CONTRACT AGREEMENT DOCUMENT

**For**

# THE PROCUREMENT OF

## RENOVATION WORKS AT SOS CHILDREN’S VILLAGE GANDAKI, RAMBAZAR-15

#### **Abbreviations**

BD Bidding Document

BDF Bidding Forms

BDS Bid Data Sheet

BOQ Bill of Quantities

MPH…………………………………… Multi-Purpose Hall

COF Contract Forms

EMPLOYER SOS Children’s Village, Nepal

ELI Eligibility

EEC Evaluation and Eligibility Criteria

GCC General Conditions of Contract

GoN1 Government of Nepal

ICC International Chamber of Commerce

IFB Invitation for Bids

ITB Instructions to Bidders

JV Joint Venture

NCB National Competitive Bidding

PAN Permanent Account Number

PPA Public Procurement Act

PPMO Public Procurement Monitoring Office

PPR Public Procurement Regulations

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



**SOS Children’s Villages, Nepal**

**National Office**

**Sanothimi, Bhaktapur**

**Province 3, Nepal**

**A. INVITATION FOR BID**

**Date of publication: 09/24/2024 (2081/06/08 B.S)**

**SOS Children’s Villages, Nepal, National Office invites Bid from Eligible bidder’s for following works under National competitive bidding (NCB) Single Stage Single Envelope System Bidding Procedure. Bidders may obtain further information from the SOS Children’s Villages Nepal’s web Portal** [www.sosnepal.org.np](https://www.sosnepal.org.np/)

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| **S. N** | **Contract ID.** | **Description of Works** | **Est. Amount (Without Vat)** | **Bid Security Amount (NPR.)** | **Cost of Bidding Documents (NPR.)** | **Bidding Procedu re** | **Last Date of Bid Submission** | **Last Date Of Bid Opening** |
| **1** | **SOS CV NEPAL/RENOVATION WORKS-CIVIL/SOS CV GANDAKI/2024** | **Renovation works to be carried on at SOS Children’s Village Gandaki, Rambazar-15.** | **-** | **150,000.00** | **-** | **Single Stage Single-Envelope Bidding Procedure** | **10/25/2024 (2081/06/29 B.S) till 10:00** | **10/25/2024 (2081/06/29 B.S) at 11:00** |

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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.

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| 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 Contracts of the National Competitive  Bidding (NCB) are provided **in the BDS.** |
| * 1. Throughout this Bidding Document:      1. the term “in writing” means communicated in written form and delivered against receipt;      2. except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and      3. “day” means calendar day. |
| **2. Source of Funds** | SOS Children’s Village, Nepal. |
| **3. Fraud and Corruption** | 3.1 Procuring Entities as well as bidders, suppliers and contractors and their sub- contractors, shall adhere to the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this;   1. the Employer (SOS Children’s Village, Nepal) adopts, for the purposes of this provision, the terms as defined below:    1. “corrupt practice” means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;    2. “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;    3. “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;    4. “collusive practice” means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party. |

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|  | * 1. “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/EMPLOYER’s contractual rights of audit or access to information; and   2. “integrity violation” is any act which violates Anti Corruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of GoN/EMPLOYER sanctions, retaliation against whistleblowers or witnesses, and other violations of Anti Corruption Policy, including failure to adhere to the highest ethical standard.  1. 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; 2. the Employer will cancel the portion of the financing allocated to a contract if it determines at any time that representative(s) of the Employer or of a beneficiary of the Employer is engaged in corrupt, fraudulent, collusive, or coercive practices or other integrity violations during the procurement or the execution of that contract. 3. the Employer will impose remedial actions on a firm or an individual, at any time, in accordance with the Employer's Anti Corruption 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 Employer-financed, -administered, or -supported activities or to benefit from an Employer-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   1. the Contractor shall permit the Employer 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 Employer, if so required by the Employer. |

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|  | * 1. 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 :      1. give or propose improper inducement directly or indirectly,      2. distortion or misrepresentation of facts,      3. engaging in corrupt or fraudulent practice or involving in such act,      4. interference in participation of other competing bidders,      5. 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,      6. 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,      7. 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. |
| * 1. Employer 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:      1. if convicted by a court of law in a criminal offence which disqualifies the Bidder from participating in the contract,      2. if it is established that the contract agreement signed by the Bidder was based on false or misrepresentation of Bidder’s qualification information,      3. 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, an Employer-financed contract.      4. if the successful bidder fails to sign the contract.      5. if the bidder fails to inform about the saturation of maximum number of contracts as per ITB 4.9. |

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|  | * 1. A bidder declared blacklisted and ineligible by the GoN, Public Procurement Monitoring Office (PPMO) and/or the Employer, shall be ineligible to bid for a contract during the period of time determined by the GoN, PPMO and/or the Employer. |
| * 1. 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 (GCC 28.3 and 72.3(j). |
| **4. Eligible Bidders** | * 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:      1. 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      2. 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. |
| * 1. 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:      1. they have controlling partners in common; or      2. they receive or have received any direct or indirect subsidy from any of them; or      3. they have the same legal representative for purposes of this bid; or      4. 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 |

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|  | 1. 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 2. 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 3. 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. 4. 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/Employer 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 Employer-financed, -administered, or -supported project while under temporary suspension or debarment by Employer pursuant to the Employer's Anti-Corruption Policy (see ITB 3), whether such debarment was directly imposed by the Employer. 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. |
| * 1. Firms shall be excluded in any of the cases, if      1. 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.      2. as a matter of law or official regulation, Nepal prohibits commercial relations with that country, provided that the Employer is satisfied that such exclusion does not preclude effective competition for the supply of goods or related services required;      3. a firm has been determined to be ineligible by the Employer in relation to their guidelines or appropriate provisions on preventing and combating fraud and corruption in projects financed by them. |

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|  | * 1. Maximum number of running contracts that a Bidder, and all parties constituting the Bidder can have shall be as specified in BDS. The bidders shall be considered ineligible if number of running contracts exceeds the number as specified.   2. For the purpose of ITB 4.8 above, the bidder shall declare that the bidder, and all parties constituting the Bidder have not running contracts more than the number 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 as specified saturates due to issuance of letters of acceptance by a particular public entity, the bidder shall inform in written 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 ITB 4.2 above 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 Document** | 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 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) |

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|  | 6.2 The Invitation for Bids 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, 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 |

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|  | 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 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** | * 1. The Bid shall comprise the following:      1. Letter of Bid;      2. Completed Bill of Quantities (BoQ), in accordance with ITB 12 and ITB 13, or as stipulated **in the BDS**;      3. Bid Security, in accordance with ITB 16;      4. Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 17.2;      5. Documentary evidence of establishing the Bidder’s eligibility;      6. 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 |

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|  | 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; and  (h) any other required documents, which is not against the provision of  Procurement Act/Regulation/Directives and Standard Bidding Document issued by PPMO as specified 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 or the Bid Price in the Bill of Quantities shall 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. |
| 13.7 All 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 |

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|  | 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** after the bid submission deadline date prescribed by the Employer. 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. A bid valid for a shorter period shall be rejected by the Employer as non-responsive. |
| 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.** |
| * 1. The bid security shall be, at the Bidder’s option, in any of the following forms:      1. an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law or;      2. 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. |
| 16.3 Any bid not accompanied by an enforceable and substantially compliant bid security shall be rejected by the Employer as non-responsive. 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 bid security of unsuccessful Bidders shall be returned within three days,  once the successful bidder has furnished the required performance security and signed the Contract Agreement pursuant to ITB 34.1 and 35.1. |

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|  | 16.5 The bid security shall be forfeited if:   1. a Bidder requests for withdrawal or modification of its bid, except as provided in ITB 15.2:    1. 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. 2. a Bidder changes the prices or substance of the bid while providing information pursuant to clause ITB 24.1; 3. a Bidder involves in fraud and corruption pursuant to clause 3.1; 4. the successful Bidder fails to:    1. furnish a performance security in accordance with ITB 34.1;    2. sign the Contract in accordance with ITB 35.1    3. accept the correction of arithmetical errors pursuant to clause 28.1; |
| 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. |
| 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 mail/by hand/by courier. Procedures for submission, sealing and marking are as follows:   * 1. Bidders shall enclose the original and each copy of the Bid. These |

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|  | envelopes containing the original and the copies shall then be enclosed in one single envelope.   1. 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.   1. 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. |
| **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**. |
| 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** | * 1. A Bidder may withdraw, or modify its bid after it has been submitted. Procedures for withdrawal or modification of submitted bids are as follows:      + 1. 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 hours prior to the deadline prescribed for submission of bids, in accordance with ITB 19. |

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|  | 21.2. Bids requested to be withdrawn in accordance with ITB 21.1 shall not be  Opened, and returned unopened to the Bidders. |
| * 1. 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.   2. 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:   1. 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. |
| 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. |
| 22.3 Unreadable and or partially submitted bid files shall be considered incomplete. |
| 22.4 Envelopes marked “WITHDRAWAL” shall be opened first and read out and the envelope with the corresponding bid shall not be opened, but returned |

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|  | 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. |

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|  | 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 may be rejected. |
| **25. Deviations, Reservations, and Omissions** | 25.1 During the evaluation of bids, the following definitions apply:   1. “Deviation” is a departure from the requirements specified in the Bidding Document; 2. “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and 3. “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 ITB11. |
| * 1. 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,      1. if accepted, would:         1. affect in any substantial way the scope, quality, or performance of the Works specified in the Contract;   or   * + - 1. limit in any substantial way, inconsistent with the Bidding Document, the Employer’s rights or the Bidder’s obligations under the proposed Contract; or     1. 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. |
| 26.5 In case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution/company or any partner of JV, such Natural Person or Board of Director of the firm/institution/company or any partner of JV, such bidder’s bid shall be excluded from the 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. |

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|  | 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 non-material non-conformities in the bid related to documentation requirements. Requesting information or documentation on such non-conformities 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 non-material non-conformities 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:   1. 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; 2. 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 3. 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. 4. 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 the Bidder that submitted the lowest evaluated bid does not accept the  correction of 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. |
| * 1. To evaluate a bid, the Employer shall consider the following:      1. the bid price, excluding Value Added Tax , Provisional Sums, and the |

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|  | provision, if any, for contingencies 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;   1. adjustment for correction of arithmetic errors in accordance with ITB 28.1; 2. adjustment due to discounts offered in accordance with ITB 13.4; 3. adjustment for non-conformities in accordance with ITB 27.3; 4. application of all the evaluation factors indicated in Section III (Evaluation and Eligibility Criteria); |
| 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 an Unit Rate Contract, which results in the lowest Evaluated Bid Price is seriously unbalanced or front loaded **or extremely low** in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analysis, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder as **mentioned in BDS** to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract or may consider the bid as non-responsive. |
| * 1. In Case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such bidder’s bid shall be excluded from the evaluation, if public entity receives instruction from Government of Nepal. |
| **30. Comparison of Bids** | 30.1 The Employer shall compare all substantially responsive bids in accordance with ITB 29.2 to determine the lowest evaluated bid. |
| **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. |

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| F. Award of Contract | |
| **32. Award Criteria** | 32.1 The Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated bid 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/ Notifi cation 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 lowest evaluated Bidder 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 lowest evaluated Bidder 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** | * 1. Within Fifteen (15) days of the receipt of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security as under mentioned from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law 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.      1. If bid price of the bidder selected for acceptance is up to 15 (fifteen) percent below the approved cost estimate, the performance security amount shall be 5 (five) percent of the bid price.      2. For the bid price of the bidder selected for acceptance is more than 15 (fifteen)   percent below of the cost estimate, the performance security amount shall be determined as follows: |

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|  | Performance Security Amount =[(0.85 x Cost Estimate – Bid Price) x 0.5] + 5% of Bid Price.  The Bid Price and Cost Estimate shall be exclusive of Value Added Tax. |
|  | 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 lowest evaluated Bidder 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 **location office (where the construction site is located)**. The Employer may make arrangements to post the notice into its website, 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. |
| * 1. 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:      1. 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.

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| **A. General** | |
| **ITB 1.1** | The number of the Invitation for Bids is : **SOS CV NEPAL/RENOVATION WORKS-CIVIL/SOS CV GANDAKI/2024** |
| **ITB 1.1** | The Employer is: **SOS CHILDREN’S VILLAGE NEPAL** |
| **ITB 1.1** | The number and identification of lots (contracts) comprising this bidding process is:  **SOS CV NEPAL/RENOVATION WORKS-CIVIL/SOS CV GANDAKI/2024** |
| **ITB 1.1** | The name of the Project is: **RENOVATION WORKS AT SOS CHILDREN’S VILLAGE GANDAKI** |
| **ITB 4.1 (a)** | Maximum number of partner in a joint venture shall be : **3 (three)** |
| **ITB 4.2** | Eligible countries: **Nepal** |
| **B. Bidding Document** | |
| **ITB 7.1** | For clarification purposes only, the Employer’s address is:  Attention: **Bharat B. Rupakheti**  Address: **SOS CHILDREN’S VILLAGES NEPAL,**  **SANOTHIMI, BHAKTAPUR, NEPAL**  Telephone: : **01-6630091, 9841699870**  Facsimile number:  Electronic mail address: [bharat.rupakheti@sosnepal.org.np](mailto:bharat.rupakheti@sosnepal.org.np)  Website: [www.sosnepal.org.np](https://www.sosnepal.org.np/) |
| **ITB 7.4** | A Pre-Bid meeting **shall not** beheld.  A site visit **shall not** beorganized 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. |

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| **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: **Work Schedule.** |
| **ITB 14.6** | 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 with a minimum of **NPR 150,000/-** which shall be valid for 30 days beyond the validity period of the bid. |
| **ITB 16.2 (b)** | 1. **Information to deposit the cost of bidding document in Bank:**     1. Name of the Bank: Not Applicable (N/A)    2. Name of Office Account: N/A    3. Office Account no.: N/A 2. **Information to deposit the Bid Security in Bank:**     1. Name of the Bank: Standard Chartered Bank, New Baneshwor, Kathmandu    2. Name of Office Account:SOS CV National Office    3. Name of Office to Deposit: SOS CHILDREN’S VILLAGE NEPAL    4. Office Code no. (Rajaswa Code): …………………………   v. Office Account no.: 18-0009520-86 |
| **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:   1. 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 2. 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. |
| D. Submission and Opening of Bids | |
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| **ITB 18.1** | Bidders **shall not** have the option of submitting their bids electronically**.** |

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| **ITB 19.1** | For bid submission purposes only, the Employer’s address is:  Attention: SOS CHILDREN’S VILLAGE NEPAL  Address: SOS CHILDREN’S VILLAGE, SANOTHIMI, BHAKTAPUR, NEPAL  The deadline for bid submission is as per displayed in SOS CHILDREN’S VILLAGE NEPAL’s official website [www.sosnepal.org.np](https://www.sosnepal.org.np/) |
| **ITB 22.1** | The bid opening shall take place at:  Address: SOS CHILDREN’S VILLAGE NEPAL, SanoThimi, Bhaktapur  Date: 10/15/2024 (2081/06/29 B.S)  Time: 11:00. |
| **E. Evaluation and Comparison of Bids** | |
| **ITB 29.4** | Not Applicable |
| **ITB 29.5** | The amount of the performance security be increased by Eight (8) percent of the quoted bid price. |

**SECTION - III**

#### **Evaluation and Eligibility Criteria**

This Section contains all the criteria that the Employer shall use to evaluate bids and eligible Bidders. Employer 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. **Adequacy of Technical Proposal**

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's

technical capacity, to mobilize key equipment and personnel for the contract consistent with

its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and

fully in accordance with the requirements stipulated in Section V (Works Requirements).

* 1. **Multiple Contracts**

Pursuant to Sub-Clause 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. **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:

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.

1. Qualification
   1. **Eligibility**

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| **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 requiremen t | | | existing or intended JV must meet requirement | | | must meet requirement | | | not applicable | | | Letter of Bid | | |
| *2.2 Government-owned Eligibility* | | | | | | | | | | | | | | | |
| Not having been declared ineligible by government/EMPLOYER  , as described in ITB Sub-Clause | must meet requiremen t | | | 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 requiremen t | | | existing or intended JV must meet requirement | | | must meet requirement | | | not applicable | | | 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 Running contracts2  not more than five (5) as described in ITB Sub-Clause 4.8. | | must meet requirement | | | existing or intended JV must meet requirement | | | | must meet requirement | | | not applicable | | | ELI-3 | |
| *2.5 Other Eligibility* | | | | | | | | | | | | | | | | |
| Firm Registration Certificate | | | must meet requirement | | | not  applicabl e | | must meet  requiremen t | | | not applicable | | | Document attachment | | |
| Business Registration Certificate (License) | | | must meet requirement | | | not applicabl e | | must meet requiremen t | | | not applicable | | | Document attachment | | |
| VAT and PAN Registration certificate | | | must meet requirement | | | not applicabl e | | must meet requiremen t | | | not applicable | | | Document attachment | | |
| Tax clearances certificate for the F/Y **2078/79** Tax return submission evidence or evidence of  tax time extension for. | | | must meet requirement | | | not applicabl e | | must meet requiremen t | | | not applicable | | | Document attachment | | |
| Additional requirements  [Insert if any] | | | ……………. | | | ………… | | …………… | | | ………… | | | ………… | | |

**2** Note: Only the contracts accepted since 2078-12-03 i.e. March 17, 2022 which are not substantially completed are considered. The contracts those are running under any type of foreign assistance are not accounted for this purpose.

2.2 Pending Litigation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | | Compliance Requirements | | | Documents |
| Requirement | Single  Entity | Joint Venture | | | Submission  Requirements |
| All Partners  Combined | Each  Partner | One  Partner |
| 2.1.1 Pending Litigation | | | | | |
| All pending litigation shall be treated as resolved against the Bidder and so shall in total not represent more than 100 percent of the Bidder's net worth. | must meet requirement by itself or as partner to past or existing JV | not applicable | must meet requirement by itself or as partner to past or existing JV | not applicable | Form LIT - 1 |

2.3 Financial Situation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | | Compliance Requirements | | | Documents |
| Requirement | Single  Entity | Joint Venture | | | Submission  Requirements |
| All Partners  Combined | Each  Partner | One  Partner |
| 2.3.1 Historical Financial Performance | | | | | |
| Submission of audited balance sheets and income statements, for the last three (3) years to demonstrate the current soundness of the Bidder's financial position. As a minimum, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive. | must meet requirement | not applicable | must meet requirement | not applicable | Form FIN - 1 with attachments |

Note:

1. The financial information provided by a Bidder should be reviewed in its entirety to allow a truly informed judgment,

and the pass-fail decision on the financial position of the Bidder should be given on this basis. Balance sheet of the

past three to five years period which shall be decidedaccording to the nature of the work.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 2.3.2 Average Annual Construction Turnover | | | | | |
| Minimum average annual construction turnover of NPR (Not Applicable (NA)) calculated as total certified payments received for construction contracts in progress or completed, within best three years out of last ten fiscal years. | must meet requirement | must meet requirement | must meet 25%  of the requirement | must meet 40%  of the requirement | Form FIN -2 |

2.4 Experience

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | | Compliance Requirements | | | Documents |
| Requirement | Single  Entity | Joint Venture | | | Submission  Requirements |
| All Partners  Combined | Each  Partner | One  Partner |
| 2.4.1 General Construction Experience | | | | | |
| Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last (NA) years prior to the applications submission deadline. | must meet requirement | not applicable | must meet requirement | not applicable | Form EXP - 1 |

2.5 Personnel

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Position** | **Academic Qualification**  ***[When position demands]*** | **Total Work Experience [Years]** | **Experience in Similar Works [years]** |
| ***1.*** |  |  |  |  |
| ***2.*** |  |  |  |  |
| ***3.*** |  |  |  |  |

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Information Forms included in Section IV (Bidding Forms).

