall provide adequate ventilation at all times during painting until coating and curing is completed. Suitable ventilation from at least two different sources shall be installed in order to prevent a local build-up of solvent vapours. In all cases it shall be ensured that solvent vapours are kept at least at 20% below the explosion limit.

When designing ventilation installations for above mentioned purposes, attention should be paid to the fact that solvent vapours are heavier than air.

While working under above conditions, the necessary lighting and electrical equipment shall be explosion-proof.

19.2 SCOPE

This specification covers painting works on surfaces of timber, plaster, metal etc. with lime distemper, waterproof cement paint, enamel paint, acrylic emulsion paint, linseed oil, varnish, chapra polish, bitumen paint, wood preservative, coal tar, silicone resin based colorless paint, epoxy wall and ceiling painting, polyurethane coating, etc

19.3 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications and affecting works of this trade and co-ordinate all work between Divisions as required.

19.4 FINISH SCHEDULE

The products indicated in the room finish schedule are for colour reference only. The products to be used shall be strictly as specified in this Division. Final colour selection will be to Engineer’s approval.

19.5 STANDARDS

The work specified in this section shall be in accordance with the following standards, or approved equal, except as they are modified and supplemented herein:

- American Society for Testing and Materials (ASTM)
- British Standards (BS),
- Canadian Standards (CAN/CGSB-85.100), and
- Indian Standards (IS)

19.6 SUBMITTALS

19.6.1 Colours and Samples

In accordance with Division 1 – General Requirements, the Contractor shall submit three (3) 300mm x 300mm sample of all colours in each paint item to the Engineer for approval prior to execution of work. Full product literature, including colour selection swatches shall be provided from each manufacturer the Contractor proposes to use.

19.6.2 List of Materials

Not less than 30 days before beginning painting work, the Contractor shall submit a complete list, in duplicate, of all materials proposed for use, together with manufacturer's specifications. All paint and coating materials and products shall be subject to the Engineer's approval.

19.6.3 Unsuitability of Specified Products

No claim by the Contractor concerning the unsuitability of any material specified or the Contractor's inability to produce first class work with same will be entertained, unless such claim is made in writing to the Engineer before the Work is started.

19.6.4 Mock-up for Approval of Final Colours

Final coat of paint for both exterior and interior work shall not be applied until the colours have been approved by the Engineer. To accomplish this, the Contractor shall paint a sample panel, approximately 2 m^2, of the colours selected on every surface of the building to be painted. The Engineer shall approve the sample panels or direct changes as desired.

The Contractor shall be on the job and be prepared to change sample panels to colours desired on the spot. The Contractor shall notify the Engineer at least 5 days in advance of when the Contractor shall be ready to receive approval for the sample panels. Such notice shall not be given, however, until permanent fluorescent and incandescent lights are installed and in operation in the rooms or areas where the sample panels have been painted; temporary lights at the same level and of the same type, intensity, and colour as the permanent lights will be permitted for viewing of sample panels.

19.6.5 Scaffolding

The Contractor shall furnish, maintain and remove all scaffolding, ladders and planks required for this work, and all drop cloths for the protection of concrete walls, floors, pre-finished materials, building fixtures, etc. Painted and finished surfaces subject to damage or defacement due to other work on the building shall be properly protected and covered. The Contractor shall be responsible for any and all damage to painted work and to that of other work caused by operations under this Section.

19.7 MATERIALS

19.7.1 General

Paint materials and their components, e.g. paints, fillings, pigments, cements, metallic coating materials shall comply with the standard quality and specification, any special permit conditions and official regulations. Officially approved but unstandardized material and components shall comply with the prevailing conditions and require the Engineer's approval for application.

The Contractor shall obtain from the manufacturer and shall submit to the Engineer a "paint manufacturer's guarantee" regarding the quality of each painting material and its compatibility with the previous and subsequent coats.

All pigmented paints and primers shall be delivered to site in sealed containers packaged by the manufacturer.

If a particular material is stipulated in the specification, the Contractor may propose another adequate material to the equal of the specified type, subject to the approval of the Engineer.

Paint and finishing systems consisting of all preparation, priming and finishing products for a particular application as required to achieve the final finish, shall be from one manufacturer, and be recommended in writing by the manufacturer for use in the particular application and in the combination proposed. Where a paint is to be applied over a primer applied under another section, obtain both manufacturer's assurances that the paint and primer are compatible before applying the paint.

19.7.2 Types of Paint Application

Paints which do not need to be prepared by mixing several constituents prior to use shall be brought to the site in such a state of readiness that they need only be adjusted to brushing or spraying consistency to meet the relevant working conditions (e.g., temperature) by adding the particular thinners in accordance with the manufacturer's instructions.

In the case of paints to be applied by mixing several constituents (e.g., multi-constituent types), the various constituents shall be of such a kind that mixing will be limited to a minimum. Mixing shall be performed by electrical stirrers or agitators.

19.7.3 Quality of Paint

The quality of the paints shall be such that they will form no solid sediment and at most a slight skin in unopened original containers within 6 months -calculated from the maker's delivery date. A paint which has formed solid sediment of more than just a slight skin in the unopened original containers by the time of use or which cannot be processed satisfactorily shall not be used. Sediment shall be regarded as solid if it cannot be eliminated quickly and completely by stirring.

Coating material used for touch-up and repairs shall be the same material and colour as that originally applied.

In the event that the Contractor selects, for the protection of steel or aluminium alloys against corrosion, paints and filling cements for which neither quality regulations, permit conditions nor technical conditions of delivery exist, they may only be used if the Contractor can prove their suitability by means of test certificates for the necessary degree of protection against corrosion and if approved by the Engineer.

Paint material for windows and exterior doors must, in particular be suitable for these wooden components; i.e., the paint coat must allow vapour pressure from interior to penetrate through the coat by avoiding the development of air blisters and finally the peeling-off the paint coat from the substrate. The contractor shall give evidence from supplier's origin of the aforesaid required property.

19.7.4 Composition

All paint shall be formulated without lead. Formulations with low voluable organic compounds (Low VOC) shall be selected in all case unless approved otherwise by the Engineer.

19.7.5 Source of Materials

Painting materials shall be supplied by an established manufacturer(s) of paints with a comprehensive range of products and a system of technical support including local technical representation. Individual products shall confirm to at least one internationally recognized standard specific to the product and satisfactory to the Engineer.

19.7.6 Products

The products to be used for different types of painting works shall conform to the following specifications:

TYPE OF PAINT	SPECIFICATIONS
Coal tar	Coal tar of approved brand.
Wood preservative	Solignum of shalimar or any other reputed firm as approved.
Chapra polish	Made from turpentine and chapra properly screened. Tints as required may be added.
Linseed oil	Double boiled of approved make.
Water repellent paint	Silicone resin based colourless paint from reputed

	manufacturer like MC-Bauchemie Muller GmbH & Co. KG. or equivalent as approved by the Engineer.
Waterproof cement paint	Sealed tins of paint from reputed manufacturer like Jenson and Nicholson, British Paint. (India) Ltd., Snowcem (India) Ltd., Garware Paints, Asian Paints, or equivalent as approved by the Engineer.
Acrylic emulsion paint	Paint from reputed manufacturers like British Paints India Ltd., Jenson and Nicolson, India, Asian Paints or any other superior brand as approved by the Engineer.
Synthetic enamel paint	Paint from reputed manufacturers like British Paints India Ltd., Jenson and Nicolson India, Asian Paints, or any other superior brand approved by Engineer. It shall be in sealed tins and its type and use for exterior and interior surface shall be as per the manufacturer's printed instructions.

TYPE OF PAINT	SPECIFICATIONS
Epoxy (resin) Wall Coating	Epoxy (resin) coating shall be from reputed manufacturer like MC-Bauchemie Muller GmbH & Co. KG. or equivalent as approved by the Engineer.
Polyurethane Wall/ceiling Coating	
Exterior Paint (Raincoat)	Exterior Paint (Raincoat) materials be from reputed manufacturer like MC-Bauchemie Muller GmbH & Co. KG. , Araldiate or equivalent as approved by the Engineer.

PU coating materials shall be from reputed manufacturer like MC-Bauchemie Muller GmbH & Co. KG. , Araldiate or equivalent as approved by the Engineer.

19.8 EXECUTION

19.8.1 General

Materials, which are subject to working instructions, shall be treated and applied according to these instructions.

If not otherwise specified, the method of applying and performing of paint systems shall be as follows:

- Paint systems may be applied manually or by machines, unless a particular method of execution has been stipulated in the specifications.
- Paint coatings shall bond firmly to the substrate and each other and be of even surface.
- The surface shall be smooth, if not stipulated as finely or coarsely granulated.
- All paint coatings shall be applied as per the manufacturer’s specifications and instruction to create a uniform surface.
- Final coats shall be high-gloss, if not specifically stipulated as eggshell or matt.
- To achieve the flat levels are to be formed, the prime coated surfaces shall completely be covered with suitable undercoat filler, sanded smooth.
- Primer protective coatings shall be applied on woodwork according to manufacturers' instruction. If several coats are required, the preceding coat shall be dry. This does not apply

for wet-on-wet techniques, if so specified or permitted by the manufacturer.

- Drying periods prescribed by the manufacture shall be observed, for open surfaces, as well as for edges or irregular surfaces. All edges at doors, windows, skirtings, sockets, etc., shall be of sharp and straight line.
- Open air works shall not be carried out under adverse weather conditions. Ready-mixed paints shall be worked according to the manufacturer's instructions.

19.8.2 Verification of Painting Surface

Prior to the start of painting, the Contractor shall verify that all conditions are suitable for the timely and effective carrying out of its work. Where unsuitable conditions are found, they shall be reported in writing to the Engineer and under the Engineer's direction be immediately adjusted. In particular the Contractor shall verify that the following conditions do not exist:

- the base not being appropriate for the bond of material
- softness or chalkiness of plaster
- cracked plaster and other damages
- mineral base or surface with too high moisture
- lime plaster surfaces of insufficiently slaked lime
- sintered surfaces
- efflorescence
- fresh lime rendering as base for outdoor coatings of latex-, oil- or gloss-paint
- rendering of gypsum of too low strength overworked gypsum rendering on the top
- concrete surfaces with accumulated bonding agents on the top or of cement powdered surface or with oil residues from the formwork

19.8.3 Special Consideration for Painting

The Contractor shall select the materials to be used and determine the succeeding coats, unless certain materials and the kind of succeeding coats have been prescribed in the specifications.

If toxic painting materials need to be used, the Contractor shall observe the prevailing rules and regulations in connection with such materials.

Painting materials, which contain inflammable solvents or those injurious to health, shall be stored and worked with according to their properties under observation of the official safety regulations.

Surplus painting materials shall be disposed of in such a way that they will not cause any hazard or environmental problem. They shall not be poured into any outlets, drains, toilets, waterways, etc.

The Contractor shall select the materials insofar as no definite material is stipulated in these specifications or other parts of the Contract Documents. The materials shall be chosen in such a manner that they are suitable for the surface and for conditions during work (e.g.. weather, time), that the superimposed coats are compatible with each other and that the final result satisfies the demands likely to be expected and the local conditions.

19.8.4 Handling of Paint

Paints shall be brought to the site in tightly closable, convenient, original containers. The containers shall be marked in a durable manner with the following particulars:

- maker
- paint and relevant thinner identification
- gross and net weights

- date of supply by the maker's factory.
- accompanied by manufacturer's application instructions.

The free space in the containers shall leave enough room for the use of a stirring appliance.

All containers shall be kept tightly closed until the contents are to be used. Immediately prior to use of the contents and before pouring into smaller containers for working purposes, any skin shall be removed and the contents stirred thoroughly, if necessary with a stirring appliance.

Paints, thinners and filling cements, which are not required for immediate use, shall be protected against the action of frost and heat.

Only thinners supplied by the makers of the paint or those described by them as suitable shall be used for adjusting paints to working consistency. The instructions of the makers shall be followed in this respect.

19.8.5 General Preparation of Surface

Concrete and plastered surfaces shall, prior to commencing painting operations, be prepared by the Contractor in using applicable methods to obtain suitable conditions. The surfaces shall be dry

and free from oil, grease, powdery friable and where necessary be washed with brush and water. On foundations and cement plastered surfaces moisture level shall be less than 12%.

Where acid etching is required the surfaces shall be thoroughly washed with fresh water and abrasive sweeping.

If, for obtaining smooth and even surfaces additional application of a filler or primer is required, this shall be done without any extra payment.

Mask built-in hardware and similar items already permanently installed.

19.8.6 Systems

Following Clauses indicates painting materials of special compositions considered suitable for various parts of the works.

The Tenderer shall state in it’s Tender the name of the manufacturer and the identification of the product, which it proposes as equivalent. The colours will be determined by the Engineer.

19.8.6.1 Alkyd Enamel Painting

Preparation of Surface

The surface where paint is to be applied shall be cleaned and smoothly sand papered, all dust being removed. If the paint is to be applied on a wooden surface, suitable filler materials shall be applied and sanded off to achieve a clean and smooth surface. When painting a metal surface, all loose scales, rust, etc. shall be removed by the use of suitable sand paper.