2.6 Equipment

In case the Bidder proposes to consider Equipments that may be spared from committed/ongoing contracts for

evaluation, the Bidder shall provide details of Equipments which will be spared from committed/ongoing

contracts, clearly demonstrating the availability of such equipments with respect to the physical progress of

the ongoing contracts on the date of bid submission. Based on the details so submitted by the Bidder, only

the spared equipments proposed for the contract shall considered for evaluation.

In case of Equipments to be leased/hired the same procedure as mentioned above shall apply.

The Bidder must demonstrate that it has the key equipment listed hereafter:

i. For the equipments under Bidder's ownership

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Equipment Type and Characteristics | Total Nos. of Equipments under Bidder's Ownership | No. of Equipments engaged/proposed for ongoing/committed contracts | Nos. of Equipments proposed for this contract |
| 1. |  |  |  |  |
| 2. |  |  |  |  |
| 3. |  |  |  |  |

ii. For the Equipments to be leased/hired

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Equipment Type and Characteristics | Total Nos. of Equipments under the ownership of lease/hire provider | No. of Equipments engaged/committed for other works | Nos. of Equipments proposed to be leased/hired for this contract |
| 1. |  |  |  |  |
| 2. |  |  |  |  |
| 3. |  |  |  |  |

**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: RENOVATION WORKS AT SOS CHILDREN’S VILLAGE GANDAKI

To: **SOS CHILDREN’S VILLAGE, NATIONAL OFFICE, SANOTHIMI, BHAKTAPUR, NEPAL**

We, the undersigned, declare that:

1. We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) Clause 8;
2. We offer to execute in conformity with the Bidding Documents the following Works:
3. The total price of our Bid, excluding any discounts offered in item (d) below is: ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………
4. The discounts offered and the methodology for their application for subject contract are ……………………………………………………………………………………………………………...………………………………………………………………………………………………………………......
5. Our bid shall be valid for a period of **90 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;
6. If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document;
7. 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] …………………………………………………………………………………………………………………………………………………………………………………………………………………..;
8. 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;
9. 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;
10. 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;
11. We are not a government owned entity/We are a government owned entity but meet the requirements of ITB 4.5;1
12. 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;
13. 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.
14. We declare that we have not running contracts more than five (5)3 in accordance with ITB 4.8.
15. 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.

1. We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive; and
2. If awarded the contract, the person named below shall act as Contractor’s Representative:
3. We agree to permit the Employer/EMPLOYER 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.

Name: .......................................................................................................................................................

In the capacity of: .………………………………………………….................................................

Signed: ………………………………………………...…………………………………………

Duly authorized to sign the Bid for and on behalf of: …………………………………………......

Date: ………………………………………………….………………………………………….

3 Note: Except contracts accepted and running under any type of foreign assistance, all the contracts accepted and running since 2079-12-03 i.e. March 17, 2022 which are not substantially completed needs to declare.

1 Use one of the two options as appropriate.

**Table of Price Adjustment Data4**

**[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.

1. Labor: "National Salary and Wage Rate Index"- "Construction Labor" of Nepal Rastra Bank or

rate fixed by District Rate Fixation Committee

1. Material:"National Wholesale Price Index" - Construction Materials" of Nepal Rastra Bank
2. 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

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 Data5**

**[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 Letter head of the Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal)

Beneficiary: SOS CHILDREN’S VILLAGE, SANOTHIMI, BHAKTAPUR, NEPAL.

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 ...........name of Contract . …………… under Invitation for Bids 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…………………. . name of Bank ….hereby irrevocably

undertake to pay you any sum or sums not exceeding in total an amount of amount in figures

………………………. (. ………….. .amount in words ) upon receipt by us of your first

demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

1. has withdrawn or modifies its Bid, during:
2. during the period of bid validity specified by the Bidder on the Letter Bid, in case of electronic submission, or,
3. 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
4. does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter “the ITB”); or,
5. 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,
6. is involved in fraud and corruption in accordance with the ITB.

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 later 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, ICC Publication No. 758.

. . .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).

Technical Proposal Format

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Personnel

Form PER - 1: Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements

for each of the positions listed in Section III (Evaluation and Qualification Criteria). The data on their

experience should be supplied using the Form below for each candidate.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Name** | **Position\*** | **Academic Qualification** | **Total Work Experience [Years]** | **Experience in Similar Works [years]** |
| **1.** |  |  |  |  |  |
| **2.** |  |  |  |  |  |
| **3.** |  |  |  |  |  |

* As listed in Section III (Evaluation and Qualification Criteria).

Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the

requirements for the key equipment listed in Section III (Evaluation and Qualification Criteria). A

separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed

by the Bidder. The Bidder shall provide all the information requested below, to the extent possible. Fields

with asterisk (\*) shall be used for evaluation.

|  |  |  |
| --- | --- | --- |
| **Type of Equipment\*** | | |
| **Equipment Information** | **Name of manufacturer** | **Model and power rating** |
| **Capacity\*** | **Year of manufacture** |
| **Current Status** | **Current location** |  |
| **Details of current commitments** | |
| **Source** | **Indicate source of the equipment**  **0 Owned 0 Rented 0 Leased 0 Specially manufactured** | |

The following information shall be provided only for equipment not owned by the Bidder.

|  |  |  |
| --- | --- | --- |
| **Owner** | **Name of owner** | |
| **Address of owner** | |
| **Telephone** | **Contact name and title** |
| **Fax** | **email** |
| **Agreements** | **Details of rental / lease / manufacture agreements specific to the project** | |

Bidder’s Information and Qualification Format

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Bidder’s Qualification

To establish its qualifications to perform the contract in accordance with Section III (Evaluation and

Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information

Sheets included hereunder.

**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 EMPLOYER 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.

Form LIT - 1: Pending Litigation

Each member of a JV must fill in this form

|  |  |  |  |
| --- | --- | --- | --- |
| Pending Litigation | | | |
| 0 No pending litigation in accordance with Criteria 2.2 of Section III (Evaluation and Qualification Criteria)  0 Pending litigation in accordance with Criteria 2.2 of Section III (Evaluation and Qualification Criteria) | | | |
| **Year** | **Matter in Dispute** | **Value of Pending Claim in NRS** | **Value of Pending Claim as a Percentage on Net Worth** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Form FIN - 1: Financial Situation

Each Bidder or member of a JV must fill in this form

|  |  |  |
| --- | --- | --- |
| **Financial Data for Previous 3 Years [in NRS]** | | |
| **Year 1 :** | **Year 2 :** | **Year 3 :** |

**Information from Balance Sheet**

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Assets** |  |  |  |
| **Total Liabilities** |  |  |  |
| **Net Worth** |  |  |  |
| **Current Assets** |  |  |  |
| **Current Liabilities** |  |  |  |

**Information from Income Statement**

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Revenues** |  |  |  |
| **Profit Before Tax** |  |  |  |
| **Profit After Tax** |  |  |  |
| * + Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last three or above years, as indicated above, complying with the following conditions. * All such documents reflect the financial situation of the Bidder or partner to a JV, and not sister  or parent companies. * Historic financial statements must be audited by a certified auditor. * Historic financial statements must be complete, including all notes to the financial statements. * Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).   **Note:**  *In case of e-submission the attachments should not be uploaded but shall be submitted on notification by the Employer as per ITB 27.1* | | | |

Form EXP – 1: General Construction Experience

Each Bidder or member of a JV must fill in this form.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **General Construction Experience** | | | | |
| **Starting Month Year** | **Ending Month Year** | **Year** | **Contract Identification and Name and Address of Employer Brief Description of the Works Executed by the Bidder** | **Role of Bidder** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**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 EMPLOYER 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.

**Part – II**

**EMPLOYER’S REQUIREMENTS**

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**SECTION** - **V**

#### **Works Requirements**

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

#### **Scope of Work**

Renovation Works at SOS CHILDREN’S VILLAGE Gandaki, Rambazar-15.

#### **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, DoLIDAR 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.

**Standard Specifications for this Contract shall be the “Standard Specifications for building works” issued under the authority of Government of Nepal.**

**Specification**

**RENOVATION WORKS AT SOS CHILDREN’S VILLAGE, GANDAKI**

**SOS Children’s Villages Nepal**

**SEPTEMBER 2024**

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# Special NotE to CONTRACTOR

1. The Contractors are responsible to have Supervision Engineer, supervisors and such other manpower as mentioned in the Bid submission on site throughout the contract period.
2. The contractor shall appoint and identify a supervisor to monitor the safety issues arising. Further, the contractor is responsible to furnish, maintain and enforce all safety rules/equipment/tools/measures required to complete this project.
3. The contractor will prepare and install information regarding safety which is to be posted with-in view of the public before work commences, with contact numbers of the safety officer and the company home office.
4. The contractor is responsible to make arrangement of all his electrical requirements during the project at his own expenses/w maintenance.
5. Site and effected boundaries connecting to joining areas shall be rendered to a state of "as good" or "better" at the time of completion and demobilization, blending and matching in an acceptable manner in all areas.
6. The successful bidder shall within 15 days of notice of award of contract submit a Master Project Schedule for client review and adjustment if required.
7. The contractor shall be responsible to maintain the cleanliness in and around adjoining areas, for health and safety reasons of persons on and off the site.
8. The contractor shall from his own expenses maintain adequate lighting for safety and security at all times for the duration of the project.
9. The contractors are required to arrange their required spaces for the camp and material storage at their own expenses if the space is not available at the sch0ol premises.

## 1. General

1. The Work shall be carried out according to these Specifications whether specifically mentioned elsewhere or not. No extra in any form will be paid unless it is stated as an item in the Bill of Quantities (BoQ).
2. Whenever the Specifications are not given or when the Specifications are ambiguous, the relevant Nepal Standards or Indian Standards and further amendments will be considered as final and binding.
3. All Works shall be carried out simultaneously with electrical, plumbing, sanitary and other services. The Work shall be carried until it is completed satisfactorily along with the completion of all other essential services. The building contractor shall keep the other contractors informed of the proposed program of work, well in advance, so that the building work is not hindered. The Contractor shall further cooperate with other Contractors in respect of any facility required by them e.g. making holes in shuttering for sanitary, pipes, electric conduits, fan hook etc. However, no extra payment shall be admissible for such reasonable assistance and facilities extended to other Contractors and the building Contractors shall be deemed to have taken these factors into consideration while quoting the rates.
4. The Work shall be as per the drawings and bill of quantities and in conformity to the specifications, which the Contractor is presumed to have studied. Nothing extra will be paid for any item because of its shape, location or other difficult circumstances, even if the schedule makes no distinction, as long as the item is shown in the drawings.
5. The sources of materials stated in the Specifications are those from which materials are generally available. However, materials not conforming to Specifications shall be rejected even if they come from the stated sources. The Contractor should satisfy himself that sufficient quantity of materials of acceptable Specification is available from the stated or other sources.
6. The compliance to the Specifications shall be fulfilled by the Contractor without extra charges i.e. the item rates quoted shall be deemed to have taken these Specifications into account.

7. These are requirements the Contractor shall fulfill after the issue of Letter of Acceptance but before the Date of Commencement.

##### 1.1 Definitions

**General:**

**Acceptable/Approved (Approval)** - Acceptable to/approved by the Engineer.

**Agreed** - Agreed in writing.

**As detailed** - As detailed on the drawings.

**Authorized/ordered/rejected** - Authorized/ordered/rejected by the Engineer.

**Designated** - Shown on the drawings or otherwise specified by the Engineer or, in relation to an item scheduled in the bid documents, descriptive of an item to be priced by a bidder.

**Indicated** - Indicated in or reasonably to be inferred from the contract, or indicated in writing by the Engineer.

**Instructed/directed/permitted** - Instructed/directed/ permitted by the Engineer.

**Satisfactory** - Capable of fulfilling or having fulfilled the intended function.

**Service** - Any pipeline, cable, duct etc. for conveying or transmitting any fluid or other matter.

**Submitted** - Submitted with the tender or submitted to the Engineer, as appropriate.

**Tolerances:**

**Deviation** - The difference between the actual (i.e., measured) size or position and the specified size or position.

**Permissible deviation** - The specified limit(s) of deviation.

**Tolerance** - The range between the limits within which a size or position must lie.

**Measurement and Payment:**

**Bill/schedule** - The bill/schedule of quantities.

**Billed/scheduled rate** - The unit rate or price entered in the bill/schedule at which the Contractor undertakes to execute the particular work or to provide the required material, article or service, or to do any or all of these things, as set out in the item concerned.

**Billed/scheduled** - Listed in the bill/schedule of quantities.

**Fixed charge** - A charge for work that is executed without reference to time.

**Method-related charge** - The sum for an item inserted in the bill by the Contractor when tendering, to cover items of work relating to his intended method of executing the Works.

***Time-related charge*** *- A charge for work the cost of which, to the Employer, is varied* in proportion to the length of time taken to execute the particular item scheduled.

**Value-related charge** - A charge that is directly proportional to the value of the contract.

##### 1.2 Contractor’s Office & Accommodation

Various works defined under this item are for the provision and maintenance of the Contractor's office, camps, stores, equipment yard, and workshops. The structure of the buildings shall be adequate, rainproof, spacious, airy and hygienic with proper lighting and toilet facilities. The area shall be kept neat and clean. Any garbage or sewage shall be disposed at a location and in a manner approved by the Engineer.

Space allocated for storage of various materials such as cement, reinforcement steel, and petroleum products etc. shall be clearly separated to avoid contamination. Petroleum products shall be stored and handled in a way that avoids contamination of ground water. Workshops shall be installed with oil and grease traps for the same purpose.

Written information shall be given to and approval taken from the Engineer regarding proper establishment and maintenance of such camps. Failure in compliance with Engineer's instructions in respect of overall standard will lead to reduction or withholding of any payment due to the Contractor.

The Contractor shall provide at his own expense adequate temporary accommodation and toilet facilities for his Workmen and keep the same in good conditions. This may `be done to suit Site conditions with the approval of Project Engineer. The above-mentioned temporary structures shall be removed on the completion of Works at Contractor's own cost. All materials shall belong to the Contractor.

The Contractor shall make his own arrangement for the supply of electric power and lighting as required for construction purpose.

The Contractor shall make his own arrangement for all internal and external telephones and other communication means deemed necessary for the Works. The Contractor shall make his own arrangement for office equipment and other consumable for his use for the Works.

##### 1.3 Office for Engineer

The contractor shall provide and maintain site office of two rooms having total area 20 sq.m (approximately) confirming to the drawing provided, for the use by the client, consultant, contractor and visitors during the entire period of construction. It shall also include office chair of 4 nos., office table, lockable file cabinet, potable water etc. All the charges for the provision and maintenance of the site office will be borne by the contractor. If any government property is used for the purpose of site office, no payment will be considered. If the site office is not constructed within 1 month from the start the construction in site, will be considered an adjustment in first IPC of the Contractor.

##### 1.4 Safety Measures

The Contractor shall be responsible for safety of all workmen and other persons entering the Works and shall at his own expense; where not stated otherwise take all measures, subject to the Engineer's approval, necessary to ensure their safety. Such measures shall include but not be limited to:

* Provision of safety and emergency regulations for fire, gas, and electric shock prevention, together with rescue operation plan
* Safe control of flowing water
* Provision and maintenance of suitable lighting to provide adequate illumination at place of work with appropriate spares and standby unit
* Provision and maintenance of safe, sound slings, pulleys, ropes, and other lifting device
* Provision of safe access to any part of the works.
* Provision of safety barriers and safety nets at floors above 3m.
* Provision of notices in local dialect temporarily or permanently during construction at locations likely to be used by the public. Placement of such notices shall depend on the existence of the nature of work in the vicinity. These notices shall be in addition to any other statutory requirements demanded of the Contractor

The Contractor shall submit before starting the Site operations a Safety Plan, a proposal with detailed safety and emergency measures for the Engineer's approval. When the proposal has been approved, English and Nepali version of the regulations shall be made available to all of his Employees and the Engineer.

The Contractor shall ensure that all his Employees are fully conversant with the regulations, emergency and rescue procedures etc. and shall enforce a rule that will instantly dismiss any employee committing a serious breach of such regulations.

##### 1.5 Project Information Board

The Contractor shall erect notice boards (1.2 m x 1.8 m) at the site giving details of the Contract in the format and wordings directed by the Engineer. These boards shall be erected within 14 days after the Contractor has been given the Possession of Site.

The Contractor shall not erect any advertisement sign board on or along the work. The board shall be in good condition until the removal by the Contractor at the end of the Defects Liability Period. If the contractor fails to erect the project information board within 14 days from the start the construction in site, will be considered an adjustment in first IPC of the Contractor.

##### 1.6 Barricading the Construction Area:

Barricading the construction area will be done with CGI sheet and poles to restrict the unwanted access to students and other personnel which are not related to the construction work**.** Stairways, Hatches, Chutes, Open Manholes, Elevated platforms, Areas with moving machinery, Excavation sites, Construction sites, Temporary wall or floor openings should be guarded or barricaded properly using suitable technique for overall project duration.

It shall be ensured that the safety signs are erected to warn workers of specific hazards and to communicate necessary precautionary measures and emergency actions. As a minimum, it shall be ensured that safety signs are erected, The following shall (but not limited to) shall form mandatory requirements to meet the safety requirements at site:

* Barricading of the confined spaces;
* Provision and use of specific Personal Protective Equipment (PPE) requirements;
* Care while handling hazardous chemicals;
* Provision of Fire protection equipment;
* Provision of First Aid Kits
* Traffic management and pedestrian control (wherever applicable).

Safety signs erected shall meet the relevant legislative requirement.

##### 1.7 Occupational Health and Safety

Required personnel protection equipment (PPE) must be worn at all times when on construction or renovation sites. At a minimum, each employee is required to wear a hard hat, high visibility safety vests with reflective striping, wear shirts with sleeves, long work pants, and sturdy work shoes or boots when working on a construction or renovation site. Sleeveless or tank top shirts, short pants, sweatpants, sneakers, sandals, and high-heeled or open-toed shoes are not permitted.

Depending on the circumstances and potential hazards present, additional PPE may be required. This determination will be made by supervisor based on the preliminary Job Hazard Analysis; EHS may also be consulted. Additional PPE may include:

* [Protective gloves](https://ehs.princeton.edu/node/291)
* [Hearing protection](https://ehs.princeton.edu/node/294)
* [Full face shields when cutting, grinding, or chipping](https://ehs.princeton.edu/node/289)
* [Chemical splash goggles](https://ehs.princeton.edu/node/289)
* [Respiratory protection](https://ehs.princeton.edu/node/295)
* [Fall protection equipment when working above 6 feet](https://ehs.princeton.edu/node/300)
* Specific protective clothing such as welding leathers when welding or FR clothing when working with live electric

## 2. Temporary Facilities:

No separate measurement and payment shall be made for the works described in this Clause.

##### 2.1 Provision of Temporary Services

When the rehabilitation or replacement of existing public utilities requires their temporary disconnection, the Contractor shall provide to the affected users with temporary services in at least the same standard as the original services. For water supply he may install temporary lines or arrange for regular supply by tankers. When forced to disconnect existing sewers the Contractor shall install temporary pipes of adequate size to carry off sewage from any private sewer facilities cut off by construction work. Connections to temporary pipes shall be made immediately by the Contractor upon cutting off the existing facility. No sewage shall be allowed to flow from any severed facility on the ground surface or into trench excavation. Pipes used in temporary sewers may be plastic or approved flexible material.

Upon completion of work the Contractor shall replace all severed connections and restore to operating order the existing sanitary facilities. The Contractor without approval of the Engineer shall not operate any valve or other controls in public service facilities. All users affected by such operation shall be notified by the Contractor at least one hour before the operation and advised of the probable time when service will be restored.

##### 2.2 Provision of Temporary Learning Centers (TLC)

The contractor will wherever necessary provide the Temporary Learning Centers (TLC) as per drawing and will keep it in operational condition till the end of the construction period after which the same will be dismantled and materials stored/disposed to the satisfaction of the school authority. The TLCs will be well ventilated and protected from rain and sun and will be safe for the children/teachers to conduct learning.

##### 2.3 Protection of Adjoining Property

The Contractor shall control the movement of his crews and equipment on right-of-way including access routes approved by the Engineer so as to minimize damage to crops and property and shall endeavor to avoid marring the lands. Ruts and scars shall be obliterated and damage to land shall be corrected and the land shall be restored as close as possible to its original conditions before final taking-over of the Works.

The Contractor shall be responsible directly to the Employer for any excessive or avoidable damage to crops or lands resulting from his operations whether on lands adjacent to right-of-way or on approved access road and deductions will be made from payment due to the Contractor to cover the amount of such excessive or avoidable damage as determined by the Engineer.

##### 2.4 Reinstatement upon Completion

Temporary facilities shall be provided by the Contractor, only for as long as required after which he shall dismantle and remove the same from their place of use as speedily as possible. The Contractor in his yard shall safely store re-usable components. The place of use shall be cleared and reinstated to the satisfaction of the Engineer, immediately atleast to the condition existing before the temporary facilities were provided.

##### 2.5 Measurement and Payment

Unless otherwise provided in the contract, no separate measurement and/or payment shall be made for all materials and works required under this clause (Clause 2, Temporary Facilities). All costs in connection with the work specified herein shall be considered to be included with other related items of the work in the BOQ.

##### 2.6 Publicly and Privately Owned Services

• If any privately owned service for water, electricity, drainage, etc., passing through the site is affected by the works, the Contractor shall provide a satisfactory alternative service in full working order to the satisfaction of the owner of the services and of the Engineer before terminating the existing service.

• Drawing and scheduling the affected services like water pipes, sewers, cables, etc. owned by various authorities including Public Undertakings and Local Authorities included in the contract documents shall be verified by the Contractor for the accuracy of the information prior to the commencement of any work.

• Notwithstanding the fact that the information on affected services may not be exhaustive, the final position of these services within the works shall be supposed to have been indicated based on the information furnished by different bodies and to the extent the bodies are familiar with the final position. The Contractor must also allow for any effect of these services and alternations upon the works and for arranging regular meetings with the various bodies at the commencement of the contract and throughout the period of the works in order to maintain the required co-ordination. During the period of the works, the Contractor shall agree if the public utility bodies vary their decisions in the execution of their proposals in terms of program and construction, provided that, in the opinion of the Engineer, the Contractor has received reasonable notice thereof before the relevant alterations are put in hand.

• No clearance or alterations to the utility shall be carried out unless ordered by the Engineer.

• Any services affected by the works shall be restored immediately by the Contractor who must also take all measures reasonably required to protect their services and property during the progress of the works.

• The Contractor may be required to carry out the removal or shifting of certain services/utilities on specific orders from the Engineer for which payment shall be made to him. Such works shall be taken up by the Contractor only after obtaining clearance from the Engineer and ensuring adequate safety measures.

##### 2.7 Insurance of works

• **Insurance of Works**

* The Contractor shall take out Insurance for the Works from approved agency/institution;
* Payments made to the agency/institution and stamp charges/duties incurred if any, by the contractor in compliance of the above work shall be paid from Provisional Sum included for the item in the BOQ after submission of the insurance document to the satisfaction of the Engineer.

• **Third Party Insurance**

* The Contractor shall take out Third Party Insurance from an approved agency/institution;
* Payments made to the agency/institution and stamp charges/duties incurred if any, by the Contractor in compliance of the above work shall be paid from the Provisional Sum included for the item in the BOQ after submission of the documents to the satisfaction of the Engineer.

• **Insurance of Contractor's Workmen and Employees**

* The Contractor shall insure against such liability as stipulated in Conditions of Particular Application.

##### 2.8 Environmental Protection Works

The environment has been defined to mean surrounding area including human and natural resources to be affected by the execution and after completion of works. The Contractor shall take all precautions for safeguarding the environment during the construction of the works. He shall abide by all prevalent laws, rules and regulations governing pollution and environmental protection. The Contractor shall prohibit employees from unauthorized use of explosives, poaching wildlife and cutting trees. The Contractor shall be fully responsible for the action of his employees.

The Contractor is expected to arrange and execute the Works in such a way that existing environmental conditions are not deteriorated. Borrow pits and dumping sites used by the contractor shall be reinstated at his own cost by grass and/or tree plantation.

Written instruction/approval must be obtained from the Engineer regarding protection and reinstatement of environment throughout the Contract period. Failure in compliance with Engineer's instructions in respect of overall standard will lead to reduction or withhold of payment. Further, any serious deterioration in the environment including pollution attributable to Contractor as determined by the Engineer, may result in deduction of actual expenditures incurred in their reinstatement done through separate agency, from any money due to the Contractor.

Environmental protection works, among others, shall also include the following:

##### 2.9 Borrow/Quarry Sites

The Engineer shall have the power to disallow the method of construction and/or the use of any borrow/quarry area, if in his opinion, the stability and safety of the works or any adjacent structure is endangered, or there is undue interference with the natural or artificial drainage, or the method or use of the area will promote undue erosion.

All areas susceptible to erosion shall be protected as soon as possible either by temporary or permanent drainage works. All necessary measures shall be taken to prevent concentration of surface water and to avoid erosion and scouring of slopes and other areas. Any newly formed channels shall be backfilled.

Borrows/quarries shall be located away from the population centres, drinking water intakes, cultivable lands and drainage systems. The cutting of trees shall be minimized. Temporary ditches and/or settling basins shall be dug to prevent erosion. The undesirable ponding of water shall be prevented through temporary drains discharging to natural drainage channels.

Earthworks operations shall be strictly limited to the areas to be occupied by the permanent works and approved borrow areas and quarries unless otherwise permitted by the Engineer. Due provision shall be made for temporary drainage. Erosion and/or instability and/or sediment deposition arising from earthwork operations not in accordance with the Specifications shall be made good immediately by the Contractor.

The Contractor shall obtain the permission of the Engineer before opening any borrows pits or quarries. Such borrow pits and quarries may be prohibited or restricted in dimensions and depth by the Engineer where:

1. They might affect the stability or safety of the works or adjacent property;
2. They might interfere with natural or artificial drainage or irrigation;

(iii) They may be environmentally unsuitable.

The Contractor shall not purchase or receive any borrow materials from private individuals unless the source of such materials has been approved by the Engineer. At least 14 days before he intends to commence opening any approved borrow pit or quarry, the Contractor shall submit to the Engineer his intended method of working and restoration.

##### 2.10 Disposal of Spoil and Construction Waste

Materials in excess of the requirements for permanent works and unsuitable materials shall be disposed of in locations and in the manner as agreed with the Engineer. The locations of disposal sites shall be such as not to promote instability, destruction of properties and public service systems. Approval for the disposal site/sites will be obtained by the contractor from the relevant authority. Exposed areas of such disposal sites shall be suitably dressed and be planted with suitable vegetation.

The Contractor shall plan his works in such a way that there is no spillage of POL products to the surface or sub-surface water.

##### 2.11 Provision and Maintenance of Camps, Offices, Stores, Equipment Yards

Various works defined under this item are related to provision and maintenance of camps for work person and employees, Contractor's site offices, stores equipment yards and workshops. These camps must be adequate, rain-proof, spacious, airy and hygienic with proper lighting and materials storage facilities. The area shall be kept neat and clean. Space allocated for storage of materials such as cement, gabion wire, reinforcing wire etc. shall in general be damp-free, rain-proof and away from petroleum products storage. Permission may be granted by the Engineer to erect suitable camps within the right of way free of charge, if such establishments do not cause obstructions to traffic, nuisance to works execution and adverse effect to the environment.

Written information must be given to and approval be taken from the Engineer regarding proper establishment and maintenance of such camps. Failure in compliance with Engineer's instruction in respect of overall standard will lead to reduction or with holding of payment.

##### 2.12 Provision and Maintenance of Toilets

Provision of toilets for labour and employees shall be made to avoid public nuisance as well as pollution of water courses and air. The Contractor shall construct suitable septic tanks and/or soak pits along with room of pit-type latrines. Enough water must be provided and maintained in the toilets. Proper methods of sanitation and hygiene should be employed during the whole project duration.

##### 2.13 Provision of Potable Water

The Contractor shall supply potable water from the commencement of work to Contractor's staff and work person both at camps and at construction-sites. This arrangement shall be enforced to avoid proliferation and generation of various water borne diseases.

The Contractor shall inform the Engineer regarding sources, installation and operation of supply of potable water within a week after the supply is commenced.

##### 2.14 Provision of First Aid/Medical Facilities

Provision of first aid/medical facilities shall be made along with commencement of work to provide quick medical service to injured/sick work person, and employees. Services shall also include on- the-way service and other arrangements required for taking them to the nearest hospital in case of emergency.

The Contractor shall also supply and provide adequate medicines and facilities required for standard first aid.

The Contractor shall inform the Engineer regarding the medical facility within a week after its establishment and operation.

##### 2.15 Hazardous Materials

The Contractor shall not store hazardous materials near water surfaces. The Contractor shall provide protective clothing or appliances when it is necessary to use some hazardous substances. High concentration of airborne dust resulting in deposition and damage to crops and water resources shall be avoided.

##### 2.16 Reinstatement of Environment

The Contractor shall arrange and execute works as well as related activities in such a way that environmental conditions are reinstated. He may be required to carry out filling, removal and disposal works along with plantation of grass and trees as directed by the Engineer at his own costs at identified locations to reinstate environment.

Written instruction/approval shall be given by/sought from the Engineer regarding reinstatement of environment both during and after completion of works and up to the end of Defects Liability Period.

##### 2.17 Survey And Setting Out

• Prior to the Commencement of works the Contractor shall survey the construction area and confirm the levels. He shall immediately notify the Engineer of any discrepancies and shall agree with the Engineer any amended values to be used during the contract, including replacements for any stations missing from the original stations.

• The Contractor shall check, replace and supplement as necessary the station points/Benchmark and agree any revised or additional station details with the Engineer.

• All stations and reference points shall be clearly marked and protected to the satisfaction of the Engineer.

• The Contractor shall establish working Bench Marks with reference stations soon after taking possession of the site. The coordinates and the elevations of the reference stations shall be obtained from the Engineer. The working Bench Marks shall be near all major/medium structure sites. Regular checking of these Bench Marks shall be made and Adjustments, if any, got agreed with the Engineer and recorded.

• The Contractor shall be responsible for the accurate establishment of the centrelines based on the Drawing and data supplied. The centrelines shall be accurately referenced in a manner satisfactory to the Engineer. A schedule of reference dimensions shall be prepared and supplied by the Contractor to the Engineer.

• The existing profile and cross-sections shall be taken jointly by the Engineer and the Contractor. These shall form the basis for the measurements and payments. If in the opinion of the Engineer, design modifications of the centrelines and/or grade are advisable, the Engineer shall issue detailed instructions to the Contractor and the Contractor shall perform modifications in the field, as required, and modify the levels on the cross-sections accordingly.

##### 2.18 As-Built Drawings

Such approved Working Drawings as have been selected by the Engineer shall be correctly modified for inclusion in the As-Built Drawings incorporating such changes to the Works as have been ordered and executed. Such drawings shall show the actual arrangement of all structures and items of equipment installed under the Contract. The Contractor shall submit 1 (one) reproducible copy and 3 (three) prints of all As-Built Drawings clearly named as such to the Engineer for approval before applying for the Taking-Over Certificate for the respective Section of the Works.

During the course of the Works, the Contractor shall maintain a fully detailed record of all changes from the approval to facilitate easy and accurate preparation of the As-Built Drawing. Irrespective of the other contractual prerequisites no Section of the Works will be considered substantially completed until the Engineer has approved the respective As-Built Drawings.

##### 2.19 Photographs

The Contractor shall supply colour prints of photographs, of such portions of the works in progress and completed, as may be directed by the Engineer.

## 3. Notes About Measurement And Payment

##### 3.1 Measurement

Unless specified, all measurements shall be based on “Principals of Measurement (Int.) for works of constructions and method of measurement and tolerance as per Nepal standard." The tolerances specified in these Specifications are for evaluation of accuracies only based on which the work shall be accepted or rejected. However, the measurement of the work performed within the limits of tolerances shall be the measurement of actual work done in place, if their dimensions are less than what have been specified or instructed by the Engineer. If the actual work done in place is more than what has been specified or instructed by the Engineer, but within the limit of tolerances, the measurement shall be the measurement of the work what has been specified or instructed by the Engineer.

##### 3.2 Payment

Unless otherwise stated in the contract, the contract unit rates and/or prices for items as set out in the Bill of Quantities are the full and the final compensation to the Contractor for:

* Supply of all materials necessary to complete the item as per relevant specifications;
* Use of materials, labours, tools, equipment, machines and other resources as per need;
* All handling, packing charges and transportation;
* Cost of supervision, quality assurance, temporary and ancillary works;
* Site commissioning;
* Maintenance and making good;
* All duties and obligations as set out in the contract
* General works such as setting out, clearance of site before setting out and after completion of works the preparation of detailed work program providing samples of various materials proposed to be used
* the detailed Design and Drawing of temporary works
* testing of materials
* any other details as required by the contract
* cost of all operations like storing, erection, moving into final position, etc. necessary to complete and protect the work till handing over to the Employer;
* the cost for safeguarding the environment
* All incidental costs, profit and overhead costs not covered under above stated.

Where the Bill of Quantities does not include the items mentioned in this Section, no separate payment shall be made for such works. The costs in connection with the execution of the works specified herein shall be considered to be included in the related items of other works specified in the Bill of Quantities or shall be considered to be incidental to the works specified. Items specified in this Section if included in the Bill of Quantities shall be paid at the contract unit rates as agreed and shown in the Bill of Quantities.

##### 3.3 National Specifications

Certain Specifications issued by various national or other widely recognized bodies are referred to in these Specifications. Such Specifications shall be defined and referred to as National Specifications.

The Contractor may propose that the materials and workmanship be defined in accordance with the requirements of other equivalent National Specifications and he may execute the works in accordance with such National Specifications as may be approved by the Engineer. A copy of the National Specification, together with its translation into the English language if the National Specification is in another language, shall be submitted to the Engineer along with the request for its adoption.

In referring to National Specifications, the following abbreviations are used:

NS Nepal Bureau of Standards and Metrology

IS Indian Standards

ASTM American Society of Testing and Materials

BS British Standards

BSCP British Standard Code of Practice

ISO International Organization for Standardization

EN European Norm

NFP French Norm

##### 3.4 Equivalency of Standards

Wherever reference is made in these Specifications to specific standards and codes to be met by the materials, plant, and other supplies to be furnished, and work to be performed or tested, the provisions of latest current edition or revision of relevant standards and codes in effect shall apply. Other authoritative standards which ensure a substantially equal or higher performance than the specified standards and codes shall be accepted subject to the Engineer's prior review and approval. Differences between the standards specified and the proposed alternative standards shall be fully described by the Contractor and submitted to the Engineer at least 28 days prior to the date when the Contractor desires the Engineer's approval. If the Engineer determines that such proposed deviations do not ensure substantial performance, the Contractor shall comply with the standards and codes specified. No payment shall be made for adoption of higher standards.

##### 3.5 Units of Measurement, Abbreviations and Terminology:

**Units of Measurement**

The Symbols for units of measurement are used in these Specifications as they are given below.

micron m x 10-6

mm millimetre

m meter

km kilometre

sq. mm. or mm2 square millimetre

sq.m. or m2 square meter

sq. km. or km2 square kilometre

ha hectare

PI Plasticity Index

PL Plastic Limit

Cu. M. or m3 cubic meter lit

I litre

rad radian

°C degrees Celsius

kg kilogram

g gram = kgx10-3

mg milligram = kg x 10-6

mg/l milligram per litre

t ton = kg x 103

kg/m3 kilogram per cubic meter

t/m3 ton per cubic meter

N Newton

N/m2 Newton per square meter

Lin. m Linear meter

Max Maximum

Min Minimum

ACV Aggregate Crushing Value

BOQ Bill of Quantities

CR Crushing Ratio

dia Diameter

hr Hour

LS Linear Shrinkage

MC Moisture Content

MDD Maximum Dry Density

min Minute

no Number (units), as in 6 no.