Primer

When alkyd enamel paint is to be applied onto a cement plastered surface or concrete surface, two coats of suitable cement primer shall be applied to the clean prepared surface. When the paint is to be applied to a wooden surface, two coats of wood primer shall be applied to the cleaned prepared surface.

Application of the Paint

Following the preparation of the surface and the application of the primer a top coat shall be applied. A second coat shall be applied after the first coat has dried. Care should be taken that dust or other foreign materials do not settle or otherwise disfigure the various coats.

The same brand and same batch of materials shall be used for all coats. The paint shall be used

and applied as per manufacturer's printed instruction. The paint shall be applied with bristle brushes. Once the paints shall be applied in the thinnest possible layers with parallel drawings, no flow down shall be allowed.

19.8.6.2 Emulsion (Latex Paint) Painting

Preparation of Surface

The surface where paint is to be applied shall be cleaned and smoothly sand papered, all dust being removed. If the paint is to be applied on a wooden surface, suitable filler materials shall be applied and sanded off to achieve a clean and smooth surface. When painting a metal surface, all loose scales, rust, etc. shall be removed by the use of suitable sand paper.

Primer

Two coats of cement primer, wood primer or metal primer as required shall be applied. Each coat shall be approximately 20-30 microns when applied by brush. The primed surface shall be neatly and smoothly sand papered and cleaned.

Application of Paint

The paint of approved shade shall be applied as per manufacturer's printed instruction by suitable roller or brush. A minimum of two coats shall be applied to achieve a uniform painted surface.

19.8.6.3 Cement Paint

Mixing

The dry cement paint shall be thoroughly mixed with clean fresh water so as to produce paint of required consistency which for normal work shall be that of ordinary paint. In mixing and application, the Contractor shall follow the manufacturer's instructions. Paint for application by brush shall be stained through paint strainer. The paint shall be kept stirred and used within the specified time of the manufacture. Hardened or damaged paint shall not be used.

Application of Paint

The paint shall be applied by means of brushes and in the manner specified by the manufacturer. The number of coats shall be as mentioned in the item in the Bill of Quantities. The subsequent coats shall be applied after the preceding coat is properly cured and has thoroughly hardened, inspected and approved and as per manufacturer's specification.

Absorbent surfaces shall be evenly damped so as to give even suction. In dry weather, freshly painted surfaces shall be kept damp for at least two days and protected from direct sun.

19.8.6.4 Oil Bound and Dry Distemper

Preparation of Surface

The surface where paint is to be applied shall be cleaned and smoothly sand papered, all dust being removed. If the paint is to be applied on a wooden surface, suitable filler materials shall be applied and sanded off to achieve a clean and smooth surface. When painting a metal surface, all loose scales, rust, etc. shall be removed by the use of suitable sand paper. Oil bound distemper shall not to be applied to freshly plastered surface.

Mixing

The paste of synthetic washable distemper shall be thinned by adding 700 ml of cold water to every kg of distemper paste. Water shall be added gradually to mix them properly to get uniform consistency.

The dry distemper powder shall be mixed with 300-400 ml of clear warm water to a kg. of distemper to obtain a creamy paste. The paste shall be kept aside for sometime. Then after 700-1000 ml of water shall be added to obtain a proper brushing consistency.

Application of Paint

Following the preparation of the surface and the application of the primer a top coat shall be applied. A second coat shall be applied after the first coat has dried. Care should be taken that dust or other foreign materials do not settle or otherwise disfigure the various coats

19.8.6.5 Coal tar or Wood Preservative

The undressed surfaces of timber work shall be painted with bitumen paint or wood preservative as specified for various items like underside of door, window frame, timber rafter, purlin, underframing, underside of ceiling etc. This shall be applied in two coats.

19.8.6.6 Lime Wash

The surface shall be thoroughly cleaned of mortar droppings and other sticking. Lime solution shall be prepared from screened lime putty mixed with 0.36 Kg. of gum with 1 cubic meter of lime putty. The lime solution shall be screened through muslin cloth to obtain a clear solution. The holes etc. shall be filled with lime putty and rubbed smooth. The surface shall be sand prepare smoothly. The lime coat shall be done with alternate application of horizontal and vertical making it one coat.

Second coat shall be done after the drying of previous coat. The lime wash shall be finished to give an even and uniform surface without any patches, cracks of brush marks.

19.8.6.7 Colour Wash

Colour of required shade and quantity shall be added in the lime solution to achieve the colour wash solution. Application and finish shall be as of lime wash.

24.8.6.7 Primer Paints

In case of timber surfaces, the surface to be primed shall be sand papered smooth. The surface having knots, nail holes shall be filled with stopping and knotting materials which shall be allowed to dry and sand papered. In case of plaster surface, the surface defects shall be patched up with this paste of the same primer and after drying. In case of metal, derusting shall be done and properly cleaned after sand papering. After preparing the surface, the priming coat shall be applied with brushes. The plastered surface shall be water sprayed prior to application of cement primer. The primer to other surfaces like timber and metal shall be applied after cleaning the surfaces.

24.8.6.8 Linseed Oil

This shall be applied on clean, sand-papered surface and allowed to dry.

24.8.6.9 Water Repellent Paint

This paint shall be applied on the exposed surface of brickwork. Prior to application of silicone based colourless paint, the brickwork surface shall be cleaned of all dirts and patches of mortar, if any. This shall be applied in two separate coats, allowing at least 24 hours between coats. The printed instructions of the manufacturer shall be strictly followed. The approximate covering capacity shall be 1.85-2.3 sq. m. per coat litre on brick surfaces.

24.8.6.10 Chapra Spirit Polishing on Wood, Plywood etc.

The chapra polish shall be of the make approved by the Engineer/Engineer's representative or as specified in the description of the item. It shall be of the required shade. The surface to be polished shall be cleaned, all unevenness rubbed down smooth with sand paper and well dusted. Visible knots shall be covered with a preparation of red lead and glue size laid on while hot.

24.8.6.11 Readymade Wax Polish

Ready-made wax polish shall be of the make approved by the Engineer/ Engineer's representative or as stipulated in the description of the item. The surface to be polished shall be prepared in the same way (including a coat of wood filler) as described under "Varnishing" with the exception that knotting, holes, cracks, etc. shall be stopped with a mixture of fine saw dust formed of the wood

being treated, beaten up with sufficient bees wax to give it cohesion.

The polish shall be applied evenly with a clean soft pad of cotton cloth in such a way that the surface is completely and fully covered. The surface is then rubbed continuously for half an hour. When the surface is completely dry, a second coat shall be applied in the same manner and rubbed continuously for an hour or until the surface is dry. The final coat shall then be applied and rubbed for two hours or more until the surface has assumed a uniform gloss and is dry, showing no sign of stickiness.

24.8.6.12 Exterior Paint Coat

Applicator of coating system shall have a minimum of three years recent experience in applying similar coatings and shall be an "Authorized Applicator" recognized in writing by the manufacturer of the coating materials.

Prior to commencement of any work, a minimum 2 m^2 mock-up will be installed on site for each system. This will be viewed by all parties, and only when accepted will work of same system be allowed to proceed. The mock-up will serve as a benchmark for the installation of each system for the entire project.

During job mock-up and initial period of installation, manufacturer of coating system will provide a trained employee to insure proper use and installation of product. Periodic site visits will also be made during application to verify continued proper application.

Samples: Submit two samples representative of coating system applied to suitable rigid substrate.

Manufacturer's Literature: Submit two copies of manufacturer's literature, specifications and application instructions for all products provided.

Attestation: Submit a minimum of three projects of similar nature which have been installed during the last five years, including name, locations and installation date.

Applicator Certificate: Submit "Authorized Applicator" certificate issued to system applicator by coating material manufacturer.

The substrate must be clean and free from all dirt, dust, oil and other containments. Surface preparation shall be carried out as per the manufacturer’s instructions.

Surface preparation, application, finishing shall be carried out strictly in accordance to the manufacturer’s instructions and specifications.

19.9 AUXILIARY WORKS

The following works, however not limited thereto shall be deemed as auxiliary works for painting:

Measurements for execution and payment of the works including the provision of measuring instruments, gauges, labour, etc.

Provision of compete scaffolding above ground and similar temporary works required for the proper execution of the work.

Supply of all consumables.

Provision of adequate stores for all material, consumables and equipment.

Removal of all waste and empty containers, bags, debris, etc.

Decontamination of toxic and harmful residues of paint, solvents and other matters.

Provision of all thinners, solvent cleaners for tools and other equipment.

Submitting samples of paints whenever required.

Any cleaning and preparation of surfaces such as rust removal on steel by sandblasting or other adequate method as specified in the relevant Technical Specifications.

Covering and protection of the surrounding or other equipment against contamination from painting process and removal of same after completion including all cleaning works involved.

Repair and retouching once completed painting works before take over by the Employer/Engineer.

19.10 MEASUREMENT

The work shall be measured in Sq. m. of the finished area and shall be in accordance with IS: 1200-1964. The rate shall include the cost of all labour and materials involved in all the operations described above.

Measurement shall be as follows:

Description of Works	Measurement	Multiplying Coefficient
Flush door	Flat including frame	1.0 each side
Fully paneled	Flat including frame	1.5 each side
Fully glazed	Flat including frame	0.5 each side
Part panel/Part glazed	Flat including frame	1.4 each side
Railing with balusters,	Flat overall	1.0 for painting all over
Guard bars	Flat overall	1.0 for painting all over

Measurement for payments for painting works shall be made in square meter for the completed work as indicated in the Bill of Quantities. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq. m. Deductions shall be made for the opening exceeding area 1 sq.m.

19.11 RATES AND BASIS OF PAYMENT

The rate shall include the cost of materials, accessories, labour and other required accessories for all the operations described above. The unit rate shall include the followings:

a. Supplying and mixing the paint as specified.

b. Scaffolding including erection and dismantling.

c. Preparation of the surface before painting.

d. Application of paints as specified as per manufacturer's instructions.

e. Curing and protecting the painted surface.

f. All required auxiliary works as mentioned above

The painting works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

Nepal Electricity Authority

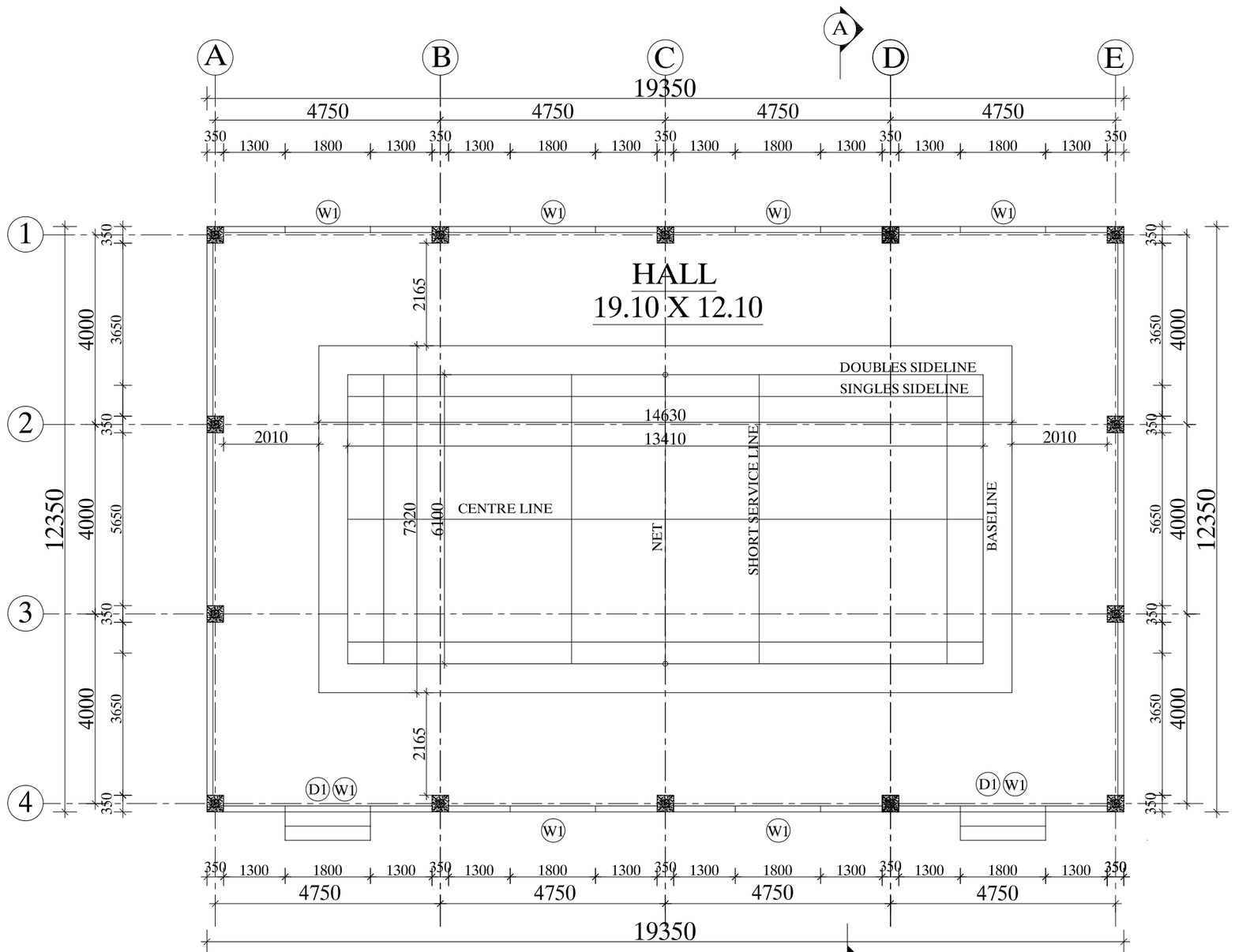
Building and Physical Infrastructure Construction Project