No Number (order) as in No 6

OMC Optimum Moisture Content

OPC Ordinary Portland Cement PI

PM Plasticity Modulus (PI x % passing 0.425 mm sieve)

POL Petrol, Oil & Lubricant

ROW Right of Way

SE Sand

Equivalent sec Second

SG Specific Gravity

SI International Standard Units of Measurements

SSS Sodium Sulphate Soundness test, loss on 5 cycles

STV Standard Tar Viscosity

TS Tensile Strength

UC Uniformity Coefficient

UCS Unconfined Compressive Strength

VIM Voids in Mix

w/c Water cement ratio

wt Weight

% Percent

**Terminology**

The term "the Specifications" shall be construed as the Standard Specification and the Special Specification all together.

##### 3.6. Program

The Contractor shall provide all information including Master Construction Schedule needed for fulfilment of the program and required in accordance with the Conditions of Contract including the sequence in which he intends to work including implementation of quality assurance plan. If the Contractor requests a change in the sequence and such change is approved by the Engineer, the Contractor shall have no claim as per the Conditions of Contract for delay arising from such revisions to the program. If the Contractor fails to submit the updated Master Construction Schedule within 15 days of signing of the contract will reconsidered adjustment in first IPC , same will apply, if the Master Construction Schedule is not updated on a Monthly basis, will be reconsidered in following IPC´s.

The program shall be detailed enough to give, in addition to construction activities, detailed activities for the submission and approval of materials, procurement of critical materials and equipment, fabrication of special products/equipment if any and their installation and testing, and for all activities of the Engineer that are likely to affect the progress of work. The Contractor shall update all activities in accordance with the Conditions of Contract on the basis of the decision taken at the periodic site review meetings or as directed by the Engineer.

##### 3.7. Submittal:

**i. General Requirements**

The Contractor shall maintain an approved system of recording and tracking submissions indicating 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 filed on site, available for reference by the Engineer at any time.

**ii. Contractor’s Compliance Reports**

The project will be monitored through the Daily Reports submitted by the Engineer which will include among other things, Safety Observations Reports; Inspection Reports; Material Submittal Requests and Quality Reports among others. The Contractor is required to submit the compliance reports on a timely manner.

**iii. Contractor’s Monthly Progress Report**

The Contractor shall submit monthly progress report to the Engineer in triplicate showing actual work done during the month, vis- a- vis the cumulative work progress till the end of the month superimposed upon copies of the program. He shall furnish an explanation of any deviation from the Program 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. The Contractor shall comply with the reporting requirements on implementation of Environmental Management Plan in the monthly report following the guidelines provided by the Engineer.

**iv. Submission of Samples**

* 1. The Engineer may at his discretion request or take samples of any material or product intended for use in the Works. Where samples are requested in the Specifications they shall be submitted in the number requested or if not specified then as directed by the Engineer.
  2. Samples shall be of the type and size specified and fully representative of the materials proposed to be used.
  3. Samples shall be indelibly and clearly marked with the date of submission, material reference and any other data required to determine the source and kind of sample.
  4. 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. 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.
  6. One or more “accepted” samples shall be retained at the Contractor’s site office and be available for reference on request.
  7. 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. No separate or additional payment shall be made for the samples or the replacement of defective materials. The contractor shall be responsible and it should have been considered during the submission of tender document.

**v. Copies of Orders**

If the Engineer so wishes he may demand for copy of supply/purchase orders for the supply of materials and goods required in connection with the works. However this would not relieve the contractor the responsibility of bringing authentic/specified materials.

**vi. Inclusive Documents**

The provisions of General Conditions of Contract, Special Conditions of Contract, Drawings and Bill of Quantities and notes or other Specifications issued in writing by the Engineer shall form part of these Specifications.

If there is any ambiguity in the execution drawings, the Contractor should immediately report the matter to the Engineer. It should be returned for review and do not commence order for materials or products or execute the works until drawings have been reviewed and are revised except when instructed by the Engineer.

**vii. As Built Drawings**

Within one month of handing taking over, the Contractor shall submit “As-Built Drawings” for the structures (including the Master Plan), water supply, electrical & plumbing & sewerage works have to be prepared and submitted. It is advisable that the Contractor prepares the As-Built Drawings as the work is completed at the site to facilitate checking and verification. The following requirements will apply:

1. The drawings shall be prepared in the latest version of autoCAD.
2. The drawing should indicate:
   * 1. The exact locations of all the building structures;
     2. Location of all manholes, inspection chambers with their invert level;
     3. Dimension and lay out of different sewer line in the network; Should provide the general lay out plan for water supply distribution network indicating the reduce levels at different point of connection from the main line;and
     4. All electrical installation details
3. Drawings shall be at a scale suitable for easy reference and as required to clearly depict all required information as directed by the Engineer.
4. The Contractor shall conduct such on-site checks as required to ensure the accuracy of the as- built drawings.
5. One original and one copy (hard copies along with soft copy) of drawings shall be submitted in bound sets sub-divided by discipline. Copyright of all materials submitted will remain with the Employer without further compensation or charge.

**viii. Maintenance Manual**

The contractor will have to submit a maintenance manual which will among other things contain the types of fitting/installations used their specifications and source of availability. Any special features of maintenance will also be highlighted. The As-Built Drawings will be a part of the Maintenance Manual.

**xi. Unacceptable Work**

All defective Works are liable to be demolished, rebuilt and defective materials replaced by the Contractor at his own cost. In the event of such Works being accepted by carrying out repairs/rectification etc. as specified by the Engineer, the cost of repairs/rectification shall be borne by the Contractor and no extra time shall be considered in doing this work.

In the event of the work being accepted by giving ‘Design Concession’, arising out of but not limited to under sizing, under strength, shift in location and alignment, etc. and accepting design stresses in members which are higher than those provided for in the original design or by accepting materials not fully meeting the Specifications, etc. the Contractor will be paid for the Works actually carried out by him at the suitable reduced rate of the tendered rates for the portion of the work thus accepted.

1. **Measurement and Payment**

No separate measurement and payment shall be made for items under “Submittal”. All costs in connection with the work specified herein shall be considered included with other related items of the work in the Bill of Quantities.

## CW.0. CIVIL WORKS

## CW.1. STANDARD CONSTRUCTION MATERIALS

##### CW.1.1. Water

Water for construction work shall not be salty or blackish and shall be clean water, 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 be clean.

##### CW.1.2 Cement

Cement shall conform I.S. 269‑1976 or equivalent Nepal Standard. The type of the cement as to whether it shall be Ordinary, Rapid Hardening or Low Heat shall be specified. When specific type is not specified, Ordinary Portland Cement shall be used.

The Contractor shall submit certificate from manufacturer for each batch of cement to be delivered at site.

The weight of Ordinary Portland Cement used shall be as per latest Nepal Standard. The measurement of proportion of cement should normally be on the basis of weight and whole bags each undisturbed and sealed 50 kg. Date of manufacture, batch number and place of manufacture should be clearly readable in each cement bag.

**Tests:** when tests are considered necessary, they shall be carried out as indicated in Nepal Standard/ I.S. 269‑1958. The contractor should ensure that the cement is of sound and required quality before using it. Test of each batch of cement shall be carried out in an approved laboratory at the Contractor's cost to show the acceptability of the material.

**Storage:** cement required for use shall be as fresh as possible and stored on planks raised 15 to 20 cms above the storey and stacked 30 cms away from the walls in suitable closed weatherproof buildings at the work site or at the selected approved site in such a manner as to prevent deterioration by dampness or moist atmosphere or intrusion of foreign matter. Cement shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt, i.e. first received being first used. Not more than 15 bags shall be stacked vertically in one pile and maximum width of the piles should not be more than 3 meters. Any cement which has deteriorated, cracked or which has been damaged shall not be used. Cement concerning which there is doubt shall not be used pending testing and satisfactory results. Cement that is condemned shall be immediately removed from the work site. When temporarily stored in the open for use within 48 hours, it shall be kept on a platform of planks about 15 to 20 cm above ground and covered with a tarpaulin. Ordinary cement stored for more than 2 months from the date of receipt from the factory shall be subjected to test and used only if found satisfactory. The cost of test shall be borne by the Agency responsible for the storage after two months from receipt. Different kinds or brands of cement or cement of the same brand from different factory (mills) shall be stored in separate areas and shall not be mixed during use except when directed in writing by the Engineer. Cement shall be kept in a store under double locking arrangement so that it can be taken out or fresh stock admitted with the knowledge of supervising staff of the Works. A board indicating stock and daily transactions of cement shall be kept in each room of the cement store. The cement shall not be stored unduly long periods. It shall not be handled in such a way as to impair its strength or useful characteristics.

##### CW.1.3. Sand

Sand shall consist of siliceous 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 NS/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 I.S. 383‑1970.

Sand for use in concrete shall be natural sand. Sand shall be clean, well graded, hard, strong, durable and gritty particles free from injurious amounts of dust, clay, soft or flaky particles, shale, salts, organic matter, loam, mica or other deleterious substances and shall be approved by the Engineer. When the quality of fine aggregate is doubtful, it shall be tested for clay, organic impurities and other deleterious substances as laid down in I.S. 383‑1970.

The fine aggregate shall be of the sizes as specified below.

a. Cement concrete topping of

thickness 40 mm and above ‑ fineness modules between 2 and 3.

b. Cement concrete topping of

thickness 10mm and above ‑ fineness modules between 4 and 6.

The Contractor has to identify the source of sand. The Contractor shall conduct sieve analysis test from reputed test lab for each batch of sand at his own cost.

##### CW.1.4. Reinforcing Bars

Reinforcing steel shall be clean and free from loose mill scales, dust, loose rust and coats of paints, oil, grease or other coating, which may impair or reduce bond. Reinforcing bars should be :

1. TMT steel (Thermo Mechanically Treated), Grade Fe 500, high strength deformed steel bars conforming to IS: 1786, IS :456, latest revision.

2. The TMT bars should have Yield strength 500Mpa, Tensile Strength 580MPA and Elongation in % 20.

3. Hard‑drawn steel wire fabric conforming to IS: 1566, IS 456 ‑ latest revision.

All steel reinforcement above 6mm diameter shall necessarily be of tested quality. Test of each batch of reinforcement shall be carried out in an approved laboratory at the Contractor's cost to show the acceptability of the material. Along with all types strength test of the reinforcement bars, the Contractor shall conduct bend/re-bend test, as well.

##### CW.1.5. Bricks

Bricks: Unless otherwise specified, burnt clay bricks shall conform to the requirement of I.S. 1077‑1957. Specification for Common Burnt Clay Building Bricks and shall be first class quality. As a minimum, all bricks will have a compressive strength of 7.5MPa or more. The brick has been referred as local chimney made bricks and machine-made brick for fair face. Bricks 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.

Bricks shall be free from cracks, chips, flaws, stones or lumps of any kind. They shall be free from salt which effect the mortar of the masonry. Bricks shall not show any sign of efflorescence either dry or subsequent to soaking in water. Bricks shall be sound, hard, homogeneous texture and emit a clear ringing sound on being struck and water absorption shall be minimum. All bricks shall have to be approved by the Engineer/Resident Engineer. Any bricks not up to the specification must be removed from the site immediately at Contractor's own cost. Representative samples of bricks to be used shall be submitted to the Engineer and his approval taken before bulk purchase. 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.

Bricks shall not be dumped at site. They shall be stacked in regular layers even as they are unloaded. The supply of bricks shall be arranged that at least two weeks requirement of bricks are available at site at any time.

Bricks selected for different situation for use in the work shall be stacked separately.

##### CW.1.6. Coarse Aggregate

Coarse aggregate shall consist of crushed or broken stone and be hard, strong, dense, durable, clean and of proper gradation and free from skin and coating likely to prevent proper adhesion of mortar. The aggregate shall generally be cubical in shape and as far as possible flaky, elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383‑1970 and I.S. 515‑1959. Stone shall have no deleterious reaction with cement.

The coarse aggregate shall be of the following sizes:

|  |  |  |
| --- | --- | --- |
|  | Normal cement concrete of 100mm and above thickness | ‑ graded 20mm and below |
|  | Cement concrete topping thickness 40mm and above | ‑ graded from 12mm and below |
|  | Mass cement concrete of 500mm and above | ‑ graded 38mm and below |

Grading tests shall be taken in the beginning and at change of source or material. Where required, by the Engineer, tests indicated in I.S. 383‑ 1970 and I.S. 456‑1978 shall be carried out in an **approved laboratory** at the Contractor's cost to show the acceptability of the material.

Coarse aggregate of a porous nature where absorption of water after 24 hours immersion in water, is more than 5 percent by weight, shall not be used.

Limits of deleterious substances shall not exceed those prescribed in 2.3.1.1 and 2.3.1.2 of I.S. 515‑1959.

The aggregates of different sizes shall be stored separately and handled in such a manner as to prevent intermixing of different sizes of aggregate required separately for grading purposes. No foreign matter shall be allowed to be mixed up with aggregates. If covered with dust etc. they shall be washed clean before use.

Sample of coarse aggregates required for the work shall be approved by the Engineer both regarding the quality and grading and shall be kept in the site office. The coarse aggregates to be used shall conform to these samples.

For controlled concrete, the aggregate shall be supplied in separate batches, consisting at least of coarse, medium and fine gradings. These will then be combined in proportions given by standard grading curves specified in relevant I.S. Codes. An average mix composition of 20mm (3/4") and 38mm (1.2") aggregates that will be obtained from the average standard aggregates grading curves is shown in Table ‑ A.

**Table – A Coarse Aggregate Grading**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IS Sieve** | **Percentage passing of graded aggregate of nominal size by weight** | | | |
| **50mm** | **20mm** | **16mm** | **12.5mm** |
| 40mm | 95 to 100 | 100 |  |  |
| 20mm | 30 to 70 | 95 to 100 | 100 | 100 |
| 16mm | - | - | 95 to 100 | - |
| 12.5mm | - | - | - | 95 to 100 |
| 10.0mm | 10 to 35 | 25 to 55 | 30 to 70 | 40 to 85 |
| 4.75 mm | 0 to 5 | 0 to 10 | 0 to 10 | 0 to 10 |
| 2.36 mm | - | - | - | - |

**Fine aggregate Grading**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IS Sieve** | **Percentage passing by weight** | | | |
| **Grading zone I** | **Grading zone II** | **Grading zone III** | **Grading zone IV** |
| 10mm | 100 | 100 | 100 | 100 |
| 4.75 mm | 90 to 100 | 90 to 100 | 90 to 100 | 95 to 100 |
| 2.36 mm | 60 to 95 | 75 to 100 | 85 to 100 | 95 to 100 |
| 1.18 mm | 30 to 70 | 55 to 90 | 75 to 100 | 90 to 100 |
| 600 mic | 15 to 20 | 35 to 59 | 60 to 79 | 80 to 100 |
| 300 mic | 5 to 20 | 8 to 30 | 12 to 40 | 15 to 50 |
| 150 mic | 0 to 10 | 0 to 10 | 0 to 10 | 0 to 15 |

Zone I, fine aggregate is the coarest and zone IV is the finest. Zone II is the finer, than zone I sand and zone III is finer than zone II sand.

Note: The above will NOT give a perfect grading. It can be expected, however, that the above grading will normally give good results.

Stone shall be hard, sound, far from decay, durable, tough, free from cracks and decaying. Stones with process matter or with boulder skin shall be rejected. It should be gravels / quartzite / gneiss stone in that order a preferably of similar quality and strength. It should in no case shall have any deleterious reaction with cement.

##### CW.1.7. Glass

All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters and other defects. The kind of glass supplied by the contractor shall be as mentioned in the item or in the special provision or as shown on the detailed drawings.

When plate glass is specified, it shall be "polished patent float glass" of the best quality. It shall have both the surfaces ground flat and parallel and polished to obtain clear undistorted vision and reflection. The plate shall be of the thickness mentioned in the item, shown in the detailed drawings or specified in the special provisions. In the absence of any specified thickness the thickness of the plate glass to be supplied shall be 5.5 mm. A tolerance of 0.55 to 0.80mm shall be admissible on the nominal thickness of polished plate glass.

Approved quality of toughen glass should be used as mentioned in drawing and BOQ.

##### CW.1.8. Wood/Veneer

Plywood/veneer shall be of or superior to Indian Standard, 5 or 7 ply. All such plywood shall be pressed properly to the required degree and to the required uniformity. They shall be of approved pattern and shall conform to I.S. 1328‑1959.

Defective plywood/veneer either by the damaged corner or edge or by defective pressing shall not be used at all.

Storage of such boards shall be done in uniform layer above storey level in a dry plate form. No edge shall be contacted with wall and storey while storing.

## 

##### CW.1.9. Steel Sections

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 of medium unless instructed.

## CW.2. EARTH WORK

##### CW.2.1. Scope

This specification covers the earthwork in excavation for all types of foundation wet or dry.

##### CW.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 removed as directed, roots being entirely grubbed up. The materials obtained will be the property of the Government and materials pronounced useful by the Engineer will be conveyed and properly stacked as directed. Useless materials shall be disposed off the site as directed by the Engineers.

##### CW.2. 3. Setting Out

After clearing the site, the center 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.

##### CW.2.4. 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 plans or as directed by the Engineers. It shall be taken to the exact width of the lowest step of the footing and the sides shall be left plumb where the nature of soil admits it. Unless there is a specific extra provision in the contract for shoring or for cutting side slopes, contractor shall at his own cost do the necessary shoring or cutting of slopes to a safe angle or both as approved by the Engineers, when the strata need such treatment. The contractor shall notify the Engineers before starting excavation to enable him to take cross sectional level for purposes of measurements before the ground is disturbed.

Wherever there is the need to cut the slope in order to fit the structures/building at the site, a minimum of 60-degree slope must be maintained.

##### CW.2.5. Preparation of Foundation for Footing

The bottom of foundation shall be levelled both longitudinally and transversely or stepped as directed by the Engineers. Before footing is laid final surface shall be slightly watered and rammed. If any soft patches come to light on inspection or ramming, these shall be dug out and dealt with as directed by the Engineers. If excess excavation has been done, no filling shall be allowed to bring the foundation to the required level. If by contractor's mistake, excavation is made deeper than shown on the plans or ordered by the Engineer, the extra depth shall be made up with concrete or masonry of the foundation grade as directed by the Engineers, and at the cost of the contractor. All rock or other hard foundation shall be cleaned of all soft and loose material and out to a firm surface, either level, stepped or serrated as directed by the Engineers. The elevation of the bottom of foundation shown on the plan shall be considered as approximate only and the Engineer may order such changes in the dimensions and elevations of the foundation as may be deemed necessary to secure satisfactory foundation. Footing depth shall be referenced from existing bench mark as defined in site plan.