Bhagwanpau, Kathmandu, Nepal

Construction of Badminton Covererd Hall at Dhangadi DCS, Kailali

VOLUME-III

DRAWINGS



FLOOR PLAN

Area= 238.972 SqM

DOORS & WINDOWS SCHEDULE:

S.N.	SYMBOL	SIZES	TOTAL	REMARKS
1.	W1	1800 x 1000	14	MS Frame withTransparent Sheet Shutter
2.	D1	1800 x 2500	2	MS Frame with GI Colored Plane Sheet Shutter
TOTAL			16	

CONSULTANT :
RIBS Engineering Consult
Maharajgunj, Kathmandu, Nepal.
Tel: 977-1-4370965

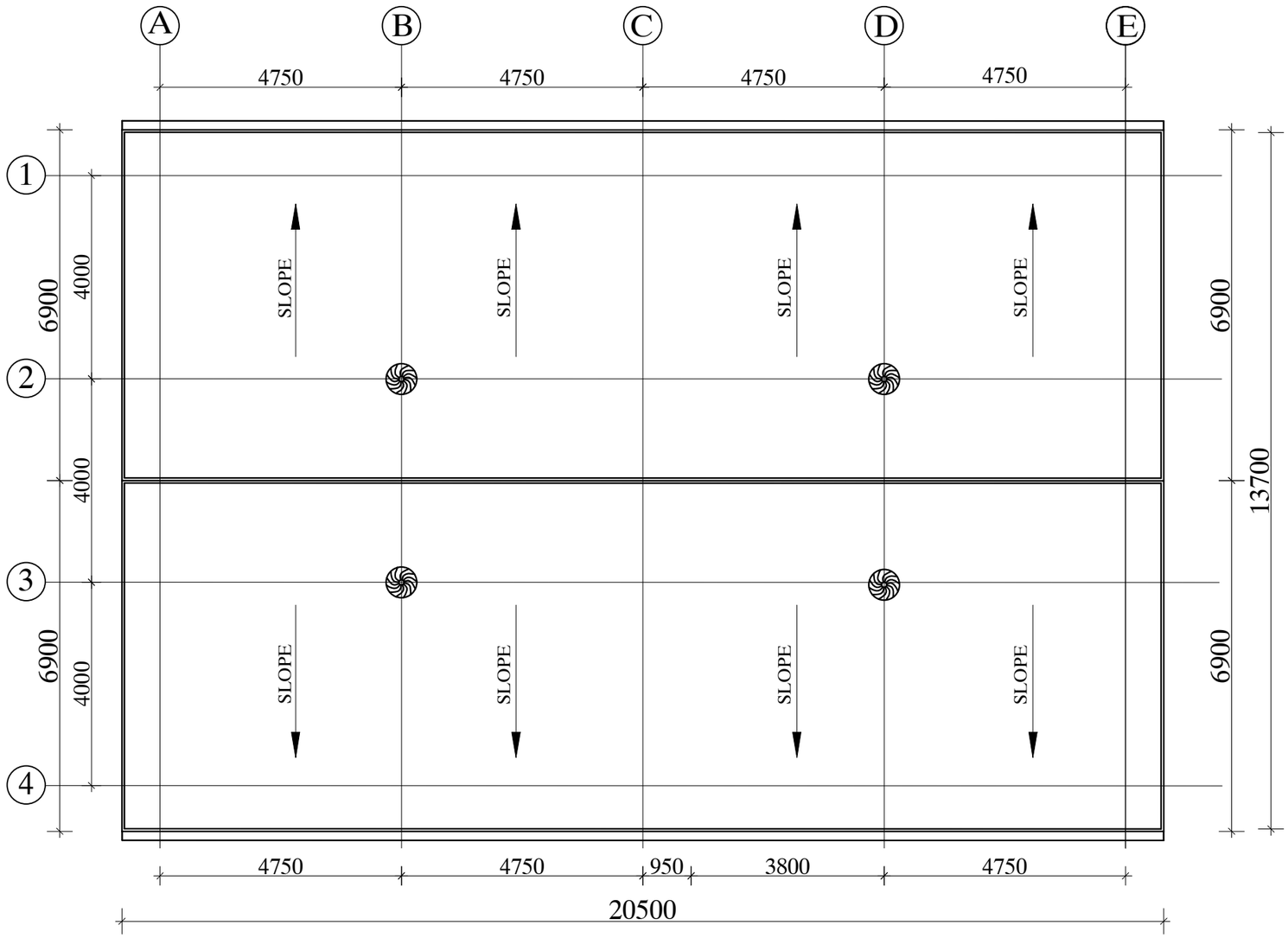
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
FLOOR PLAN

PRINT SCALE : A3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	AR-01	01	



ROOF PLAN

(Scale= 1:125)

CONSULTANT :
RIBS Engineering Consult
Maharajgunj, Kathmandu, Nepal.
Tel: 977-1-4370965

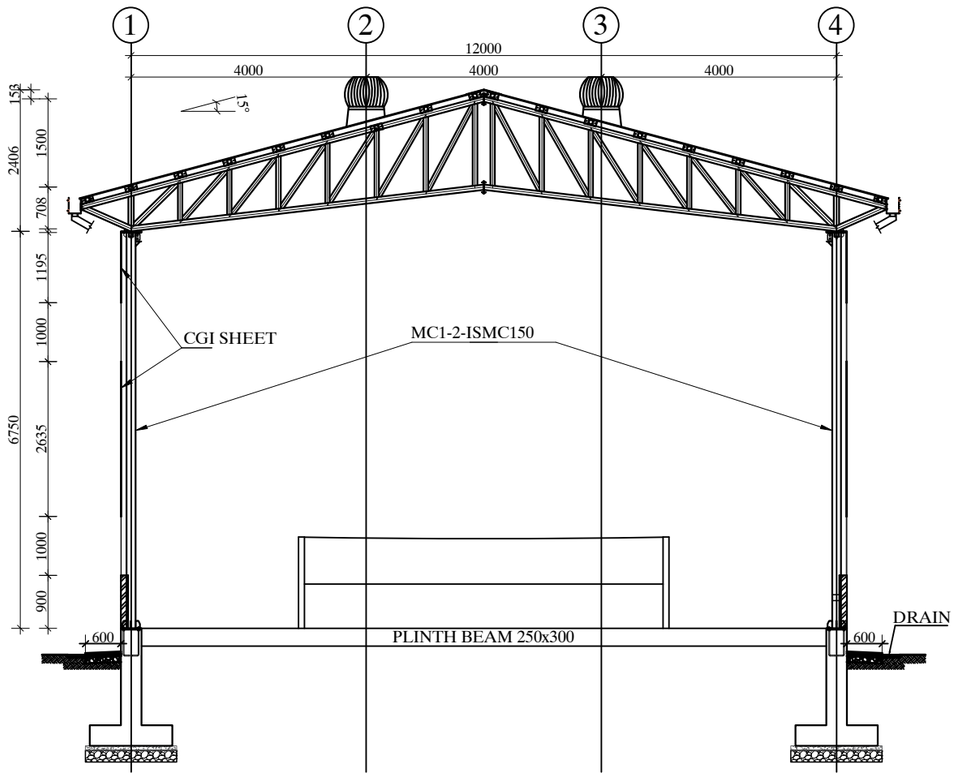
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
ROOF PLAN

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	AR-02	02	



SECTION AT A-A

Scale : 1:100

CONSULTANT :
RIBS Engineering Consult
Maharajgunj, Kathmandu, Nepal.
Tel: 977-1-4370965

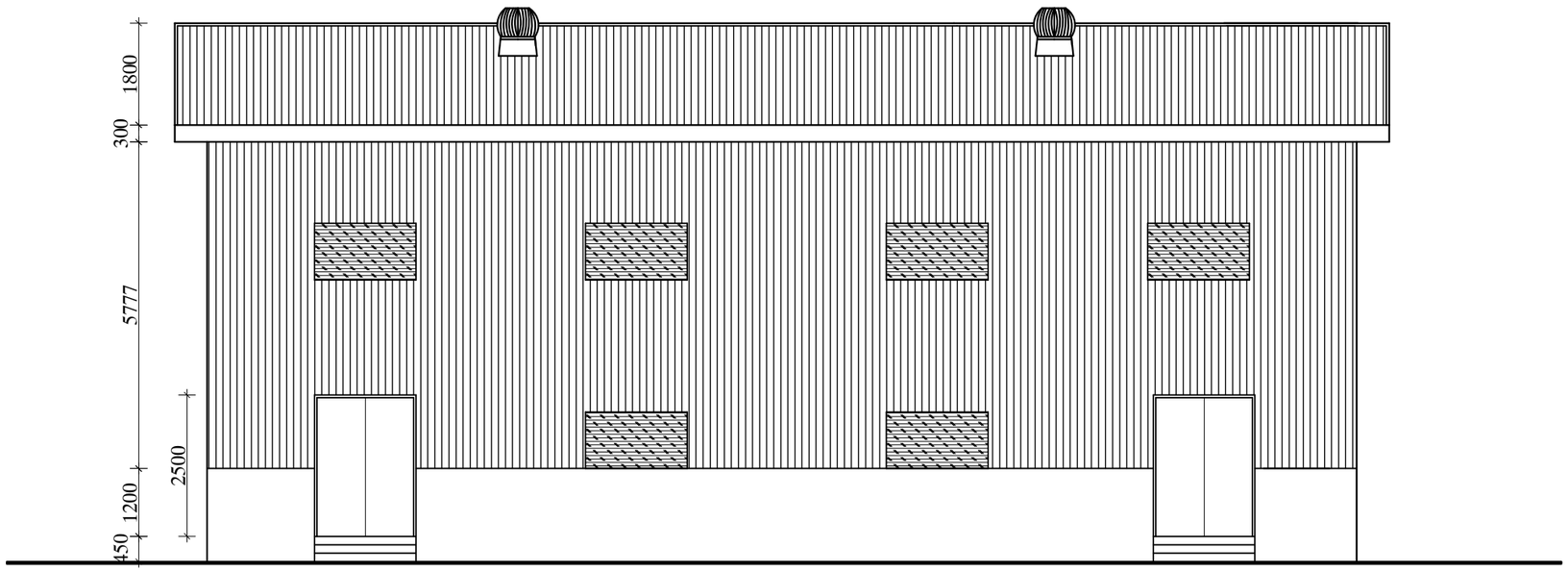
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

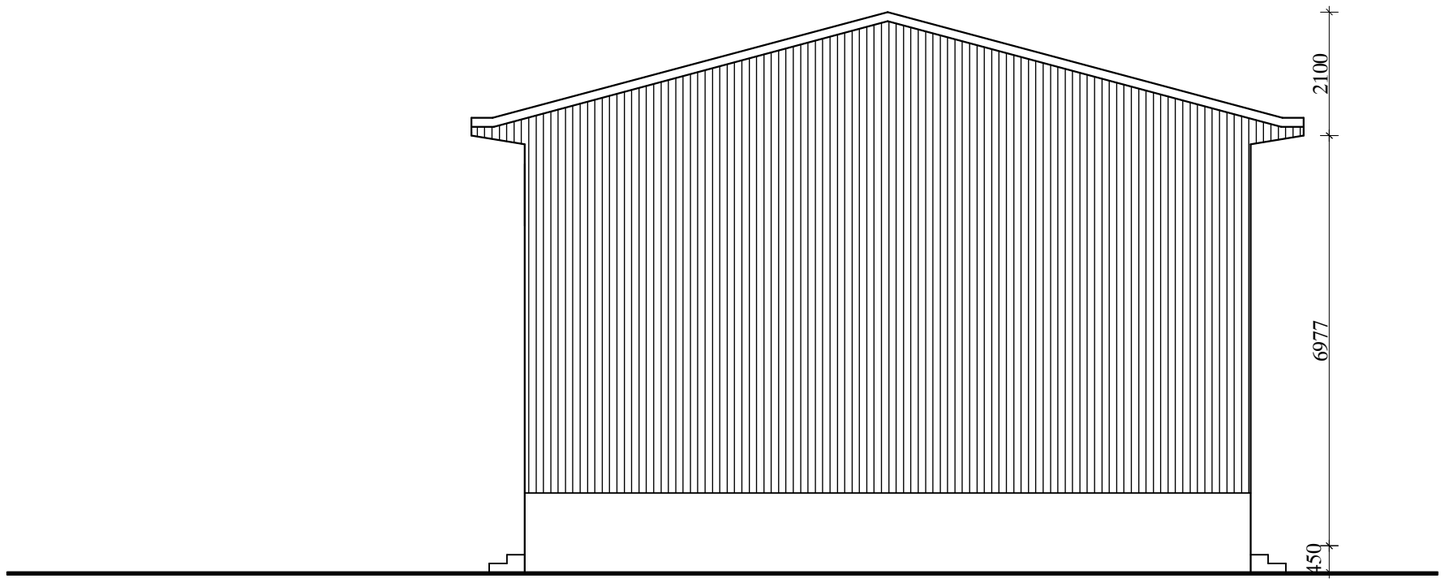
ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
SECTION