After each excavation is completed, the contractor shall notify the Engineers to that effect and no footing shall be allowed to be laid until the Engineers has approved the depth and dimensions of excavation and nature of the foundation material and the levels and measurements are recorded.

##### CW.2.6. 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.

##### CW.2.7. Protection

Near towns and all frequented places foundation pits, well pits and similar excavation shall be strongly fenced and marked with red lights at night placed in charge of watchman to avoid accidents. Adequate protective measures shall be taken to see that the foundation excavation does not affect or damage adjoining structures. 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 taken by the Contractor at his own cost, he being entirely responsible for any injury to life and damage to property caused by his negligence or accident due to his constructional operations.

##### CW.2.8. 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 1.5 meters or greater distance as directed by the Engineers from the outer edge of excavation. All materials excavated will remain the property of the Owner. The materials found unsatisfactory for backfill shall be removed from the site at the time of excavation. 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 layers not exceeding 300mm, moistened and well compacted. Materials not useful in any way shall be thrown 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.

##### CW.2.9. 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 form 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 Engineer considers that the mortar is sufficiently set.

##### CW.2.10. 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.

##### CW.2.11. Backfilling

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 not exceeding 300mm in thickness, watered and rammed to compact with a recommended dry density of 95% and testing shall be done by proctor’s test.

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.

##### CW.2.12. Types of Excavation

##### CW.2.12.1. Ordinary Soil

Soils of all sort, sand, loose gravel, soft clay, black soil and other similar soft or loose materials etc. shall include all materials of earthy or sandy nature which can be easily ploughed or small shingle or gravel which can be easily removed.

##### CW.2.12.2 Conglomerate

Gravel mixed soil / hard soil which is to be excavated by the help of pick, Jumper and lifted or removed by the help of shawel.

##### CW.2.12.3 Rock / Hard Rock

Large boulder / stone or pebbles formally jointed / cemented which need chisel to brake / excavate.

##### CW.2.12.4 Rate

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 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.

##### CW.2.12.5. Measurement and Payment

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

Dimension shall be measured nearest to one centimeter (inch) and individual quantity shall be calculated correct to two places of decimals of a cubic meter (cubic foot) as per Nepal Standards.

## CW.3. Cement concrete work for general use

##### CW.3.1. Scope

This specification deals with the cement concrete, plain or reinforced for general use of specified proportion and flooring (I.S. Code of Practice IS:456 latest revision to be complied with unless permitted otherwise hereinafter).

##### CW.3.2. Materials

All required materials shall be as specified in "STANDARD CONSTRUCTION MATERIALS"

##### CW.3.3. Grades of Concrete

**a. General:**

Structural concrete shall be either ordinary or controlled and in two grades designated as M200 and M250, as specified in IS:456 ‑ latest provision.

**b. Ordinary Concrete:**

Ordinary concrete is recommended only when accurate control is impracticable and not necessary. However, if ordinary concrete is allowed by the Engineer, it shall be used only in the concrete of Grades M200 and M250. Ordinary concrete does not require preparation of trial mixes. But all necessary tests shall be carried out before concreting and random sample collection during concreting.

At least three deferent brands of cement shall be tested for verification using approved sand and aggregate.

Concrete mix proportions for ordinary concrete shall be as per IS:456 ‑ latest revision ‑ and as follows :

**Table – B**

**Mix Proportions (By Weight) Expected to Give Different Degrees of**

**Workability with Different Water Cement Ratios and Specified Strength**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **(For Guidance)** | | | | | | |
| Workability | Water Cement Ratio | Compressive Strength in 28 days kg/Cm2 | Ratio by Weight of Cement to Gravel Aggregate | | Ratio by Weight of Cement to Crushed Stone Aggregate | |
| 20 mm size | 38 mm size | 20 mm size | 38 mm size |
| Very low | 0.4 | 360 | 1:4.8 | 1:5.3 | 1:4.5 | 1:5.0 |
| Slump | 0.5 | 290 | 1:7.2 | 1:7.7 | 1:6.5 | 1:74 |
| 0-25 mm | 0.6 | 220 | 1:8.5 | 1:8.6 | 1:7.8 | 1:8.4 |
|  | 0.7 | 160 | 1:9.0 | 1:9.0 | 1:8.7 | 1:8.9 |
| Low | 0.4 | 360 | 1:3.9 | 1:.5 | 1:3.5 | 1:4.0 |
| Slump | 0.5 | 290 | 1:5.5 | 1:6.7 | 1:5.0 | 1:5.5 |
| 25-50 mm | 0.7 | 160 | 1:8.0 | 1:8.5 | 1:7.4 | 1:8.0 |
| Medium | 0.4 | 360 | 1:3.5 | 1:3.8 | 1:3.1 | 1:3.6 |
| Slump | 0.5 | 290 | 1:4.8 | 1:5.7 | 1:4.2 | 1:5.0 |
| 50-100 mm | 0.7 | 160 | 1:6.8 | 1:7.9 | 1:6.2 | 1:7.0 |
| High | 0.4 | 360 | 1:3.2 | 1:3.5 | 1:2.9 | 1:3.3 |
| slump | 0.5 | 290 | 1:4.4 | 1:5.2 | 1:3.9 | 1:4.6 |
| 100-175 mm | 0.6 | 220 | 1:5.4 | 1:6.7 | 1:4.7 | 1:5.7 |
|  | 0.7 | 160 | 1:6.2 | 1:7.4 | 1:5.5 | 1:6.5 |

Notwithstanding anything mentioned hereinbefore, the maximum total quantity of aggregates by weight per 50 kg. of cement shall not exceed 450 kg. except where otherwise specifically permitted by the Engineer.

The minimum cement content for each grade of concrete shall be as follows:

Minimum Cement Content per Cu.M.

Grade of Concrete of Finished Concrete

……………………… ……………………………………………

M 20 360 kg.

M 25 420 kg.

At least four trial batches are to be made and six test cylinders/cubes taken for each batch noting the slump on each mix. These cylinders/cubes shall be tested in a testing laboratory approved by the Engineer at 7 days and others at 28 days for obtaining the ultimate compressive strength. The test reports shall be submitted to the Engineer. The cost of the mix design and testing shall be borne by the Contractor.

On the basis of the above test reports, proportion of mix by weight and water‑cement ratio will be approved by the Engineer, the proportions so decided for different grades of concrete shall be adhered to during all concreting operations. If, however, at any time, the Engineer feels that the quality of the materials being used, has been changed from those used for preliminary mix design, the Contractor shall have to run similar trial mixes design, the Contractor shall ascertain the mix proportions and water‑cement ratio for obtaining the desired strength and consistency. It will be within the competency of the Engineer to reduce the number of trial batches and the number of test specimens mentioned above.

The mixes once approved must not be varied without prior approval of the Engineer.

In designing the mix proportions of concrete, the quantity of both cement and aggregate shall be determined by weight. The Engineer may allow the quantity of aggregates to be determined by equivalent volume basis after the relationship between the weight and volume is well established by trial and the same shall be verified frequently. Water shall be either measured by volume in calibrated tanks or weighted.

All measuring equipment shall be maintained in a clean and serviceable condition and their accuracy periodically checked.

To keep the water‑cement ratio to the designed value, allowance shall be made for the moisture content in both fine and coarse aggregates and determination of the same shall be made as frequently as directed by the Engineer. The determination of moisture contents shall be according to IS: 2386 (Part III) ‑ (latest revision).

##### CW.3.4. Strength requirements

Where ordinary portland cement conforming to IS: 269 ‑ latest revision or Portland cement ‑ Furnace Slag cement conforming to IS: 455 ‑ (latest revision) is used, the compressive strength requirements for various grades of concrete shall be as shown in Table ‑ IV and shall apply to both controlled concrete and ordinary concrete.

The acceptance of strength of concrete shall be as per clause 5.4 "Sample size and Acceptance Criteria" of IS: 456 ‑ latest revision subject to the stipulations and/or modifications stated elsewhere in this specification.

Concrete work found unsuitable shall have to be dismantled and replacement to be done as per specification by the Contractor. No payment for the dismantled concrete, the relevant formwork and reinforcement embedded fixtures, etc. shall be made. In course of dismantling, if any damage is done to the embedded items or adjacent structures, the same shall be made good free of charge by the Contractor to the satisfaction of the Engineer.

Compressive strengths for different grades of concrete as specified in Table ‑ IV shall always refer to the cylinder/cubes strength based on test conducted on 15 cm diameter and 30 cm height.

Other requirements of concrete strength as may be desired by the Engineer shall be in accordance with IS: 456 ‑ (latest revision).

**Table –C**Strength Requirement of Concrete

Compressive strength of 15 cm. diameter and 30 cm. high cylinder or 15cm cube at 28 days after mixing, conducting in accordance with IS: 456 ‑ latest revision

|  |  |  |
| --- | --- | --- |
| **Grade of Concrete** | **Preliminary tests kg/cm2** | **Work test kg/cm2** |
| M 200 | 260 | 200 |
| M 250 | 320 | 250 |

With permission of the Engineer, for any of these above mentioned grades of concrete shall also be increased proportionately to keep the ratio of water to cement same as adopted in trial mix design for each grade of concrete. No extra payment for the additional cement will be made.

##### CW.3.5. Workability

The workability of the concrete shall be checked at frequent intervals by slump test. Where facilities exist and if required by the Engineer, alternatively, the compacting factor test in accordance with IS: 1199 ‑ (latest revisions), shall be carried out. The degree of workability necessary to allow the concrete to be well consolidated and to be worked into the corners of formworks and around on the type and nature of structure and shall be based on experience and tests within the preferred limits of consistency as specified in Table below for various types of structures.

**Table -D**

**Limits of Consistency**

|  |  |  |  |
| --- | --- | --- | --- |
| **Degree of Workability** | **Minimum Slump in mm** | **Maximum Slump in mm** |  |
| Low | 20 | 40 | Mass concrete foundations without vibrations, simple reinforced section with vibration. |
| Medium | 50 | 100 | Normal reinforced beams, columns, slabs without heavily reinforced section with vibration. |
| High | 100 | 150 | Section with congested reinforcement not normally suitable for vibration. |

*Note:* However, the slump to be obtained for work in progress shall be as per direction of the Engineer.

##### CW.3.6. Workmanship

**a. General:** All workmanship shall be according to the latest and best possible standards.

***i.*** ***Mixing of Concrete***:

The proportion of fine and coarse aggregate, cement and water shall be as determined by the preliminary tests or according to fixed proportions in case of ordinary concrete and shall always be approved by the Engineer. The quantities of fine and coarse aggregates shall be determined by weight. The water shall be metered accurately after giving proper allowance for surface water present in the aggregates for which regular check shall be made by the Contractor. Concrete shall be always mixed in a mechanical mixer unless specifically approved by the Engineer for concrete to be used in unimportant structure. The water shall not be poured into the drum of the mixer until all the cement and aggregates constituting the batch are already in the drum and mixed for at least one minute. Mixing of each batch shall be continued until there is a uniform in colour and consistency, but in no case shall mixing be done for less than two minutes and at least forty revolutions after all the materials and water are in the drum. When absorbent aggregates are used or when the mix is very dry, the mixing time shall be extended as may be directed by the Engineer. Mixer shall not be loaded above their rated capacity as this prevents thorough mixing.

The entire contents of the drum shall be discharged before the ingredients for the next batch are fed into the drum. No partly set or remixed or excessively wet concrete shall be used and it shall be immediately removed from site.

Each time the work stops, the mixer shall be thoroughly cleaned and when the next mixing commences, the first mix shall have 10% additional cement at no extra cost to the Employer to allow for loss in the drum.

When hand mixing is permitted by the Engineer for concrete to be used in non-structural elements, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. In case of hand mixing, additional 10% cement by volume shall be added to each batch with no extra cost to the owner.

***ii.*** ***Conveying and Pumping Concrete:***

Concrete shall be handled and conveyed from the place of mixing to the place of final deposit as rapidly as practicable by approved means before the initial setting of the cement starts. Concrete should be conveyed in such a way as will prevent segregation or loss of any of the ingredients. If segregation does occur during transport, the concrete shall be remixed. During the very hot or cold weather, if directed by the Engineer concrete shall be transported in deep containers which will reduce the rate of loss of water by evaporation and loss of heat. Conveying equipment for concrete shall be well maintained and thoroughly cleaned before commencement of concrete mixing. Such equipment shall be kept free from set concrete. While using the wheelbarrow for transporting the concrete, plywood/planks over the steel reinforcement have to be used. Before pouring, the concrete in the wheelbarrow must be mixed using shovel.

For major concrete works, a concrete pump should be used. Concrete mix should be placed at pouring place through an appropriate boom. At pouring spot, people of concrete gang should place concrete uniformly by holding a rubber/boom pipe.

***iii.*** ***Placing Concrete:***

Form work and reinforcement shall be approved in writing by the Engineer prior to placing of concrete. Concrete shall be placed in its final position without segregation. The forms shall be well wetted and all shavings, dirt and water that may have collected at the bottom shall be removed before concrete is placed. The interval between adding the water to the dry materials in the mixer and the completion of the final placing inclusive of compaction of the concrete shall be not more than initial setting time of the cement, normally 30 minutes for ordinary Portland cement. The concrete shall be well placed in the form work by means approved by the Engineer and shall not be dropped from a height or handled in a manner which may cause segregation. Any drop above 100 cm shall have to be approved by the Engineer. Once the concrete is placed in its final position, it shall not be disturbed. After the concrete has been placed, it shall be spread and thoroughly compacted by approved mechanical vibration to a maximum subsidence without segregation and thoroughly worked around reinforcement or other embedded fixtures into the correct form and shape. Vibration shall not be used for pushing and shoveling concrete. Vibrator must be operated by experienced men and over vibration shall not be permitted.

***Precise line, level and sloping should be strictly maintained as mentioned in the drawing and as per instruction of the Engineer. The required perfect line, level and sloping should be achieved by using power trowel machine. Hand tamping in some cases may be allowed subject to the approval of the Engineer.***

No concrete shall be placed in open, while it rains. If there has been any sign of separation of cement and sand by washing, the concrete shall be entirely removed immediately. Suitable precautions shall be taken in advance to guard against rains before leaving the fresh concrete at site. No accumulation of water shall be permitted on freshly laid concrete. Slabs, beams and similar members shall be poured in one operation normally. Bleeding of under layer, if any shall be effectively removed. Moulding, throating, drip coarse, etc. shall be poured as shown on the drawing or as directed by the Engineer. Holes shall be provided and bolts sleeves, anchors fastenings or other fixtures shall be embedded in concrete as shown on the approved drawings or as directed by the Engineer. Any deviation there from the drawing shall be set right by the Contractor at his own expense as instructed by the Engineer.

***iv.* *Construction Joints****:*

When the work is to be interrupted, the concrete shall be rebated at the joint to such shape and size as may be required by the Engineer or as shown on the drawing. All vertical construction joints shall be made with step boards, which are rigidly fixed and slotted to allow for the passage of the reinforcing steel. If desired by the Engineer keys and/or dowel bars shall be provided at the construction joints. In the case of water retaining structure water stops of approved material shall be provided if so specified in the drawings or desired by the Engineer. Construction joints shall be provided in positions as described, the joints shall be in accordance with the followings:

In a column, the joint shall be formed about 75mm below the lowest soffit of the beams framing into it.

Concrete in a beam shall be placed throughout without a joint, but if the provision of a joint is unavoidable, the joint shall be vertical and at the middle of the span. A joint in a suspended floor slab shall be vertical at the middle of the span at right angle to the principal reinforcement. The locations of construction joint shall be planned by the contractor well in advance of pouring and will have to be approved by the Engineer.

Before fresh concrete is placed, the cement skin of the partially hardened concrete shall be thoroughly removed and surface made rough by hacking, sand blasting, water jetting, air jetting or any other method as directed by the Engineer. The rough surface shall be thoroughly wetted for about two hours and shall be dried and coated with 1:1 freshly mixed cement sand slurry before placing the new concrete. The new concrete shall be worked against the prepared surface before the slurry sets. Special care must always be taken to see that the first layer of concrete placed after a construction joint is cold. Joints during pour shall be treated with 1:1 freshly made cement sand slurry only after removing all loose materials.

***v. Protection and Curing of Concrete:***

Newly placed concrete shall be protected from rain, sun and wind. As soon as the concrete has hardened sufficiently for the surface to be marked, it shall be covered either with canvas or similar materials and kept continuously wet for at least fourteen days after final setting. This period may be extended at the discretion of the Engineer. For the columns wetted jute bags shall be used and for the slab ponding has to be created.

***vi. Control Tests on Concrete:***

Six test cubes for each type of work shall be taken by the Contractor for each 8 hours or less of concreting. If the value of concrete poured is less than 20 M3 on any day per mixing plant, the Engineer may exempt or reduce the number of test cylinders. The samples of concrete shall be tested in an approved laboratory in presence of the Engineer and the test results shall be submitted in triplicate to the Engineer. The Contractor shall carry out the sampling and testing according to the provisions of this Specification at his own cost. No payment shall be made for the concrete used in specimens.

To control the consistency of concrete from every mixing plant, slump tests shall be carried out by the Contractor free of charge every two hours or as directed by the Engineer. The amount of mixing water shall not be changed without prior approval of the Engineer. Slumps corresponding to the test cylinders shall be recorded for reference. The Engineer if he so desires may order special tests to be carried out on cement, sand or coarse aggregates, water, reinforcing steel, or traverse tests in accordance with I.S.I. recommendations. If the material tested is found to be suitable for the intended use, the cost of these special tests shall be borne by the Owner. If the material is found to be not suitable for the intended use the cost of these special tests shall be borne by the Contractor. Further, during the progress of the work if the Engineer has doubt about the quality of any material in use he can instruct suspension of its use till the material is proved acceptable by test. Any consequent loss arising out of the suspension shall be borne by the Contractor. The Engineer at its discretion can ask for NDT tests whenever required the cost of which will have to be borne by the contractor

**b. Exposed Surface**

Interior: ‑ Imperfect surface, where strength is not required shall be patched with plaster (of cement: sand ratio of 1: 2) and rubbed smooth with carborundum stone. Immediately the formwork is stripped off, fins and projections shall be removed and the concrete surface affected thereby shall be rubbed smooth to the satisfaction of the Engineer.

Wherever there are exposed surfaces in the structural elements, pressure grouting as directed by the Engineer will have to be undertaken to rectify the defect and the cost of the same will be borne by the contractor.