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	AR-03	03	



FRONT ELEVATION



SIDE ELEVATION

CONSULTANT :
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Tel: 977-1-4370965

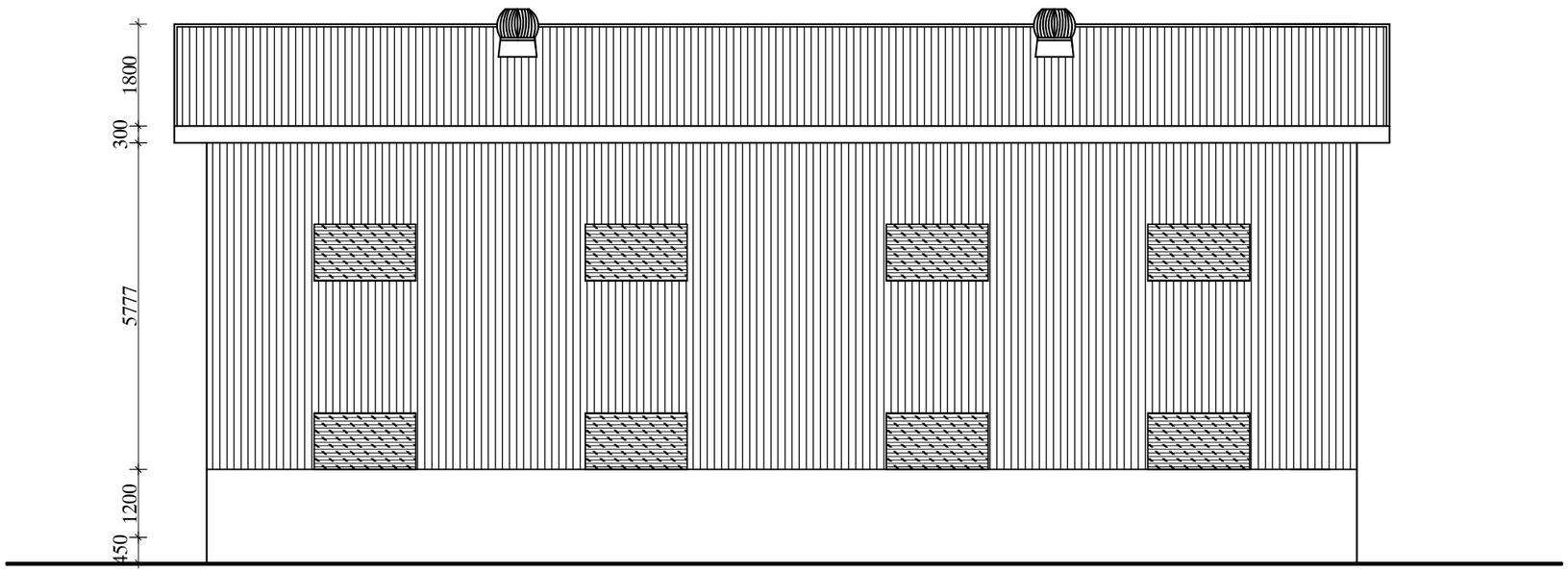
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

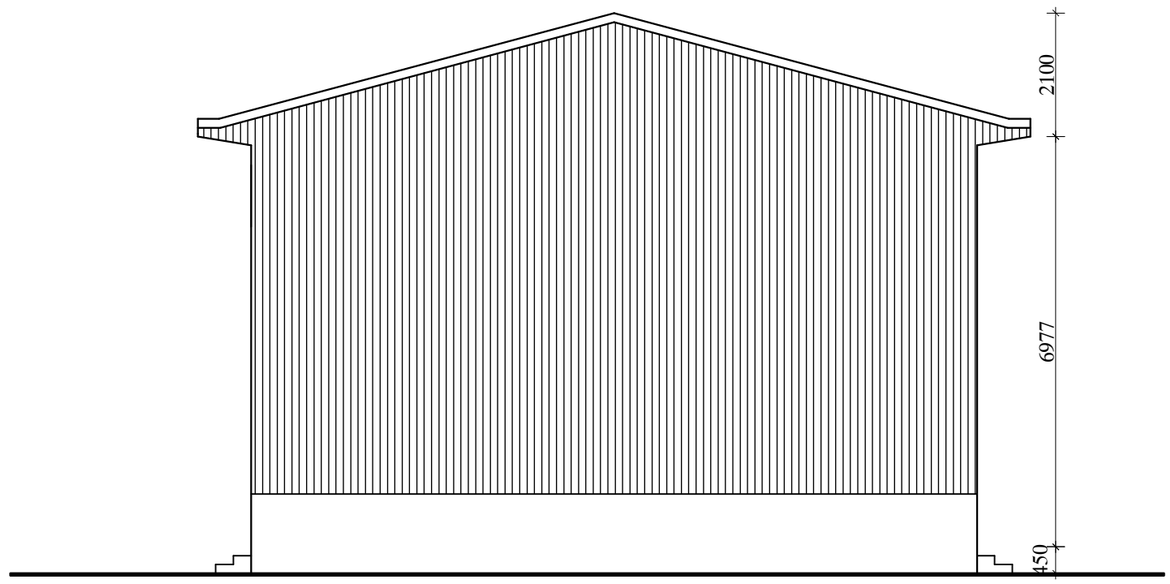
ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
ELEVATIONS

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	AR-04	04	



REAR SIDE ELEVATION



SIDE ELEVATION

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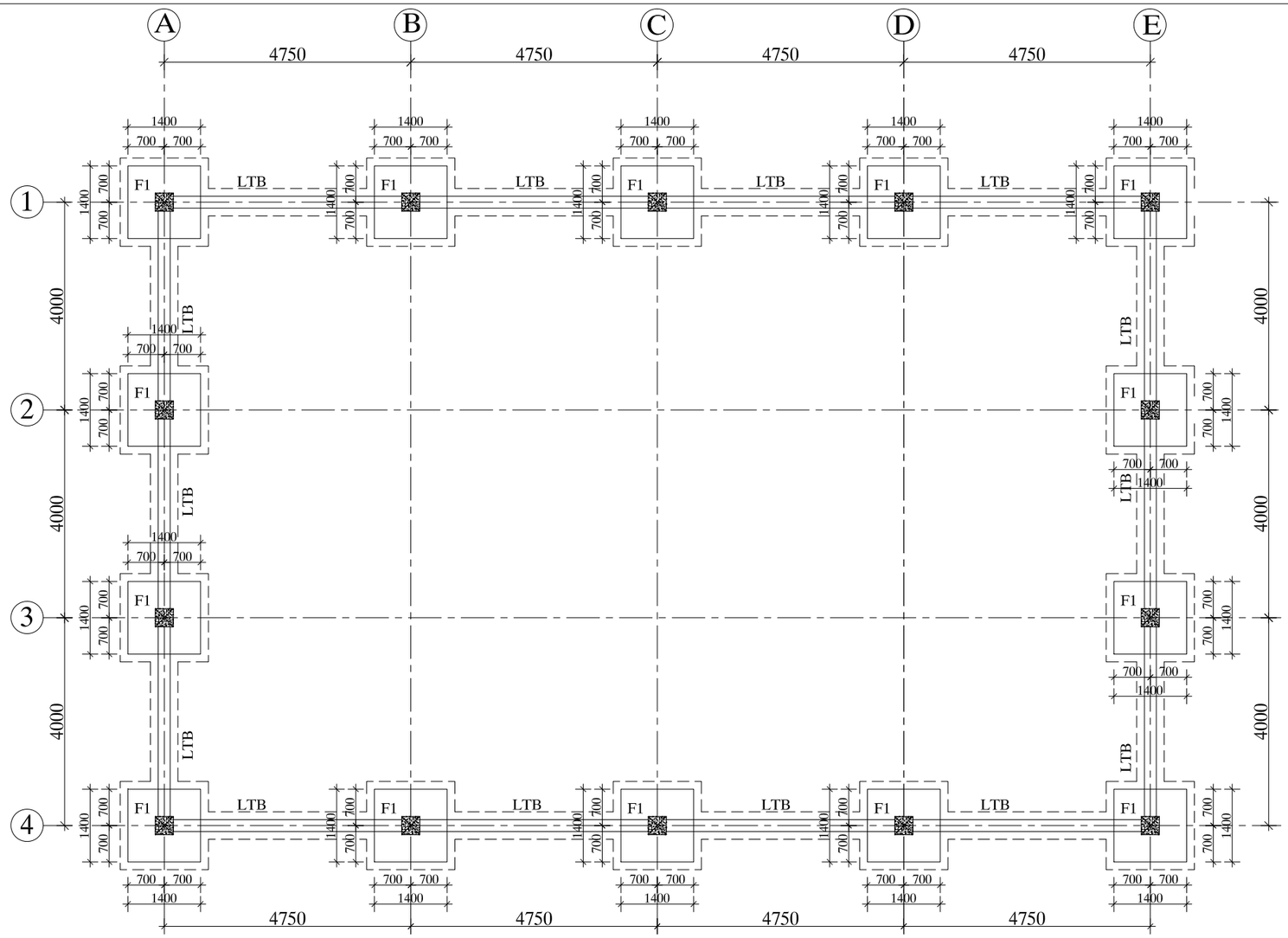
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

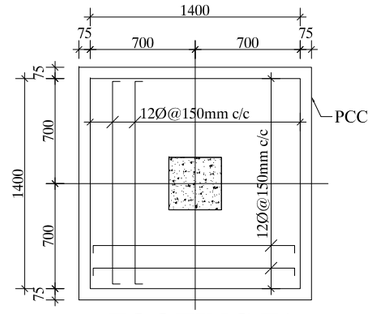
ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
ELEVATIONS

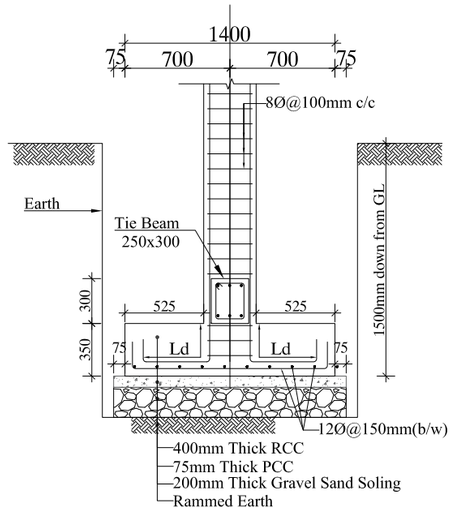
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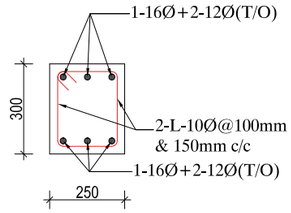
TRENCH/ FOOTING PLAN
(Scale= 1:100)



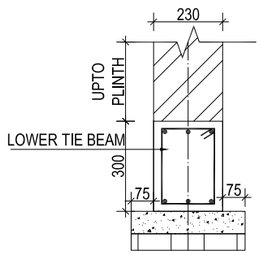
FOOTING F1
(Scale= 1:40)



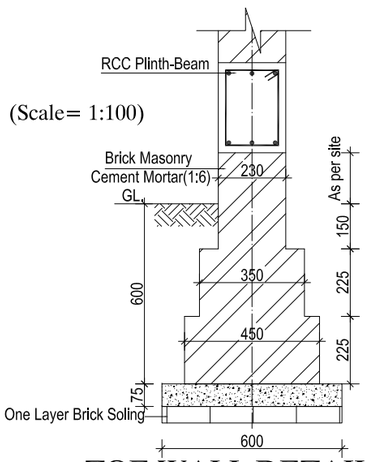
F1 SECTION
(Scale= 1:40)



Lower Tie Beam
250X300
(Scale= 1:20)

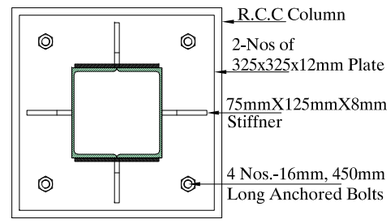


LOWER TIE BEAM
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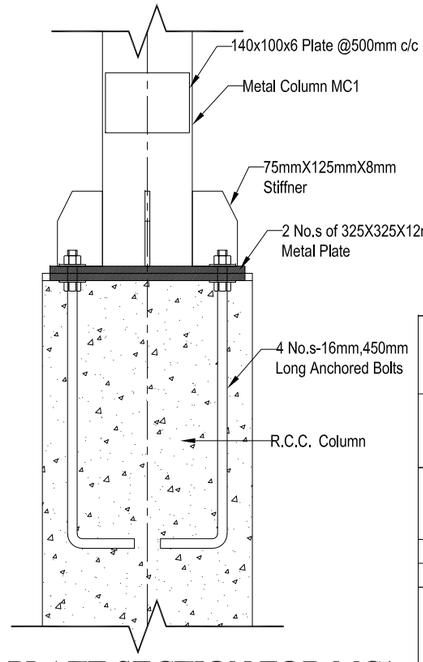


TOE WALL DETAILS
(Scale= 1:20)

(Scale= 1:100)



BASE PLATE DETAIL(BP-1)
(Scale= 1:10)



BASE PLATE SECTION FOR MC1
(Scale= 1:10)

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Tel: 977-1-4370965

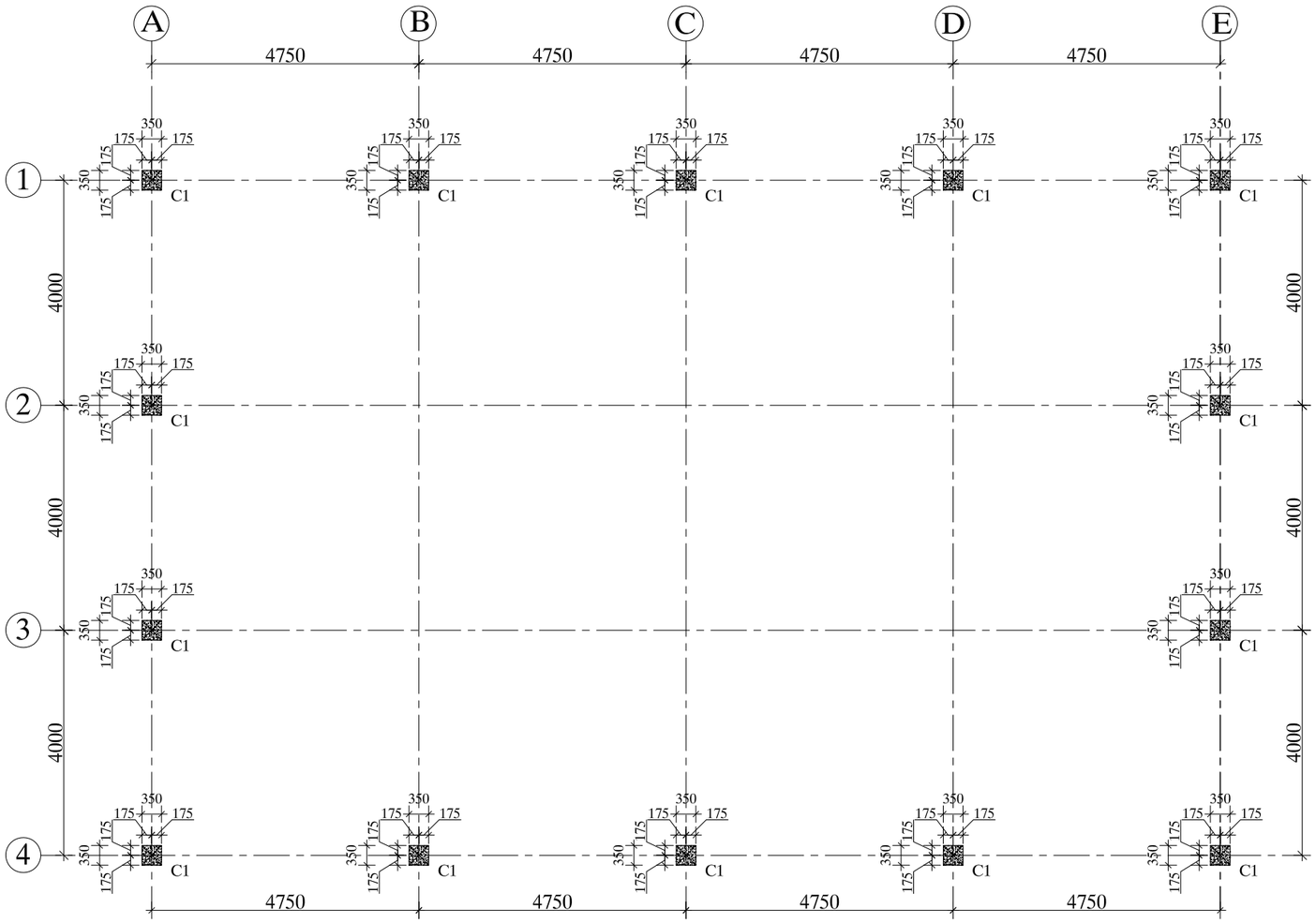
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
TRENCH/FOOTING PLAN

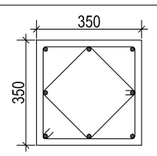
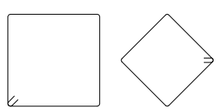
PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	ST-01	06	



RCC COLUMN PLAN

(Scale= 1:100)

COLUMN DETAILS

TYPE	GRADE	SIZE	UPTO PLINTH LEVEL	STIRRUPS
C1	M25	350X350 (25 Nos.)	 8-16mmØ	 Use 10Ø stirrups @100mm C/C

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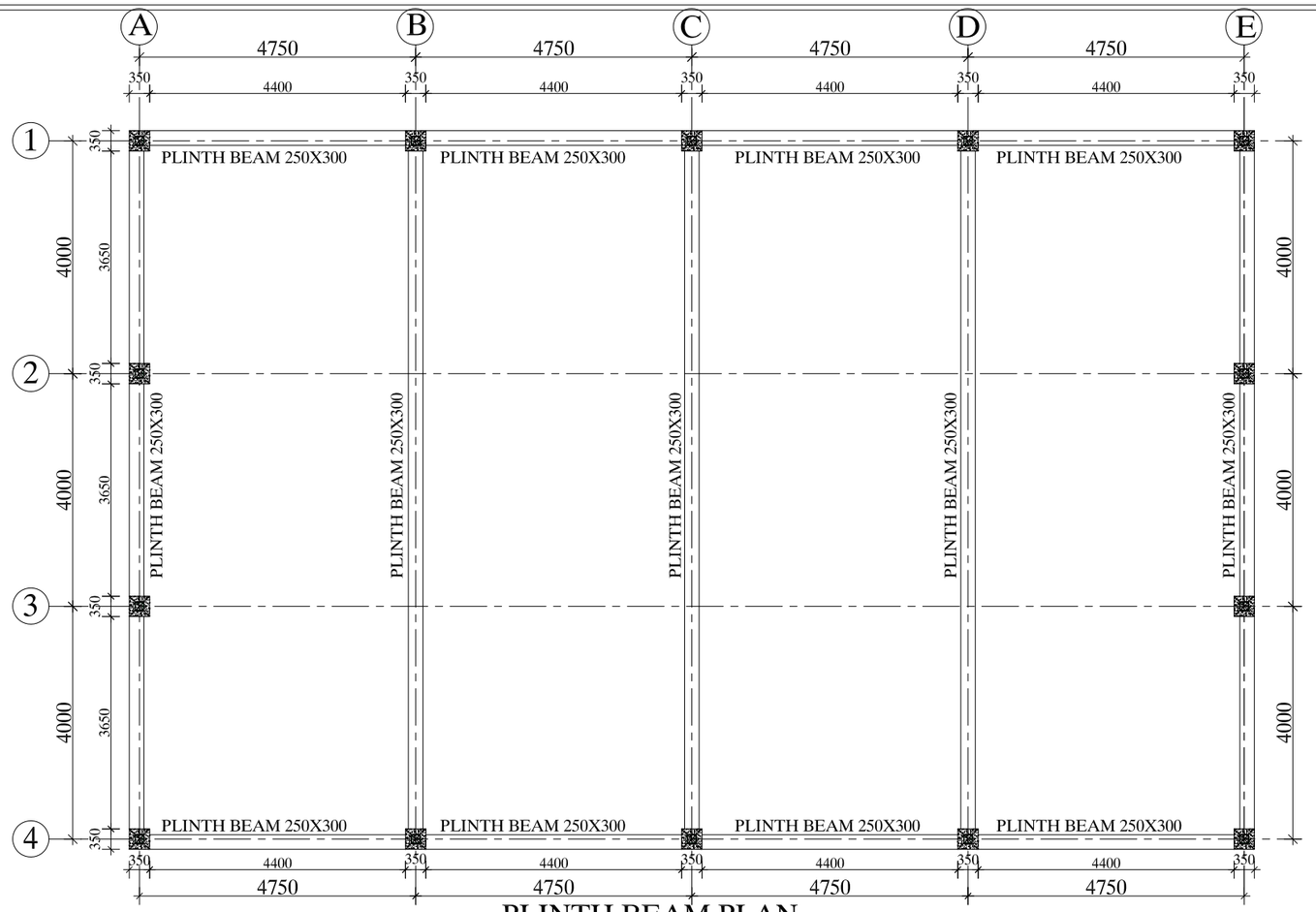
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

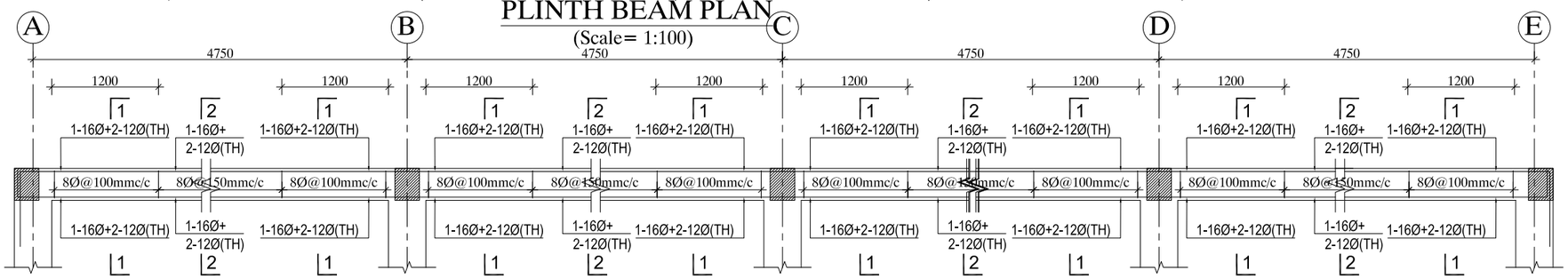
ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
RCC COLUMN PLAN

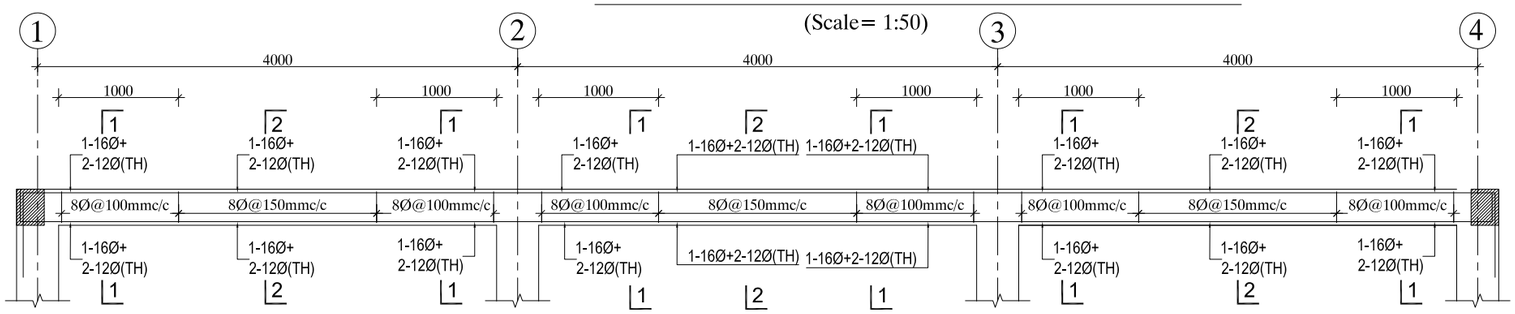
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1:100	ST-02	07	



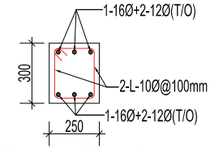
PLINTH BEAM PLAN
(Scale= 1:100)



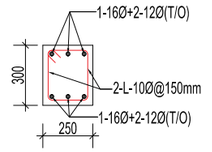
PLINTH BEAM SECTION ALONG GRID 1 & 4
(Scale= 1:50)



PLINTH BEAM SECTION ALONG GRID A & F
(Scale= 1:50)



Beam Section-1
(Scale = 1:30)



Beam Section-2
(Scale = 1:30)

CONSULTANT :
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Tel: 977-1-4370965