**c. Anchor Bolts, Anchors, Openings, Sleeves, Inserts and Other Built‑in Fixtures**

The Contractor shall take care to comply with the requirements of all openings, grooves, chases etc. in concrete work as shown on the drawings or as specified by the Engineer. He shall build into concrete work all the materials noted below and shall embed and secure the same as and when required. The materials required to be supplied by the Contractor, shall be of best quality available of approved manufacture and shall be up to the satisfaction of the Engineer.

Materials to be embedded:

i. Inserts, hangers, anchors, opening frames, manholes, covers, floor clips, sleeves and conduits.

ii. Anchor bolts and plates for machinery, equipment and for structural steel work.

iii. Dowels bars, etc. for concrete work falling under scope of future works.

iv. Lugs or plugs for door and window frames occurring in concrete work.

v. Flashing and jointing in concrete work.

vi. Sanitary floor trap at the appropriate elevations for finished floor covers..

vii. Any other built‑in‑fixtures as may be required.

viii. Correct location, exact alignment, etc. of all these shall be entirely the responsibility of the Contractor.

**d. Joints etc.**

***i. Expansion and Isolation Joints:***

Expansion joints in concrete structures shall be provided at specified places as indicated on the drawings. The materials and types of joints shall be as specified below. In case of liquid retaining structures, additional precaution shall be taken to prevent leakage of liquids as may be specified on the drawings or as directed by the Engineer. The Engineer may demand test certificates for the materials and/or get them tested.

##### 

##### CW.3.7. Waterproofing

The materials shall conform to the respective I.S. Code ‑ latest revision, where applicable. The Engineer's approval to the materials shall be obtained by the Contractor before procurements. If desired by the Engineer, test certificates for the materials shall be submitted by the Contractor. The materials shall be of best quality available indigenously, fresh and thoroughly clean.

**Water Proofing Admixtures**

***i. In Concrete:***

The admixture shall be of right variety and procured freshly. The admixture shall be approved by the Engineer. The method of application and other details shall exactly conform to the manufacturer’s specification. The concrete shall have the services of the manufacturer’s supervision at no extra expense to the Employer to supervise the work if desired by the Engineer.

***ii. In Plaster:***

The concrete surface to be plastered, to be hacked to the Engineer's satisfaction. The plaster shall be made of cement and sand as approved by the Engineer. If desired by the Engineer, the Contractor shall have the work supervised by the manufacturers supervisor at no extra cost to the Owner.

##### CW.3.8. Rates

The rates for items shall include cost of all materials consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

## CW.4. CENTERING AND SHUTTERING FOR RCC WORK

##### CW.4.1. Scope

This specification covers centering and shuttering works for RCC works of any size, shape etc. at any level including strutting, propping and removal thereof.

##### CW.4.2. Material

Form work shall be composed of steel and/or best quality shuttering wood or shuttering of 18mm thick plywood. Timber shall be free from knots and shall be of medium grain as far as possible. Hard woods shall be used as caps and wedges under or over posts. Plywood or equivalent shall be used where specified to obtain smooth surface for exposed concrete work. Struts shall generally be mild steel tubes. Shuttering shall give a best-off form finish with proper alignment of all joints and gaps shall not exceed 5mm.

##### CW.4.3. Shop Drawing

The Contractor shall prepare, design and drawings for formwork and centering before commencement of actual work and get them approved by the Engineer. The formwork and centering shall conform to the shape, lines and dimensions as shown on the drawings.

##### CW.4.4. Construction

The centering shall be true and rigid and thoroughly braced both horizontally and diagonally. The forms shall be sufficiently strong to carry without undue deformation, the dead weight of the concrete as a liquid and working load. Where the concrete is vibrated, the formwork shall be strong enough to withstand the effects of vibration without appreciable deflection, bulging distortion or shall be sufficiently tight to prevent any leakage of mortar. The formwork shall be poured members such as to ensure the concrete a smooth uniform surface free from honeycombs, air bubbles, fines and other blemishes.

Deflection of forms shall be limited to 5mm on column and beams. Column shall not vary from plumb more than 5mm.

For exposed interior and exterior concrete surface of beams, columns and walls, plywood or other approved forms, thoroughly cleaned and tied together with approved corrosion‑resident divides shall be used. Rigid care shall be exercised in ensuring that all columns are plumb and true and thoroughly cross braced to keep them so. All floor and beam centering shall be crowned not less than 8mm in all directions for every 5 meter span. Unless described in the drawing or elsewhere to the contrary, beveled strips 25mm by 25mm shall be provided without any extra charge, to form angles and in corners of column and beam boxes for chamfering of corners. Temporary openings for cleaning, inspection and for pouring concrete shall be provided at the base of vertical forms and at other places, where they are necessary and as may be directed by the Engineer. The temporary openings shall be so formed that they can be conveniently concerted.

##### CW.4.5. Cleaning and treatment of forms

All rubbish, loose concrete chippings, shavings, saw dust etc. shall be scrupulously removed from the interior of the forms before the concrete is poured. Wire brushes, brooms, etc. compressed air jet and/or water jet shall be kept handy for the cleaning if directed by the Engineer.

The form surface in contact with concrete shall be treated with approved non‑staining composites, such as approved brand form oil. It shall not come in contact with reinforcing steel or existing concrete surface. They shall not be allowed to accumulate at the bottom of the shuttering.

The formwork shall be so designed and erected that the forms for slabs and the sides of the beams, columns and walls may be removed first, leaving the shuttering to the soffits of beams and their support in position. If formwork for column is erected for the full height of the columns, one side shall be left open and built up in sections, as placing of concrete proceeds. Wedges, spacer bolts, clamps, or other suitable means shall be provided to allow accurate adjustment of the formwork and to allow it to be removed gradually without jarring the concrete.

##### CW.4.6. Removal of forms

The Contractor shall record on the drawing or in some approved manner, the date on which the concrete is placed in each part of the work and the date on which the formwork is removed therefrom and have this record checked and countersigned by the Engineer. The Contractor shall be responsible for the safe removal of the formwork, but the Engineer may delay the time of removal, if he considers it necessary. Any work showing signs of damage through premature removal of formwork or loading shall be entirely reconstructed without any extra cost of the owner.

Forms for various types of structural component shall not be removed before the minimum periods specified below, which shall also be subjected to the approval of the Engineer.

**Table -E**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Part of Structure | Ordinary Portland Cement Concrete (Temp °C) | |  | Rapid Hardening Portland Cement Concrete (Temp °C) | |
| 40 - 20 | 20 - 5 | 40 - 20 | 20 - 5 |
| days | days | days | days |
| a. | Columns & Walls | 1 | 2 | Do not remove forms until | 1/2 | 2 |
| b. | Beam Sides | 2 | 4 | Site cured test cylinders develop 50% of | 1 | 3 |
| c. | Slabs 125 mm | 7 | 14 | 28 days strength | 4 | 7 |
| d. | Slab below 125mm | 14 | 21 |  | 8 | 14 |
| e. | Soffit of main beams | 21 | 28 |  | 10 | 16 |

Where exposed surface of concrete can be effectively sealed to prevent loss of water, the periods specified for temperature above 40o C can be reduced to those for the temperature range of 20o C to 40o C subject to the approval of the Engineer. Before removing any form work the Contractor must notify the Engineer well in advance to enable him to inspect the concrete if he so desires.

In case of evidence of honey comb at the time of form removal the contractor shall inform the structural engineer to inspect the honey comb. The honey comb shall be rectified only as instructed by the structural engineer. The contractor should not rectify the honey comb right after removal of the form on his own. The contractor should be well prepared to rectify honey comb prior to removal of forms.

##### CW.4.7. Tolerance

The formwork shall be so made as to produce a finished concrete true to shape, lines, levels, plumb and dimensions as shown on the drawings subject to the following tolerance unless otherwise specified elsewhere in this specification or drawings or directed by the Engineer:

a. Sectional dimension – 5 mm

b. Plumb – 1 in 1000 of height

c. Levels – 3 mm

##### CW.4.8. Re‑use of forms

Before re‑use, all forms shall be thoroughly scraped, cleaned, joints etc. examined and when necessary repaired and inside surface treated as specified hereinbefore. Formwork shall not be used/re‑used, if declared unfit or unserviceable by the Engineer.

##### CW.4.9. Classification

Marine grade plywood of good quality shall be used for formwork. Where a specially good finish is required and shall be made mostly of approved brand of heavy quality marine plywood to produce a perfectly level, uniform and smooth surface. Re‑use only may be permitted after special inspection and approval by the Engineer.

##### CW.4.10. Rate

Rate shall include for all necessary material and labour to execute the formwork.

##### CW.4.11. Measurement

Measurement for payment shall be done of the area on which centering shuttering has been carried out. Rate shall include centering and shuttering including propping, strutting etc. and removal of forms including applying form oil to shuttering shall be measured in sq.m. or sq.ft.

## CW.5. REINFORCING FOR RCC WORKS

##### CW.5.1. Scope

This specification covers providing and fixing TMT steel reinforcement of various sizes in all type of R.C.C. works.

##### CW.5.2. Material

The reinforcement shall be as specified in the STANDARD CONSTRUCTION MATERIAL and test certificate shall be submitted to the Engineer for approval. Each reinforcing bars shall be tested and any bar showing cracks or flows or scales shall not be used.

##### CW.5.3. Shop drawings: bar bending schedules

The Contractor shall furnish to the Engineer bar bending schedules for all R.C.C. work within one month of the receipt of the Letter of Intent or of the receipt of each design drawings whichever is later. Approval of schedule/drawing by the Engineer shall not relieve the Contractor from responsibility for errors nor relieve him of any part of his obligation to meet the entire requirement of the Contractor or of the responsibility for the correctness of his drawings.

##### CW.5.4. Cleaning

All steel for reinforcement shall be free from loose rust, oil grease, paint or other harmful matters.

##### CW.5.5. Protection

Reinforcement bars should be stored with protection from rain. They should be supported above ground by minimum 200mm.

##### CW.5.6. Bending

Unless otherwise specified, reinforcing steel shall be bent in accordance with procedure specified in IS: 2502 ‑ (latest revision) or as approved by the Engineer. Bends and shapes shall comply strictly with the dimensions in the approved Bar Bending Schedule. Contractor shall be entirely responsible for its correctness. Bars correctly bent shall only be used. No reinforcement shall be bent when in position in the work without approval of the Engineer, whether or not is partially embedded in concrete. Bars shall not be straightened in a manner that will injure the materials. Re‑bending can be done only if approved by the Engineer. Reinforcement bars shall be bent by machine or other approved means producing a gradual and even motion. All the bars shall be cold bent unless otherwise approved.

##### CW.5.7. Placing in position

All reinforcement shall be accurately placed in position as shown on the drawings. Bars intended to be in contact, at crossing points, shall be securely bound together at all such points by No. 20 BG annealed soft iron wire or by tack welding as may be directed by the Engineer.

Binders and the like shall tightly embraced the bars with which they are intended to be in contact and shall be securely held. The vertical distance between successive layers of bars shall be placed by provision of mild steel spacer bars. They should be so spaced that the main bars do not sag perceptibly between adjacent spaces.

The placing of reinforcement bars shall be completed well in advance of concrete pouring. The reinforcement shall be checked by the Engineer for accuracy of placement and cleanliness and necessary corrections prior to pouring the cement. The column shuttering/form work shall be securely held in position by nut and bolts or wooden clamps. The verticality has to be ensured. . Laps and anchorage lengths of reinforcing bars shall be in accordance with IS:456 ‑ latest revision‑ unless otherwise specified. If the bars in a lap are of the different diameter the smaller will guide the lap length. The laps shall be staggered as far as practicable and as directed by the Engineer.

##### CW.5.8. Exposed **r**einforcement

Reinforcement projecting from work being concreted or already concreted shall not be bent out of its correct position for any reason unless they are protected from deformation or other damage. Reinforcement left projecting for bending with future extension shall be thoroughly coated with cement grout wash, encased in concrete or otherwise protected from corrosion as approved by the Engineer.

##### CW.5.9. Cover to the reinforcement

Unless otherwise specifically stated anywhere in the contract, the following clear cover to the main reinforcement shall be strictly adhere to:

Column ‑ 40mm or size of the main bar whichever is greater

Beam ‑ 25mm or size of the main bar whichever is greater

Slab ‑ 20mm or size of the main bar whichever is greater

Footing ‑ 50mm or size of the main bar whichever is greater

##### CW.5.10. Rate

Rate shall include all material, labour and other incidental items for complete work.

##### CW.5.11. Measurement

The net reinforcement shall be worked out in term of weight as per the bar bending schedule approved by the Engineer, taking theoretical unit weight for various size of the bars. ***Chairs of any profile, spacer bars of any profile, binding wires, and wastages shall not be measured***. Only the authorized laps and splices will be measured.

##### CW.5.12. Safety barriers

In all the areas above GF, safety barricades shall be erected so that there are no accidents/casualties. These can be (but not limited to) net or plywood or similar barricades

## CW.6. BRICK MASONRY WORK

##### CW.6.1. Scope

This specification covers the construction of brick work in general and the erection of half brick, full brick and above thick walls in superstructure in particular.

##### CW.6.2. Materials

All required materials shall be as specified in the "STANDARD CONSTRUCTION MATERIALS".

##### CW.6.3. 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.

* Mix

Cement and sand (or any 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.

* Use of Mortar

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. Mortar can only be rehydrated one time within the ½ hour.

Transportation of Mortar:

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.

##### CW.6.4. 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 arrangement of quoin in a course shall generally be symmetrical. Holes for required size shall be left in the brickwork 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 10mm of 1:3 cement mortar.

##### CW.6.5. Thickness of joints

The thickness of the joints in the brickwork ***shall be 12mm*** unless otherwise specified and uniform throughout the work.

##### CW.6.6. Soaking of 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 plumpness 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.

##### CW.6.7. Laying of Bricks for Masonry

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 concealed joints.

##### CW.6.8. Raking out joints

Joints of brick work shall be ranked out to a depth of 6mm at the time of laying. The face of the brick work shall be kept clear of all mortar, the very day the brick work is laid. Joints shall be ‘Struck’ with a metal tool producing a smooth and hard weather resistant surface.

##### CW.6.9. Reinforcing and anchorage

For external walls, the 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.

##### CW.6.10. Other brick work

Half/Full brick thick wall:

***Two numbers of bars of 8mm diameter shall be used longitudinally at every 4th 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. In case of ends at RCC column, the reinforcement should be inserted 2” deep into the column by drilling. Laps for the reinforcement shall be provided of minimum length of 45 times the diameter of bar.

##### CW.6.11. Workmanship

* 1. All loose materials, dirts, and set lump of mortars may be laying over the surface over which the brick work is to be freshly started, shall be removed with a wire brush.
  2. All the bricks shall be thoroughly soaked in clean water before use.
  3. The surface over which the brick work is to be started shall be slightly wetted.
  4. The first course itself shall be made horizontal by providing enough mortar in the bed joint to fill up any undulations in the bed course.
  5. Required quantity of water is mixed in the mixing platform itself and not over the courses.
  6. The joint should be of uniform thickness as specified.
  7. There shall be no thorough joints and the lap shall not be less than half the width of the brick, and all the vertical joints are properly filled with mortar.
  8. The verticality and horizontality of the courses shall be checked very often with plumb bob and spirit level respectively.
  9. The courses of brick work shall be aligned and care shall be taken to keep the perpends.
  10. The brick work shall be built in uniform layers, corners and other advanced works shall be racked back. No part of the wall during its construction shall rise more than 1 metre above the general construction level, to avoid unequal settlement, and also improper jointing. Where the masonry of one part has to be delayed the work shall be racked back suitably at an angle not exceeding 45 degrees according to bond and not toothed.

##### CW.6.12. 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).

##### CW.6.13. Curing and protection

1. The brick work shall be kept wet by misting (flooding not allowed) for 7 days commencing from 24 hours after the course is laid.
2. At the end of the day's work the masonry construction shall be protected from harmful effects of rain, sun, and frost by suitable coverings such as **tarpaulin** or any other suitable coverings.
3. Care shall be taken during construction that edges of jambs, sills, heads etc. are not damaged.

##### CW.6.14. 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 **1.0m wide plyboards** to protect the materials from dropping off while working. Areas having work performed above ground floor shall be segregated for worker safety.

##### CW.6.15. Rates

Rates for item shall include necessary materials, labour and equipment for proper execution of work and that all auxiliary work is included. Rates shall include work at all the levels, double scaffolding, (special) conveyance of materials, barricading etc. Rates shall also include for curing.

##### CW.6.16. Measurements

The measurement of work shall be the product of the length, height and thickness for full brick and above thick walls. For half brick wall, the measurement of work shall be the product of the length and height. Deduction for doors, windows and other openings including lintels shall be made to arrive at the quantity of work. Nothing shall be paid extra for forming such openings. However, no deductions shall be made for areas less than 0.1 sq.m overall, bearing of lintels, beams, girders and hold fasts blocks but nothing extra like form work shall be paid for embedding these. Similarly, no deductions shall be made for chimney flue left in the walls, but nothing extra shall be allowed for rendering for flue openings as specified. Unless otherwise specified nothing extra shall be admissible for cutting shape other than straight or any cutting necessary for shaping the walls to the structural design.

## CW.7. PLASTER WORK

Plaster works cannot be undertaken without first completing the Electrical piping and metal box works. Likewise, the for the plumbing works all piping works including pressure testing has to be completed before the start of the Plaster works.

The cement plaster shall be 12 mm, 15 mm or 20 mm thick as specified in the item. ***Only graded river sand shall be permitted to be used for making the mortar.***

##### CW.7.1. Scaffolding

For all exposed brick work or tile work double scaffolding independent of the work having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

For all other work in buildings, single scaffolding shall be permitted. In such cases the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one metre in width or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering.

##### CW.7.2. Preparation of Surface

The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scrapping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced.

In case of concrete surface if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface.

##### CW.7.3. Mortar

The mortar of the specified mix using the type of sand described in the item shall be used. The mortar for cement plaster of specified proportion shall be mixed as specified in the specification for Brick Work. For external work and under coat work, the fine aggregate shall conform to grading IV. For finishing coat work the fine aggregate conforming to grading zone V shall be used.

##### CW.7.4. Application of Plaster

Ceiling plaster shall be completed before commencement of wall plaster.

Plastering shall be started from the top and worked down towards the floor. All putlog holes shall be properly filled in advance of the plastering as the scaffolding is being taken down. To ensure even thickness and a true surface, plaster about 15 × 15 cm shall be first applied, horizontally and vertically, at not more than 2 metres intervals over the entire surface to serve as gauges. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall, between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness. This shall be brought to a true surface, by working a Aluminum straight edge reaching across the gauges, with small upward and sideways movements at a time. Finally, the surface shall be finished off true with trowel or Aluminum float according as a smooth or a sandy granular texture is required.

Excessive troweling or over working the float shall be avoided. All corners, arrises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises, provision of grooves at junctions etc. where required shall be done without any extra payment. Such rounding, chamfering or grooving shall be carried out with proper templates or battens to the sizes required. When suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scrapped cleaned and wetted with cement slurry before plaster is applied to the adjacent areas, to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of wall and not nearer than 15 cm to any corners or arises.

It shall not be closed on the body of the features such as plasters, bands and cornices, nor at the corners of arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakages. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar. No portion of the surface shall be left out initially to be patched up later on. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar.

##### CW.7.5. Thickness

Where the thickness required as per description of the 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 the case of brick work, the minimum thickness over any portion of the surface shall be not less than 12.5 mm while in case of stonework the minimum thickness over the bushings shall be not less than 12.5 mm.

##### CW.7.6. Curing

Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered. Water should be sprayed mistily upon plaster works. The plaster shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages at the contractor’s expense by such means as the Engineer. The dates on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched.

##### CW.7.7. 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 with 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.

##### CW.7.8. Precaution

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.

(i) When ceiling plaster is done, it shall be finished to chamfered edge at an angle at its junction with a suitable tool when plaster is being done. Similarly, when the wall plaster is being done, it shall be kept separate from the ceiling plaster by a thin straight groove not deeper than 6 mm drawn with any suitable method with the wall while the plaster is green.

(ii) To prevent surface cracks appearing between junctions of column/beam and walls, 150 mm wide chicken wire mesh should be fixed with U nails 150 mm centre to centre before plastering the junction. The plastering of walls and beam/column in one vertical plane should be carried out in one go.

##### CW.7.9. Measurements

Length and breadth shall be measured correct to a cm and its area shall be calculated in

sqm or sqft correct to two decimal places.

Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves, or open

joints in brick work.

The measurement of wall plaster shall be taken between the walls or partitions (the dimensions before the plaster shall be taken) for the length and from the top of the floor or skirting to the ceiling for the height. Depth of coves or cornices if any shall be deducted.

Exterior plastering at a height greater than 10 m from average ground level shall be measured separately in each storey height. Patch plastering (in repairs) shall be measured as plastering new work, where the patch exceed 2.5 sqm. extra payment being made for preparing old wall, such as dismantling old plaster, raking out the joints and cleaning the surface. Where the patch does not exceed 2.5 sqm in area it shall be measured under the appropriate item under sub head ‘Repairs to Buildings.’

Deductions in measurements, for opening etc. will be regulated as follows:

(a) No deduction will be made for openings or ends of joists, beams, posts, girders, steps etc. upto 0.5 sqm in area and no additions shall be made either, for the jambs, soffits and sills of such openings. The above procedure will apply to both faces of wall.

(b) Deduction for opening exceeding 0.5 sqm but not exceeding 3 sqm each shall be made for

reveals, jambs, soffits sills, sills, etc. of these openings.

(i) When both faces of walls are plastered with same plaster, deductions shall be made for one face only.

(ii) When two faces of walls are plastered with different types of plaster or if one face is plastered and other is pointed or one face is plastered and other is unplastered, deduction shall be made from the plaster or pointing on the side of the frame for the doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

(iii) For opening having door frame equal to or projecting beyond thickness of wall, full deduction for opening shall be made from each plastered face of wall.

(c) For opening exceeding 3 sqm in area, deduction will be made in the measurements for the full opening of the wall treatment on both faces, while at the same time, jambs, sills and soffits will be measured for payment. In measuring jambs, sills and soffits, deduction shall not be made for the area in contact with the frame of doors, windows etc.

##### CW.7.10. Rate

The rate shall include the cost of all labour and materials involved in all the operations described above.

## CW.8. NEAT CEMENT PUNNING

Specifications for this item of work shall be same as described in Cement Plaster Work except for the additional punning coat which shall be carried out as below.

When the plaster has been brought to a true surface with the wooden straight edge (as mentioned in ‘Application of Plaster’ here above) it shall be uniformly treated over its entire area with a paste of neat cement and rubbed smooth, so that the whole surface is covered with neat cement coating. The quantity of cement applied for floating coat shall be 1 kg per sqm. Smooth finishing shall be completed with trowel immediately and in no case later than half an hour of adding water to the plaster mix. The rest of the specifications described in ‘Application of Plaster’ shall apply.

Specification for scaffolding, curing, finish and precautions shall be as described above in Cement Plaster Work.

**Measurements**

The measurements for cement punning shall be taken over the finished work. The length and breadth shall be measured correct to a cm or half an inch. The area shall be calculated in sq.m or sq. ft. correct to two places of decimal.

Punning over Plaster on bands, skirting, coping, cornices, drip courses, string courses etc. shall not be measured separately but only as wall surfaces. In these cases the measurements shall be taken girthed over the above features

Punning over plaster on circular work also, of any radius shall be measured only as wall

surfaces, and not separately.

Cement punning in patch repairs irrespective of the size of the patch shall be measured as new work, and in this case the rate shall include for cutting the patch to rectangular shape before punning.

Deductions in measurements for openings shall be regulated generally as described above in Cement Plaster Work.

Rate

The rate shall include the cost of all labour and materials involved in all the operations described above.

## CW.9. IPC FLOORING (Trowel Finish)

##### CW.9.1. Scope

This specification deals with the cement concrete, plain or reinforced for general use of specified proportion and flooring (I.S. Code of Practice IS:456 latest revisions to be complied with unless permitted otherwise hereinafter).

##### CW.9.2. Materials

Cement, sand, aggregates; water etc. as specified in plain cement concrete work.

##### CW.9.3. Mixing

The proportion shall be 1 cement : 2 sand : 4 stone aggregate 13mm and down gauge by volume as specified in the schedule. Grading aggregate shall be as per reinforced concrete specification.

##### CW.9.4. Preparing Base

The cement concrete suborder shall be cleaned of all loose earth, rubbish and other foreign matter. If necessary, the suborder shall be hacked and chipped and cleaned with wire brushes. Cleaned suborder shall then be wetted with water thoroughly, but no water pool shall be allowed. Necessary slope shall be given in the suborder itself.

In order to obtain the level, prior fixing of the level will be done before the concreting so that the required level is obtained.

##### CW.9.5. Laying Of Concrete

The floors shall be laid to specify thickness in panels of uniform size not exceeding 2.35 sq.m (one side not exceeding 1500mm). These shall be laid in alternate panels on different days if no glass strips are provided. The edges of the panels shall be protected by flat bars of iron or wood, their depth being equal to that of flooring. When glass strips are provided all panels of the flooring can be cast in one operation under controlled conditions so that voids do not occur under the panels at the corner junctions of the glass strips. Power trowel should be used to achieve perfect line and level.

##### CW.9.6.**Finishing Coat**

Neat cement finish: One layer of cement sand plaster of specified proportion (1:2) shall be used, which shall be cut in pattern, the joints shall be just above the joints of the concrete. Such plaster shall be followed by a thin coat of cement punning of specified mix which shall be in the approved pattern, trowelled and finished neatly or broom finished. However, the thickness of such film shall not be less than 3mm. Curing of the finished work shall be done by covering the whole surface with damp jute bags and kept wet for one week or as directed by the Engineer. Wherever colour crete is specified, such work shall be applied only in the neat finish coat and finished similarly.

##### CW.9.7. **Slopes**

Unless shown in the drawing, all slopes of the floor shall be towards the outlet at the rate of 0.5%.

##### CW.9.8. 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 plasterwork 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.

##### CW.9.9. Rates

The rates for items shall include cost of all materials consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

##### CW.9.10. Measurement

Measurement for IPC flooring shall be done of the area of the floor. Skirting shall be measured in length.

## CW.10. CERAMIC TILING

This specification covers providing and laying ceramic tiles glazed/non glazed in base mortar in floor as well as in walls in general.

##### CW.10.1. Tiles

Glazed or non‑glazed ceramic tiles shall be of approved make. These shall be of specified size and colours approved by the Engineer. Prior to installing any tile, the Contractor shall inspect surfaces and conditions and make good in areas to receive tile work

##### CW.10.2. Mortar

Mortar shall be 1 part of cement and 1 parts of sand. Materials and preparation of mortar shall confirm to the plaster work***. Only graded river sand shall be permitted to be used for making the mortar.***

##### CW.10.3. Installing Wall Tile

The surface shall be brushed, cleaned and wetted. Glazed tile shall be soaked, completely immersed in clean water at least 30 minutes and drained. Individual tile that exhibit drying along edge shall be resoaked and drained. No free moisture shall be allowed to remain on the backs of tile at the time of setting.

Tiles shall be installed by applying a skim coat of a plastic mix of 1:1 (1 cement 1 sand) cement mortar on wall and tile and firmly pressing tile into the wall to true plane and position, joints in the tile work shall be accurately aligned with horizontal joints level and vertical joints plumb. Joints shall be maintained uniformly 3mm wide or as directed aligning spacer lugs or tile clip on tile edges if tiles are so manufactured or by use of wetted strings. Tiles shall be laid out in such a way that no tile less than half size occurs. Where tile must be cut at edges or penetrated the cut edges shall be carefully filed and neatly ground. Chipped, cracked or broken tile shall not be used and all defective work shall be replaced and repaired to the satisfaction of the Engineer at the Contractor's expense. After tiles have been set firm and strings from set tiles removed tiles shall be dampened and joints grouted with polymer based joint mortar to make joint water-proof and preventing from fungus growth.

During grouting all excess grout shall be cleaned off the tile surface with damp cloth or sponge. All tile work finishing shall be adequately protected from damage during the progress of construction till completion and any damage shall be repaired to the satisfaction of the Engineer at the Contractor's expense. Upon completion prior to final inspection of acceptance, the Contractor shall clean all tile work. Acids or other agents liable to damage the work shall be avoided. If tile surface show mass scratches, cracks or other imperfections which cannot be removed by cleaning; the Contractor shall remove the defective materials and replace with new material at no additional expense. No hollow space shall be left between the tiles and the walls.

All tile work must be planned to eliminate small pieces at edges. The cut pieces shall be laid over the corners not directly visible Wall tiles shall be installed in such a manner that no protrusion exists with adjoining surface.

##### CW.10.4. Installing Floor Tile

Installation of floor tile should be carried out in same manner as that of wall tile, except the following:

* + 1. Floor tiles shall be laid over a 1:4 cement sand mortar screeding works (20mm thick) being completed. A uniform slope should be maintained at this stage. A thin layer of gray cement slurry should be spread and then tiles should be laid.
    2. Tile joints should be 5mm.

##### CW.10.5. Rates

The rates for items shall include cost of all materials consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

##### CW.10.6. Measurement

Measurement for ceramic tile works shall be done of the area. Ceramic Tile Skirting shall be measured in length.

## CW.11.FACTORY MADE C/CONCRETE INTERLOCKING PAVER BLOCK

##### CW.11.1. Base

Interlocking paver block to be fixed on the bed 50 mm or specified otherwise thick of coarse sand of approved specification and filling the joints with the sand of approved type and quality or as specified and as directed by Engineer-in-charge.

##### CW.11.2. Interlocking Paver Block

Factory made precast paver block of M-30 or otherwise specified grade to be used. Paver blocks to be of approved brand and manufacturer and of approved quality. Minimum strength as prescribed by manufacturer and as per direction of Engineer-in-Charge for the grade specified to be tested as per method mentioned in specification of subhead cement concrete of CPWD Specification 2009 Vol. I.

##### CW.11.3. Measurement & Rates

Area provided with paver block to be measured in sqm. correct upto two places of decimal. The rate includes the cost of the material, labour, tools etc. required in all the operations described above.

## CW.12.RANDOM RUBBLE MASONRY

**Providing & laying Random Rubble Masonry with hard stone in retaining walls in cement mortar 1:4 & in cement mortar 1:6 Hammer dressed**

The stones to be used shall be durable and angular in shape. If boulders are used, they shall be broken into angular pieces. The stones shall be sound, hard, and free from iron bands, spots, sand holes, flaws, shakes, cracks or other defects. The stone shall not absorb water more than 5 per cent. The specific gravity of the stone shall not be less than 2.50. Except otherwise described in the contract, the length of any stone shall not exceed three times its height. The breadth of the stone on the bed shall not be less than 150 mm nor greater than 3/4 the thickness of the wall. At least 85% of the stones used in masonry, except those used for chinking as chips or spalls of stones shall have individual volumes of more than 0.01 m3. The chips or spalls used including voids in the dry stone masonry shall not be more than 20% of the stone masonry by volume. In case of mortared masonry, the total volume of mortar and spalls taken together shall not be more than 30% of the mortared masonry. Representative samples of the stones intended for use in the works shall be submitted to the Engineer for prior approval. Further representative samples shall be submitted for approval whenever there is a change in the type or strength of the rock that the Contractor intends to use in masonry work.

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##### CW.12.1. Mortar

Mortar for masonry shall conform to provisions under brick works.

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##### CW.12.2. Construction

The method of construction described herein shall hold good in all Clauses of this Section, wherever applicable.

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##### CW.12.3. General

Construction shall be carried out in accordance with I.S. 1597-1992, Code of Practice for construction of stone masonry, Part 1 Rubble stone masonry or Part 2 Ashlar Masonry as appropriate. All stratified stone possessing bedding planes shall be laid with its natural bed as nearly as possible at right angles to the direction of load. In the case of arch rings, the natural bed shall be radial. Facework groins shall be built to a height not exceeding one meter in advance of the main body of the work and adjacent walling stepped down on either side. Masonry face work between the groins shall then be built to a height not exceeding 500 mm above the backing which shall then be brought up level with the completed facework. At no time shall the backing be built up higher than the facework on the course and pouring water upon it to fill the gaps in stones shall not be allowed. Mortar shall be fluid, mixed thoroughly and then poured in the joints. No dry or hollow space shall be left anywhere in the masonry and each stone shall have all its faces completely covered with mortar of the thickness as specified for joints.

The bed which is to receive the stone shall be cleaned, wetted and covered with a layer of fresh mortar. All stones shall be laid full in Except for dry rubble walling, all joints (gaps) shall be sufficiently thick to prevent stone to stone contact and the gaps shall be completely filled with mortar. Stones shall be clean and sufficiently wetted before laying to prevent absorption of water from mortar. Placing loose mortar mortar both in bed and vertical joints and settled carefully in place with a wooden mallet immediately after placement and solidly embedded in mortar before it has set. Clean and wet chips and spalls shall be wedged into the mortar joints and bed whenever necessary to avoid thick joints or bed of mortar. When the foundation masonry is laid directly on rock, the bedding face of the stones of the first course shall be dressed to fit into rock snugly when pressed down in the mortar bedding over the rock. For masonry works over rock, a levelling course of M15/40 or M15/20 concrete 100mm thickness shall be laid over rock and then stone masonry work shall be laid without foundation concrete block.

In case, any stone already set in mortar is disturbed or the joints broken, it shall be taken out without disturbing the adjoining stones and joints. Dry mortar and stones thoroughly cleaned from the joints and the stones shall be reset in fresh mortar. Sliding one stone on top of another which is freshly laid shall not be allowed. Shaping and dressing of stone shall be done before it is laid in the work. Dressing and hammering of the laid stones which will loosen the masonry shall not be allowed.

Building up face wall tied with occasional through stones and filling up the middle with stones spalls and chips or dry packing shall not be allowed. Vertical joints shall be staggered. Distance between the nearer vertical joints of upper layer and lower layer in coursed rubble masonry shall not be less than half the height of the course. Masonry in a structure between two expansion joints shall be carried up nearly at one uniform level throughout but when breaks are unavoidable the masonry shall be raked in sufficiently long steps to facilitate jointing of old and new work. The stepping of raking shall not be more than 45 degrees with the horizontal. Masonry shall not be laid when the air temperature in the shade is less than 3°C. Newly laid masonry shall be protected from the harmful effects of weather.

##### CW.12.4. Ashlar

All stones shall be dressed to accurate planes on the beds and joints and they shall be fair and neatly or fine tooled on the face unless otherwise described in the contract.

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##### CW.12.5. Block in Course

Beds and joints shall be squared and dressed for a distance of at least 220 mm from the exposed face. Bond stones shall form at least one sixth of the area of the exposed face and shall extend at least 900 mm into the wall or for the full thickness of the wall if the latter is less than 900 mm. Unless described in the contract as tooled or drafted, the exposed face of all stones shall be blocked and left rough. Arises shall be dressed square at all beds and joints.

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##### CW.12.6. Square Rubble-Coursed Or Broken Courses

All stones shall be truly squared and dressed for a distance at least 120 mm from the face of the wall. Bond stones shall be provided at the rate of at least one to every 0.8 m2 of exposed face and shall measure not less than 150 mm x 150 mm on the face and not less than 450 mm in length or the full thickness of the wall, whichever is the less. Vertical joints in any layer shall be broken in the next layer and the horizontal lapping of the stones shall not be less than 100 mm.

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##### CW.12.7. Random Rubble - Coursed Or Uncoursed

All stones shall be carefully set with a bond stone provided at the rate of at least one to every 0.9 m2 of exposed face. Bond stones shall measure not less than 150 mm x 150 mm on the exposed face and not less than 450 mm in length or the full thickness of the wall, whichever is the less.

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##### CW.12.8. Dry Random Rubble

Dry random rubble masonry shall be constructed generally to the requirements of coursed random rubble masonry but with the omission of mortar. All stones shall be carefully shaped to obtain as close a fit as possible at all beds and joints, any interstices between the stones being filled with selected stone spalls. The stones in courses shall be laid perpendicular to the batter face. The exposed tops or cappings of dry rubble structures shall be formed as shown on the Drawing.

##### CW.12.9. Composite Random Rubble

Materials for composite random rubble shall comply with relevant clauses. The dry-stone insets shall be constructed when the level of the surrounding mortared masonry surround has reached the top of the dry stone inset.

##### CW.12.10. Test and Standard of Acceptance

Before laying any mortar, the Contractor shall make six sets of mortar test cubes from each source of sand to demonstrate the compliance of the mix to the specified strength. Each set shall comprise six cubes, three to be tested at 7 days and the other to be tested at 28 days. During construction, the Contractor shall make and test mortar cubes at the rate of three cubes for every 10 m3 of masonry to assess the strength subject to a minimum of 3 cubes samples for a day’s work. Testing of cubes shall be in accordance with IS 2250. The stones shall be tested for the water absorption as per IS: 1124 and it shall not be more than 5 percent. The stones shall also be tested for Specification gravity and it shall not be less than 2.65. Sand shall be tested as directed by the Engineer. At least 3 set of tests for stone and sand shall be conducted for every source.