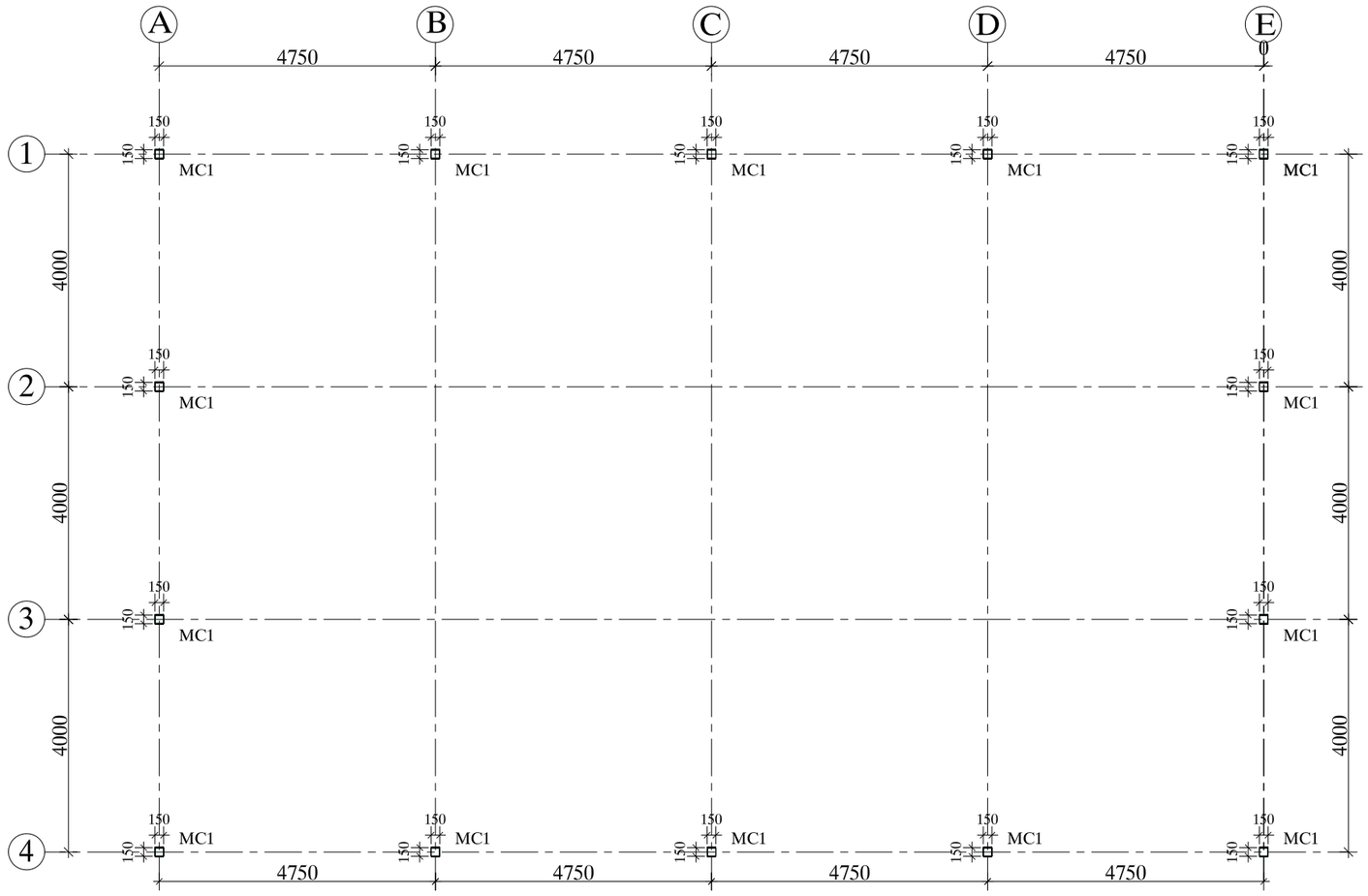
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
PLINTH BEAM PLAN

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	ST-03	08	



METAL COLUMN PLAN

(Scale= 1:100)

METAL COLUMN DETAILS

TYPE	SIZE	GROUND FLOOR
MC1	150X150 (14 Nos.)	150 / 150 ISB 150x150X6

CONSULTANT :
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Tel: 977-1-4370965

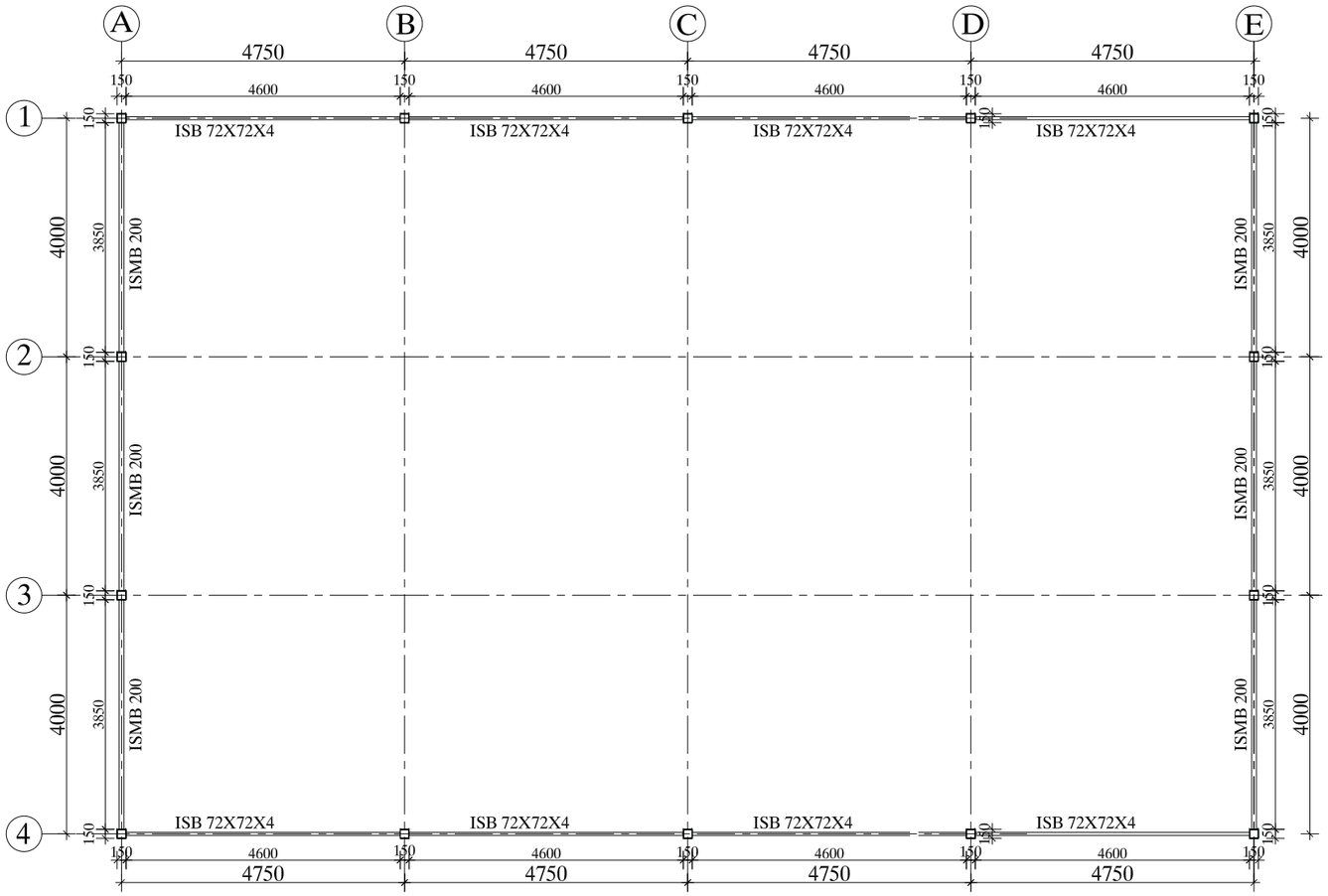
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
METAL COLUMN PLAN

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	ST-04	09	



BEAM PLAN AT LEVEL +6750mm

(Scale= 1:100)

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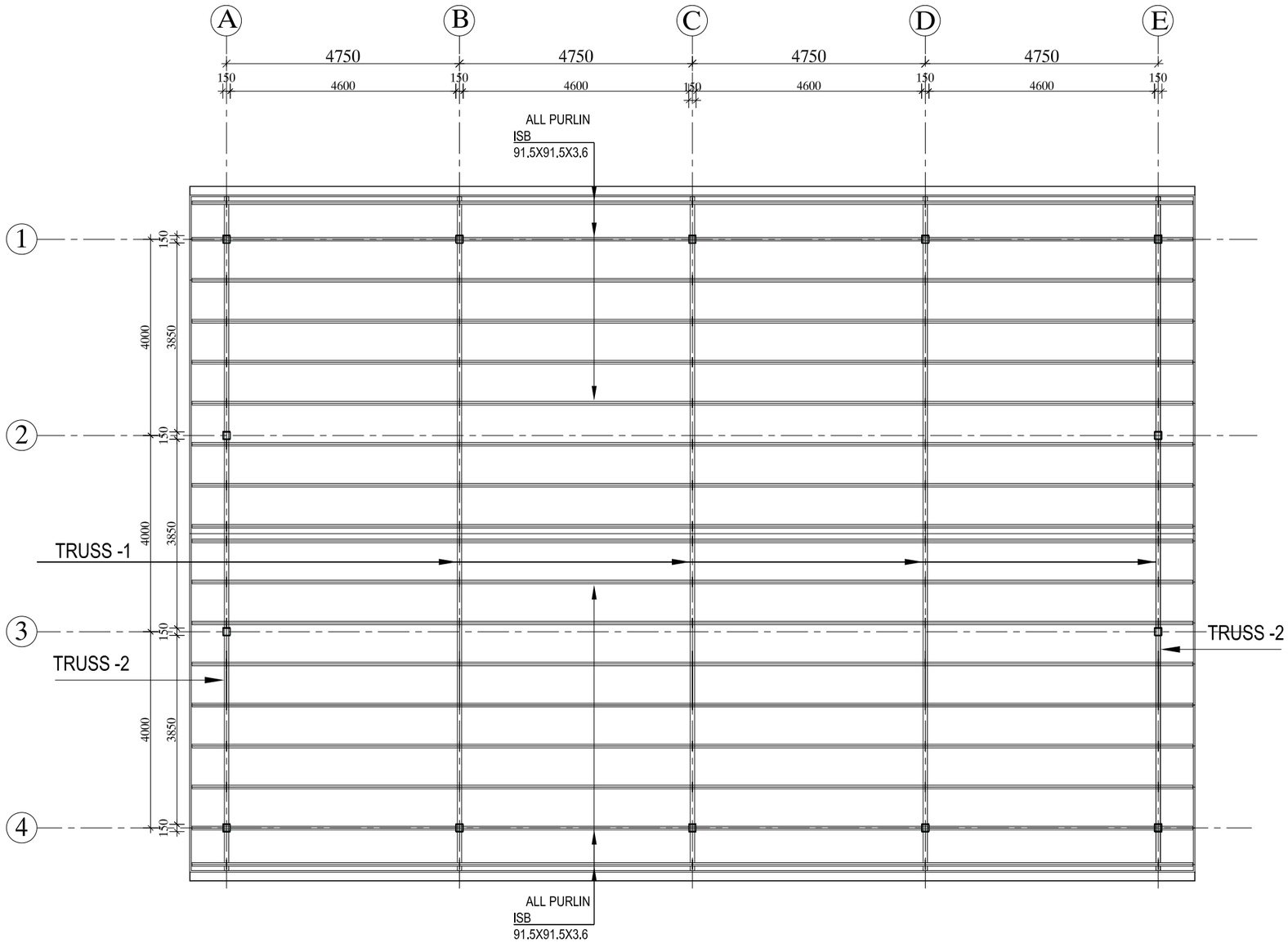
PROJECT :
BADMINTON COVERED HALL
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CLIENT :
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Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
BEAM PLAN

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	ST-05	10	



TRUSS PLAN

Scale : 1:100

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Tel: 977-1-4370965

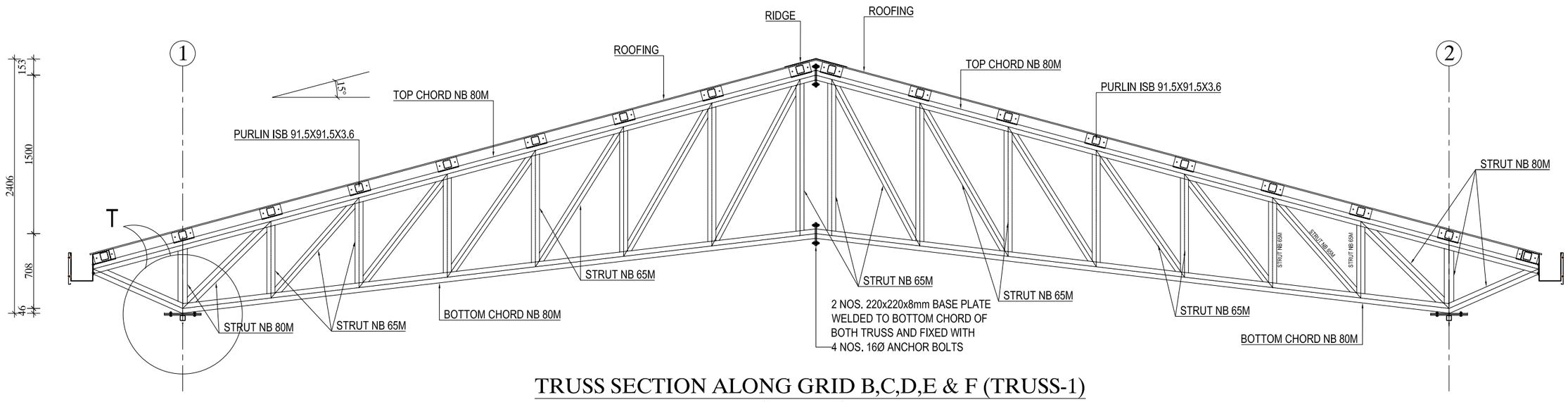
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

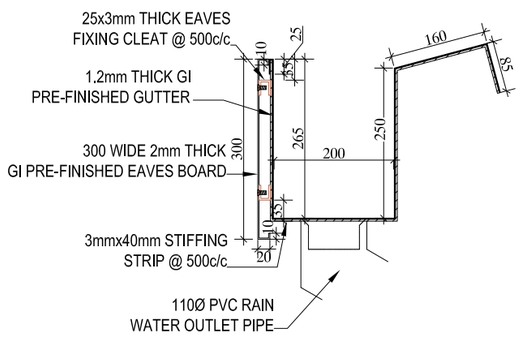
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TRUSS PLAN

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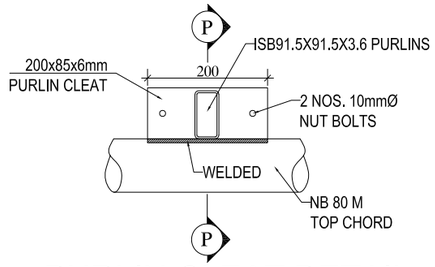
TRUSS SECTION ALONG GRID B,C,D,E & F (TRUSS-1)

(Scale= 1:40)



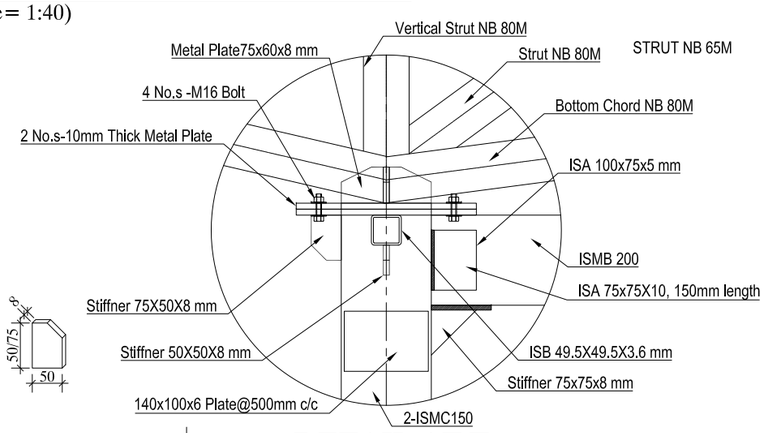
GUTTER DETAIL

(SCALE 1:10)



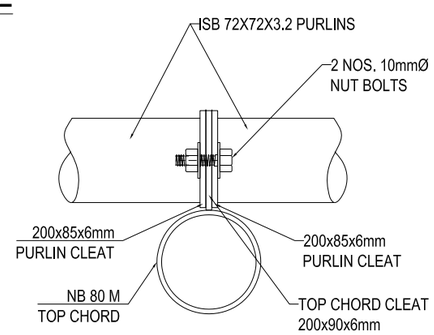
PURLIN CLEAT DETAIL

(SCALE 1:10)



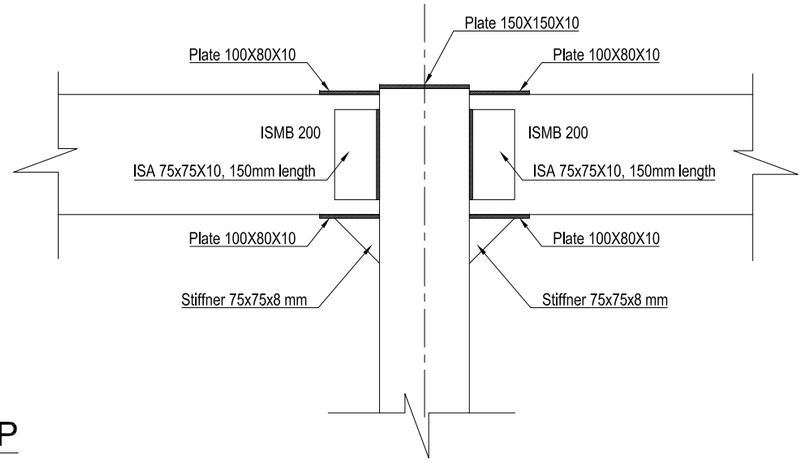
DETAIL AT T

(Scale= 1:10)



PURLIN CLEAT JOINT DETAIL AT- P-P

(SCALE 1:10)



DETAIL AT K

(Scale= 1:10)

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Tel: 977-1-4370965

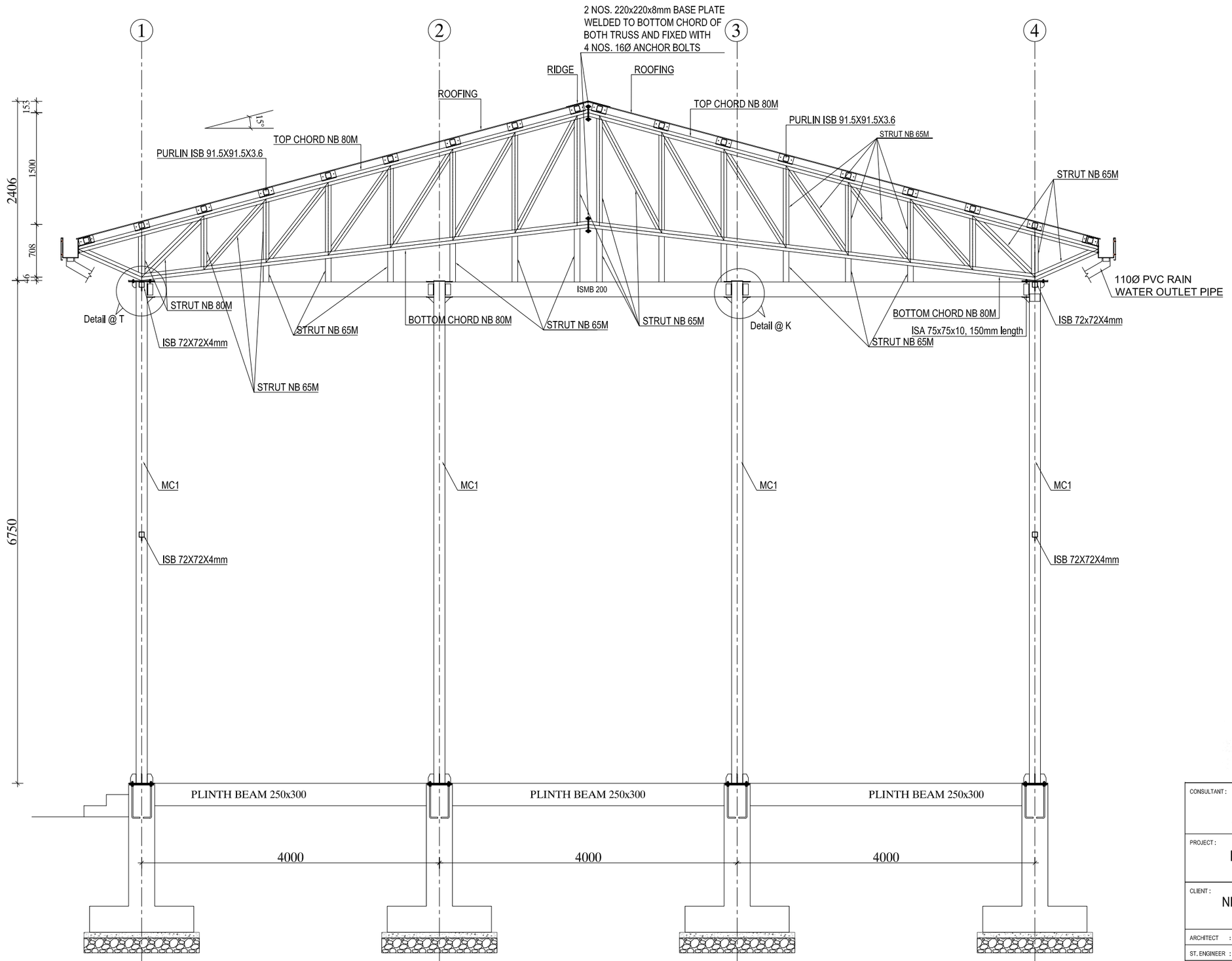
PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
TRUSS SECTION & DETAILS

PRINT SCALE : A'3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	ST-07	12	



TRUSS SECTION AT GRID A-A & E-E (TRUSS-2)

(Scale = 1:40)

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Tel: 977-1-4370965

PROJECT :
BADMINTON COVERED HALL
Dhangadi DCS, Nepal

CLIENT :
NEPAL ELECTRICITY AUTHORITY
Swayambhu, Kathmandu, Nepal.

ARCHITECT : SANGITA RAI	ACAD BY : S. RAJBHANDARI
ST. ENGINEER : S.P. GHIMIRE	DATE : APRIL 2026

DWG. TITLE :
TRUSS SECTION AT GRID A-A & E-E

PRINT SCALE : A3' SIZE	DRAWING No.	Sheet No.	REV. NO.
1:100	ST-08	13	

Nepal Electricity Authority

Building and Physical Infrastructure Construction Project

Bhagwanpau, Kathmandu, Nepal

Construction of Badminton Covererd Hall at Dhangadi DCS, Kailali

VOLUME-IV

BILL OF QUANTITIES

SECTION-IV

BILL OF QUANTITIES

Notes for Unit Rate Contracts:

Objectives

The objectives of the Bill of Quantities are

(a) to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and

(b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

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

Content

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

(a) Preamble;

(b) Work Items (grouped into parts);

(c) Day works Schedule;

d) Provisional Sums; and

(d) Summary.

Preamble

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

Work Items

The items in the Bill of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the works may be grouped as a separate section in the Bill of Quantities.

Day work Schedule

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

(a) A list of the various classes of labor, materials, and Constructional Plant for which basic day work rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a day work basis.

(b) Nominal quantities for each item of Day work, to be priced by each Bidder at Day work rates as bid. The rate to be entered by the Bidder against each basic Day work item should include the Contractor's profit, overheads, supervision, and other charges.

Provisional Sums





A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the Contract Data should state the manner in which they will be used, and under whose authority (usually the Project Manager's).

Summary

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

These Notes for Preparing Specifications are intended only as information for the Employer or the person drafting the Bidding documents. They should not be included in the final documents.

Preamble of Bill of Quantities

A. General

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Project Manager and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Project Manager may fix within the terms of the Contract.

3. For any item for which measurement is based on records made before or during construction the records shall be prepared and agreed between the Engineer and the Contractor. Should the Contractor carry out such work without the prior agreement of the Engineer, the Engineer may request the Contractor to carry out investigations to confirm the extent of the work and the quantity of work certified for payment shall be solely at the Engineer's discretion. The cost of any such investigation shall be borne by the Contractor.

4. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

5. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

6. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

7. General directions and descriptions of work and materials are not necessarily repeated nor summarized





in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities. The Specification Clause references where given in the item description of the Bills of Quantities are for the convenience of bidders and generally refer to the principal relevant- specification clause but do not necessarily represent the whole of the specification requirements for the work required within the item. The presence of a Specification clause reference shall not in any way reduce the Bidders obligation to complete work in accordance with all the requirements of the Specification.

8. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager in accordance with the Conditions of Contract.

9. The method of measurement of completed work for payment shall be in accordance with the Specifications.

10. The abbreviations and symbols used in this Bill of Quantities are:

GI- Galvanized Iron

CGI - Galvanized Corrugated Iron

B. Day work Schedule

a) **General**

1. Work shall not be executed on a day work basis except by written order of the Project Manager. Bidders shall enter basic rates for day work items in the Schedules. These rates shall apply to any quantity of day work ordered by the Project Manager. Nominal quantities have been indicated against each item of day work, and the extended total for day work shall, be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for day work shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

b) Day work Labor

1. In calculating payments due to the Contractor for the execution of day works, the hours for labor will be reckoned from the time of arrival of the labor at the job site to execute the particular item of day work to the time of departure from the job site, but excluding meal breaks and rest periods. Only the time of classes of labor directly doing work ordered by the Project Manager and are competent to perform such work will be measured. The time of gangers (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.
2. The Contractor shall be entitled to payment in respect of the total time that labor is employed on day work, calculated at the basis rates entered by it in the " SCHEDULE OF DAY WORK RATES: 1. LABOR". The rates for labor shall be deemed to cover all costs to the Contractor including (but not limited to) i) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances, ii) any sums paid to or on behalf of such labor for social benefits in accordance with Nepal law, iii) Contractor's profit, overheads, superintendence, liabilities and insurance and iv) charges incidental to the foregoing.

c) Day work Equipment

1. The Contractor shall be entitled to payments in respect of Constructional Plant already on site and employed on day work at the basis rental rates entered by him in the “SCHEDULE OF DAY WORK RATES:2 EQUIPMENT ”. The said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricant, and other consumables and

all overhead, profit and administrative costs related to the use of such equipment. The cost of drivers, operators and assistants also shall be included in the rate of the equipment and no separately payment shall be made for it.

2. In calculating the payment due to the Contractor for Constructional Plant employed on day work, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Project Manager, the travelling time from the part of the Site where the Construction Plant was located when ordered by the Project Manager to be employed on day work and the time for return journey there to shall be included for payment.

d) Day work Materials

1. The Contractor shall be entitled to payment in respect of materials used for day work (except for materials for which the cost is included in the percentage addition to labor costs as detailed heretofore), at the rates entered by him in the "SCHEDULE OF DAY WORK RATES: 3 MATERIALS" and shall be deemed to include overhead charges and profit as follows;

   (i) the rates for materials shall be calculated on the basis of the invoiced price, freight, insurance, handling expenses, damage, losses, etc. and shall provide for delivery to store for stockpiling at the Site.

   (ii) the cost of hauling materials for use on work ordered to be carried out as day work, from the store or stockpile on the Site to the place where it is to be used also shall be include in the same rate.

Provisional Sums

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Employer to select such specialized contractors. To provide an element of competition among the Bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

Bill of Quantities

S.N	Item Description	Unit	Quantity	Rate (NRs.)		Amount (NRs.)
A	**Provisional Sum**					
	Insurance, Fees for Bank Guarantee, Electrical items and other accessories	**PS**	**1.00**		**300,000.00**	**300,000.00**
B	**Civil and Architectural Works**	**Unit**	**Quantity**	**Bidder Rate (NRs.)**	**Bidder's Rate In Words**	**Total Amount (NRs.)**
1	**EARTH WORKS**					
1.1	**SITE CLEARANCE :**					
	Clearing and grubbing the site for construction by removing 150mm thick top soil including bushes, small trees, leveling of undulated ground, shorting and stacking/storing selected top soil for reuse in landscaping and other works all complete as per drawings, specifications and instructions of the Engineer.	Sq.M.	357.00			
1.2	**EARTHWORK IN EXCAVATION :**					
	Earth work in excavation for Raft/foundations, pipe/conduit trenches, wall foundation and all underground structures from ground level to bottom of footings and where required as per drawing by Manual Excavation over areas including providing required slopes including rehandling, transporting, royalties, loading at all levels, depths and height all complete as directed, all leads and lifts, incidentals, etc. complete. Excavation shall be payable only for vertical cut up to the outer edge of foundation lean concrete as indicated on drawings through out the pit depths. Cost of extra excavation required for working space, supporting side shuttering of foundations and retaining walls and that required for making slopes for stability of excavation shall be deemed to be included in the rate quoted.	Cu.M.	94.80			
1.3	**EARTH BACK FILLING BY EXCAVATED SOIL**					
	Back filling in foundation, floors and sides of foundation with approved soil obtained from the excavation at site and stacked at site in layer not exceeding 15 cm thick (compacted thickness) including transportation of soil, spreading in required line to achive 95% compactation and level, sprinkling water, ramming, compacting with mechanical rammers, testing, etc., all complete as per drawing, specification and instructions of the Engineer.	Cu.M.	126.82			
1.4	**EARTH BACK FILLING BY SOIL TAKEN FROM OUT OF SITE**					
	Soil taken from out of site for back filling stacked at site in layer not exceeding 15 cm thick (compacted thickness) including transportation of soil , spreading in required line to achieve 95% compaction and level, sprinkling water, ramming, compacting with mechanical rammers, testing, etc.., all complete as per drawing, specification and instructions of the Engineer.	Cu.M.	32.02			
1.5	**BOULDER SOLING**					

S.N	Item Description	Unit	Quantity	Rate (NRs.)		Amount (NRs.)
	Providing and laying 200mm thick uncoursed hand packed Dry Rubble Stone soling in foundation, under floor plinth, and for site development work, 100mm thick in Apron and 50mm pebbles for drain & walk way with out any special dressing of stone including filling interstices with suitable quarry waste or stone chips or quarry sand, watering, compacting using appropriate mechanical compaction means with all contractors materials, handling, placing etc. all complete as per drawings, specifications and instruction of the Engineer.	Cu.M.	6.73			
1.6	**FLAT BRICK SOLING**					
	Providing and laying flat dry brick soling under foundation beam and foundation wall including sand blinding to fill gap over the properly rammed/compacted surface , should be checked levels of varius piont before laying the brick, all complete as per instruction of the engineer & specification.	Sq.M.	256.38			
2	**CONCRETE WORKS**					
2.1	**PLAIN CEMENT CONCRETE, P.C.C (1:3:6)**					
	Providing and laying machine or hand mixed Plain Cement Concrete of nominal mix 1:3:6 (1 cement : 3 sand : 6 coarse aggregate) for leveling course in foundations and floor of building, Apron, pathway, etc in all level with stone aggregate of size not more than 25 mm of approved quality including formwork wherever necessary, dewatering, batching, mixing, transporting, placing, compacting, curing, including all lead and lift, etc. all complete as per drawings, specifications and the instructions of the Engineer.	Cu.M.	6.11			
2.2	**P.C.C. FOR R.C.C. WORKS**					
	Providing and laying in position volume batching & mixing machine vibrated mix cement concrete work of mix 1:1.5:3 (1 Cement:1.5 sand:3 aggregate) with 20 mm and down graded machine crushed stone aggregate using OPC 43 grade cement with in various locations and heights including transportation of concrete to site of placing, compaction, finished to required line and level, protection curing, and testing of work cube strength etc. all complete as per drawings, specifications and the instructions of the Engineer, but excluding the cost of centering, shuttering, and reinforcement.	Cu.M.	46.33			
2.3	**STEEL REINFORCEMENT**					

S.N	Item Description	Unit	Quantity	Rate (NRs.)		Amount (NRs.)
	Providing and fixing in position Fe 500 steel reinforcement of various diameter confirming to relevant IS code in R.C.C. works including straightening, cutting, bending, binding with 20 SWG annealed wire for tying the reinforcement bars at each junctions (binding wire shall not be measured separately) including all waste and cut pieces, provision for adequate numbers of spacers, chairs, providing and placing cement mortar (1:1) cover blocks to keep the bars in intended position at all levels all complete as per drawings, specifications and instructions of the Engineer.	M.t.	5.48			
2.4	**FORM WORKS**					
	Supplying and laying centering, shuttering of various pattern formworks with 19/12 mm thick water proof ply wood & steel adjustable props for all kinds of RCC works for foundations, columns, shear walls, beams, slab, staircase, lintel, sill, pergola, including nails, propping scaffolding, staging, supporting and bracing in proper lines and level, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including Ties, PVC Spacer, Providing openings/ cutouts/ pockets, applying deshuttering chemical, deshuttering as approved by the Engineer etc., complete at all levels as per drawing, specifications and instructions of the Engineer.					
		Sq.M.	159.85			
3	**BRICK MASONRY /AAC WORKS**					
3.1	**BRICK WORKS**					
	Providing and laying first class chimney fired half, one or more brick thick wall in cement mortar 1:6 (1 cement : 6 coarse sand) in foundation up to plinth, apron, superstructure and other specified places in all heights and level including the cost of single or multi stage scaffolding, soaking bricks, curing, raking joints, provision for recesses, openings, toothing etc., all complete as per drawing, specifications and instructions of the Engineer.	Cu.M.	25.80			
4	**DOORS AND WINDOW WORKS**					
4.1	**ALUMINIUM DOOR WITH SHUTTER**					
	Natural Anodised/ Black Anodised/White Powder Coated Profiles. 100 Series Aluminium Doors Including Door Closer, American Handle, Stopper, Aldrop, Door Lock, Rubber, Brush, Gaskets & Necessary Hardware etc (Frame - 101x45x1.5, Palla 83x44x1.2) (5mm A1, Composite/5mm Clear Glass/ 8 mm Nepal Board)	Sq.M.	9.00			
4.2	**2 PANNEL SLIDING WINDOWS**					
	Natural Anodised/ Black Anodised/White Powder Coated Profiles. 100 Series Aluminium Windows Including, Auto Lock, Roller Brush, S.S Mosquito Net, Knobs, Gasket & Necessary Hardware etc (5mm clear/colour Glass) All Complete	Sq.M.	10.80			
4.3	**FIXED WINDOW**					

S.N	Item Description	Unit	Quantity	Rate (NRs.)		Amount (NRs.)
	Natural Anodised/ Black Anodised/White Powder Coated Profiles. Frame of Size (101*45*1.2) with fixed 5mm glass and all other necessary hardware gaskets, brush and rubber	Sq.M.	14.40			
5	**CEMENT CONCRETE FLOORING**					
	Providing, laying in required line, level and pattern 38 mm thick IPS floor finish with cement concrete of mix 1:2:4 (1 cement : 2 Sand : 4 Crushed stone attregate 12mm and down grade) laid in alternate panel with finishing with neat cement paste (1:2 cement sand) for smooth surface, including mixing laying in required slope, intrigal finishing using appropriate power trowelling equipment, etc. all complete as per drawing, specification and instructions of the Engineer.	Sq.M.	250.01			
6	**PLASTERING/ WALL FINISHING WORKS**					
	Providing and applying at all levels and shape 12.5 mm thick cement plaster in building inside in specified cement mortar in 1:6 (1 cement : 6 coarse sand) under coat in all surface at all height including mixing mortar, laying in perfect line, level and plumb and finishing in regular and even surface including all necessary single or multi-stage scaffolding, providing and fixing 200 mm wide 24 gauge GI Chicken wire mesh at junction of R.C.C. and masonry, providing and fixing G.I. corner beads (in all edges of plaster, free standing (isolated) columns, column projection), making grooves and recesses, throating, dusting, dripping, wetting, curing, protection, etc., all complete as per drawing , specification and instruction of the Engineer. [Rate shall also include for providing drips band, moulds, groove, chicken wire mesh at junction of RCC and masonry, etc., to complete the works at any heights].	Sq.M.	231.21			
7	**PAINTING WORKS**					
7.1	**DISTEMPER PAINT**					
	Providing and applying washable distemper paint over a coat of primer of approved manufacturer as per manufacturer's specifications to the surface of wall, ceiling, beams columns, canopies, staircase, lobbies etc., all complete as per drawings, specifications and instruction. The rates shall include for surface preparation, scaffolding etc., all complete as per the manufacturer's recommendations and as approved by the Engineer. Contractors need to submit all the names of equivalent vendor's list if it is other than the name mentioned above in their Bid submission.	Sq.M.	231.21			
8.0	**METAL WORKS FOR TRUSS**					

S.N	Item Description	Unit	Quantity	Rate (NRs.)		Amount (NRs.)
	Providing and fixing two Channel section column post fixed with batten plates and connected to gusset plate @ bottom providing appropiriate anchorage rod to the concrete with nut bolt, truss made from required ISNB sections having top and bottom chords connected by required inclined and vertical struts members positioned on constructed metal column post with the support of designed base plates & stiffners and should be properly welded. Purlin member of required ISB size should be connected by nut and bolt with the help of clit on the truss and plates on the purlin end. all truss should be tied up along the perimeter by using desigend beam member etc., made with required grade mild steel tubes and mild steel sections of required sizes, including hoisting, fixing in position with MS bed plates, shoe angles, anchor bolts etc., and concrete grouting, concreting nut bolts, fabrication, fixing and treated with two coats of anticorrosive paints all complete as per drawings, specifications and instructions of the Engineer. Rate shall include preparing shop drawings, obtaining Engineer's or Client's approval, supplying, fabricating, delivering at site, hoisting and fixing in position, temporary staging, preparation of surface, applying Zinc chromate/Phosphate primer of one coat before and one coat after erection including two coats of synthetic enamel paint of approved make and color etc. Also, all complete as per drawing, specification and instruction of the Engineer.	K.g.	14,041.71			
9	**CGI SHEET ROOFING**					
	Supplying and laying 0.5 mm thick colour pre-coated CGI sheet roofing, bottom flushing fitted to main structural member with self tapping and self drilling/self-tapping screws of appropriate length with washer with 150mm wide end lap and one corrugation minimum for side lap complete with all materials and labour.	Sq.m.	395.16			
10	**GI COLOUR PLANE SHEET CLADING**					
	Providing and fixing 24 Gauge GI colour PLANE sheet cladding under metal frame with self taping & self drilling screw all complete as per drawings, specifications and instructions of the Engineer. 200mm laping is required to end lap . Rate shall include temporary staging all complete as per drawing, specification and instruction of the Engineer.	Sq.M.	426.00			
11	Supply and installation of 24 inches diameter roof turbine ventilator fixed at the top of roof all complete.	No.	4.00			
Total of Civil and Architectural Works						
VAT						
Total Amount with VAT						
Total Amount with VAT and PS						