About one square meter (1mx1m) measured in front face of the completed stone masonry in every 200 sq.m or part of it shall be dismantled during the process of construction up to complete depth and the aggregate volume of the stones having volume more than 0.01m3 shall be obtained by the method of displacement of water to find the volume of spalls and mortars in the case of mortared masonry and the volume of spalls and voids in the case of dry masonry. The dismantling shall be made in such a manner that the quality of the surrounding work is least affected. While dismantling, the tightness of the joints shall also be compared with the thickness of joints as specified for assessment of the quality of work. If the volume of spalls and mortars is more than the specified volume and/or the joints are not filled completely with mortar, then the entire work which the sample and test represent shall be rejected.

The dismantled portion shall be made good by the Contractor at his own cost after completion of the test.

##### CW.12.11. Measurement

Stone masonry shall be measured in cubic meters. The pointing shall be measured in sq.m.

##### CW.12.12. Payment

The stone masonry shall be paid at the respective contract unit prices which shall be the full and the final compensation to the Contractor

## CW.13. GABION WALLS

Providing & filling hand-packed stone in G.I mesh of wire 3.25 (10swg) including supplying, weaving, placing in position, securing & fastening of mesh complete.

The gabion wall so constructed shall satisfy the basic requirement such as stability, flexibility and durability. It shall also satisfy environmental and safety requirements.

The G.I wire shall be of mention diameter having tensile strength of 300-400 Mpa confirming to IS: 280. The size of the mesh shall be as specified in the items. Sausages shall be fixed as directed by the Engineer. The different blocks shall be secured properly. The crates shall be placed in position before filling with boulders. It shall be filled by carefully hand packing boulders as tightly as possible and not by merely throwing stones.

Measurements: Measurement shall be taken in cubical content correctto 0.01 cu.m.

Rate: The rate shall include all materials and labour involved in the work.

##### CW.13.1. Construction of Gabion Walls

Construction of gabion wall as per drawings with dry stone masonry (hammer dressed facing) including excavation of foundation in all types of soils, sides and backfilling, delivery of machine woven gabion mesh (Hexagonal mesh of size 100mm x 120mm with a minimum of 3 twists) with GI wire 2.70mm dia, fixing of selvedged wire 3.4 mm dia, binding/lacing wire 2.40 mm dia complete.

Construction of gabion wall as per drawings with dry stone masonry (hammer dressed facing) including excavation of foundation in all types of soils, sides and backfilling, delivery of machine woven gabion mesh (Hexagonal mesh of size 90mm x 100mm with a minimum of 3 twists) with GI wire 3.25mm (10 swg) dia, fixing of selvedged wire 4.06mm (8 swg) dia, binding/lacing wire 2.64mm (12 swg) dia complete.

The space (excavated for construction purposes) between the side of the finished walls and the road embankment needs to be filled with dry masonry in order to create a smooth finishing from the wall to the road embankment/slope and nothing extra shall be paid. Excavation As specified in “Excavation for structures” the excavation shall not exceed the dimensions of the wall and excavated materials need to be disposed of at an approved disposal site.

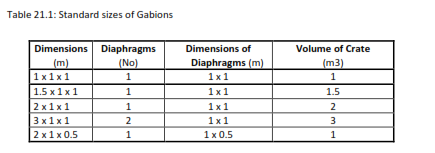
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##### CW.13.2. Gabion Material

Materials Stone Stones used for filling for gabion boxes shall be clean, hard, sound, unweather and angular rock fragments or boulders. The smallest dimension of any stone shall be at least twice that of the longer dimension of the mesh of the crate. Before filling any gabion boxes, the Contractor shall submit representative samples of the rock he proposes to use in the gabions for approval by the Engineer. Further representative samples shall be submitted for approval each time whenever there is a change in the type or strength of the rock that the Contractor proposes to use in gabion work.

Gabion Crates Gabions shall consist of steel wire mesh crates. The steel wire shall be mild steel wire complying with IS 280-197. All wire used in the manufacture of the crates and for use as diaphragms, binding and connecting wire shall be galvanized with an extra heavy coating of zinc by an electrolytic galvanizing process. The weight of deposition of zinc shall be in accordance with IS 4826-1979. Zinc coating shall be uniform and shall be able to withstand a minimum number of dips and adhesion test specified as per IS 4826-1979. Tolerance on diameter of wire shall be 2.5 percent. The tensile strength shall be between 300 to 550 N/mm2

The wire shall be mechanical woven into a hexagonal mesh of standard size with tolerance of +16 and -4. The tightness of the twisted joints shall be such that a force of 7 KN is required to pull on one wire to separate it from the other wire provided that each wire is prevented from turning and the whole process is done in one plane. All edges of the crates shall be finished with a selvedge wire. Gabions shall be manufactured in the standard sizes shown in the following table.



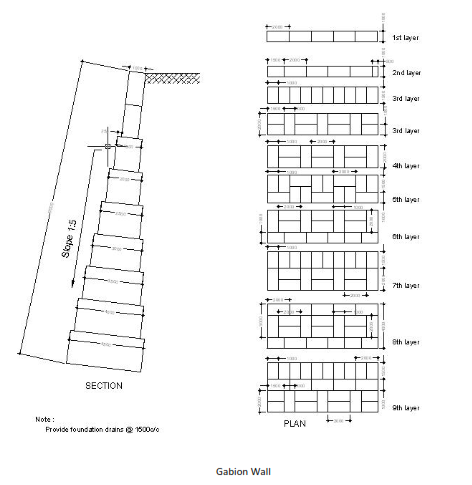
Diaphragms shall be manufactured of the same materials as the parent gabion and shall have selvedge wire throughout their perimeter. The number and size of diaphragms to be provided with each crate shall be as in the following table. All crates shall be supplied with binding and connecting wire.

##### CW.13.3. General Requirement of Gabion Walls

Construction of Gabions General Requirements Before filling any gabion boxes, the Contractor shall also submit samples of gabion boxes assembled for approval and shall be retained for reference and comparison with the gabions built. The size, type and location of the samples shall be as directed by the Engineer. Gabion boxes shall be assembled and erected including filling in the dry on prepared surfaces except as may be otherwise approved. Approval for assembling and erecting gabions in water will be given only if in the Engineer’s opinion such a method will produce work, which is otherwise in accordance with the Specification. Preparation of Foundation and Surface for Bedding The bed on which the gabion boxes are to be laid prior to filling shall be at the levels shown on the Drawings with an even surface. If necessary cavities between rock protrusions shall be filled with material similar to that specified for gabion filling.

Assembly Gabion boxes shall be assembled on a hard flat surface. After fabrication or unpacking and unfolding, they shall be stretched out and any kinks removed. Creases shall be in the correct position for forming the boxes. The side and end panels shall be folded into an upright position to form rectangular boxes or compartments. The top corners shall be joined together with the thick selvedge wire sticking out of the corners of each panel. The tops of all sides and partitions shall be levelled except as may be appropriate to special units. The sides and end panels shall be wired together using binding wire, starting at the top of the panel by looping the wire through the corner and twisting the wire together. Binding shall continue by lacing the wire through each mesh and around both selvedge, which shall be joined tightly together, with two round turns after every section mesh. Finally the end of the wire shall be secured at the bottom corner and the end poked inside the unit.

The diaphragms shall be secured in their correct positions by binding in the same way. The bindings wire shall be fixed using 250 mm long nose fencing pliers or equivalent approved tools. Filling the crates shall be placed in their final position before filling commences. They shall be stretched to their full dimension and securely pegged to the ground or wired to adjacent gabions before filling. The vertical corners shall be kept square and to full dimension by inserting a steel bar of at least 20 mm diameter at each vertical corner, maintaining it in the correct final position throughout the filling process, and removing it when the crate is full. Before filling commences, the selvedges of the crate will be bound to the selvedges of adjacent crates with binding wire. Where crates are being assembled in position in a wall, the binding of the edges of each crate may be carried out in the same operation.



Before filling with stone, gabions shall be anchored at one end or side and stretched from the opposite end or side by inserting temporary bars and levering them forward. The top and bottom shall be kept stretched by tensioning with tie wires attached to an anchorage or equivalent approved method until the gabion has been filled. The gabions shall be inspected at this stage but before filling with stone to ensure that the tie wiring has been properly carried out and the gabion boxes are not pulling apart. Gabion boxes may be tensioned either singly or in the case of a long straight structure by straining a number of units together using an approved tensioning system. The filling will be carried out by placing individual stones into the gabion by hand in courses in such a manner that the stones are bedded on each other and bonded as in dry stone masonry. No loose stones shall be tipped into the crate and the practice of coursing and bonding the outer layer and filling the interior with un-laid stones will not be permitted. All 1 m deep gabions shall be filled in three equal layers and 0.5 m depth gabions in two equal layers. Horizontal bracing wires made with the same binding wires as used for lacing shall be fixed directly above each layer of the stone in the compartments, the wires being looped round two adjoining meshes in each side of the compartment and joined together to form a double tie which shall be tensioned by winding the bracing wires together with a flat stone in order to keep the face of the gabions even and free from bulges. Bracing wires shall be spaced horizontally along and across the gabions at distances not greater than 0.33 m. Securing Lids The gabion box compartments shall be filled slightly over-full to allow for subsequent settlement. The lids shall then be laced down with binding wire to the tops of all partition panels. The lids shall be stretched to fit the sides exactly by means of a suitable tool but due care shall be taken to ensure that the gabions are not so full that the lids are over stretched. The corners shall be laid so that the hinge of the lid is on the lower side on slopes and on the outer side in walls. Where laid horizontally, hinges for retaining walls shall be placed on the valley side and for breast walls on the mountain side. On completion the crates shall be completely and tightly filled, square, true to dimensions and the line and level shown on the Drawings. Arrangement of Joints In walls, gabion boxes shall be placed such that vertical joints are not continuous but staggered. Aprons shall be formed of headers. If more than one unit is required to obtain the necessary width, units of unequal length shall be used and the joints between them should be staggered. The adjoining boxes shall be joined together with the selvedge wire. Testing Zinc coating, tensile strength and bending test of gabion wires shall be carried out by the Contractor as directed by the Engineer. Failure of test results to comply with the specifications shall lead to the rejection of gabion wires. Tests shall be carried out in accordance with IS 280 and IS 4826 on each lot of supply received at site. QA/QC: • Check the samples to meet the requirements before mass supply. • Check the diameter of wire used for the gabion boxes; it shall not be less than specified diameters. • The galvanizing shall be with extra heavy coating to comply the weight of deposition with IS 4826-1979. • Conduct adhesion test, zinc coating, tensile strength and bending test as per IS 280 and IS48261979. • The tolerance on diameter of wire shall be 2.5% with the tensile strength of 300 to 550 N/sqmm. • The hexagonal mesh size shall be 100mmX120mm with minimum of 3 twists.• The gabion box compartments shall be filled slightly over-full to allow for subsequent settlement. • The vertical joints shall be staggered and should not be continuous. • The diaphragms shall be of same materials as that of parent gabion and shall have selvedge wire through out the perimeter. • All the filled stones shall be bedded on each other as in dry rubble masonry on all sides. • All edges of the crates shall be finished with selvedge wire. • Inspect all the laid boxes before and after the fill on each layer.

##### CW.13.4. Measurement of Gabion Walls

Measurement: (1). In case of gabion retaining and breast walls, the length of the wall shall be measured in running metre correct to 10 mm and the quantity shall be calculated nearest to two places of decimal. (2). In case gabion protection works the measurement shall be taken in cubic meter and volume calculated nearest to two places of decimal.

##### CW.13.5. Rates of Gabion Walls

Rates: (1). In case of gabion retaining walls and breast walls, the rate shall include the cost of excavation to foundation level, back and side filling and providing and delivering stones from quarry and their preparation to use for gabion walls, as well as the providing, delivery and filling and closing of the gabion boxes, materials, including all testing, labour, equipment, tools, and incidentals necessary to complete the works as specified. ( 2) In case of protection works, the rate shall include providing and delivering stones from quarry and their preparation to use for gabion walls, as well as the providing, delivery and filling and closing of the gabion boxes, materials, including all testing, labour, equipment, tools, and incidentals necessary to complete the works as specified.

## CW.14. SLOPE STABILISATION AND EROSION PROTECTION

##### CW.14.1. Scope

*This Clause covers the works related to the furnishing of materials and construction of slope stabilising measures in dry stone pitching, grouted stone pitching, gabion, masonry walling, rock dowels and rock anchors/bolts and wire netting on slopes as shown on the Drawing or as instructed by the Engineer.*

##### CW.14.2. Excavation of Soil and Rock

Excavation of soil for landslide stabilisation and slope protection shall include excavation and removal of existing landslide debris, streambed debris, the trimming of scarp faces and gully sides and excavation required to construct gabion and masonry walls or other structures, in accordance with the lines, levels, grades and dimension as shown on the Drawing or as directed by the Engineer. Excavation may be undertaken either by machine or by labour or in combination of the both. However, during any excavation work care must be taken to ensure that the excavation does not endanger the stability of adjacent slopes. In some locations the Engineer may direct the Contractor to use labour only during excavation, or issue other directions as to the method of excavation.

The cutting of access tracks to enable machines to reach otherwise inaccessible areas shall not be allowed during slope stabilisation works. However, access tracks may be constructed only with the specific approval of the Engineer where no benching into the hillside is necessary.

Excavation and removal of rock for landslide stabilisation and slope protection shall include removal of individual rock blocks from a rock face, removal of potentially unstable rock masses or isolated individual boulders. Excavation and removal of rock may be undertaken by pneumatic tools, hand tools or other approved methods.

The slopes of cuttings shall be shaped or terraced in accordance with the Drawing and as required by the Engineer.

##### CW.14.3. Fill Areas

During slope stabilization work, small areas of fill may be required, such as to infill gullies. Fill material for such purposes shall consist of suitable material and shall be deposited and compacted by approved plant in accordance with the lines, levels and grades shown on the Drawing and as directed by the Engineer.

##### CW.14.4. Dry Stone Pitching

1. **Materials**

Stone used for pitching shall be from a quarry or arising from the excavation and be angular in shape. If river boulders are used they shall be broken into angular pieces. The stone shall be sound, hard, and free from cracks or other defects. Not less than 80% of the stones, except those used for chinking shall have individual volumes of not less than 0.01 cubic metres. Waste concrete may be used provided it is sound and meets the size requirements of the stone. The stones, when immersed in water for 24 hours, shall not absorb water by more than 5 percent of their dry weight when tested in accordance with IS: 1124.

1. **Construction**

Construction shall comply with Sub-clause 2.5 of Section 7.

1. **Tests and Standard of Acceptance**

Tests and Standard of Acceptance shall comply with Sub-clause 2.5 of Section 7 while the size of the stone which shall comply as per Sub-clause 4.4 (a) of Section 7.

##### CW.14.5. Grouted Stone Pitching

1. **Materials**

The materials shall comply with relevant the Technical Specifications.

1. **Construction**

Method of laying and thickness shall be as for dry stone pitching specified in Sub-clause 2.5 of Section 7. After the stones have been laid on the entire slope, all spaces between them shall be filled with clean rock fragments, crushed rock or gravel. More than 15% of the fill materials shall not pass 20 mm sieve. The material shall be carefully hand tamped into place.

Prior to the application of grout the surfaces of the stones shall be thoroughly cleaned of adhering dust and then moistened. The interstices between the stones shall be completely filled with grout throughout the entire thickness of the stone pitching. Grouting operations shall progress from the bottom of the slope toward the top. Grout shall be placed in a continuous operation for any day’s run at any location.

After the grout has been placed, the stones shall be thoroughly brushed so that their top surfaces are exposed. The grouted pitching shall be cured for a period of not less than four days after grouting. Curing shall be done with wet sacking or other approved cover, and shall not be subjected to loading until adequate strength has developed. Where required, or instructed by the Engineer, weep holes shall be provided in the pitching.

1. **Tests and Standard of Acceptance**

Stones shall be tested in accordance with these Specifications and shall meet the prescribed criteria. One set of test (3 tests in a set) shall be carried out for every change in source of materials.

The finished surface of the grouted pitching shall present an even, tight and neat appearance with no stones surface varying by more than 25 mm from the specified surface grades and lines. The average thickness of the pitching, measured at right angles to the surface, shall not be less than the specified average thickness.

##### CW.14.6. Gabion Wire Mattress

The materials used shall comply with Technical Specifications (Civil works). The mattresses shall be assembled and filled in the same manner as for gabions. Ties and anchorages shall be provided as shown on the Drawing.

1. **Wire Netting**

Where required by the Engineer or shown on the Drawing, slopes shall be covered with wire mesh to prevent small scale reveling and erosion. The wire mesh shall confirm to the requirements specified of the Technical Specifications and shall have a minimum thickness of SWG 10.

**CW.14.7. Masonry/Concrete/Reinforced Concrete Walling**

Walls of the specified type(s) shall be constructed in accordance with the Drawing and as directed by the Engineer to act as retaining structures, as revetment structures or as buttresses.

Materials for masonry walling shall comply with Technical Specifications.

Materials for concrete/reinforced concrete walling shall comply with Technical Specification (Civil Works).

##### CW.14.8. Payment

1. The quantity of excavation for structures, common backfill/previous backfill/filter materials, gabion mattresses, masonry/concrete/reinforced concrete walling and wire netting shall be paid as provided under respective Clauses of these Specifications.
2. The quantities of dry stone pitching, grouted stone pitching, rock dowels, rock/earth anchors and rock bolts shall be paid as per the respective contract unit rates. The contract unit rate shall be the full and the final payment to the Contractor to complete the works as per the Technical Specifications.

## CW.15. SUB-SURFACE DRAINS

##### CW.15.1 Scope

This Clause shall cover the works related to the construction of sub-surface drainage networks under road pavement, under road side drains, in slopes and slides. The drains shall be either main or tributary or of other types as shown on the Drawing or as directed by the Engineer.

Sub-surface drains shall consist of perforated HDP pipes surrounded by granular material laid in a trench. If specified in the contract, sub-surface drains shall also consist of perforated HDP (high density polyethylene pipes) surrounded by geotextile/geomembrane and granular material laid in a trench.

##### CW.15.2. Materials

The materials used for construction of sub-surface drains shall comply with following requirements:

1. **Stone**

Stones used for filling and lining of sub-surface drains shall comply with the specifications for dry stone pitching given in Sub-clause 4.4 of Section 7.

1. **Cement**

Cement comply with the requirements.

1. **Mortar**

The mortar used for cement masonry lining shall be as specified in Sub-clause 4.5 of section 7.

1. **Gabion Works**

Gabion works shall comply with the requirements as specified in the Technical Specifications.

1. **Filter Material**

Filter materials used in drains shall comply with the requirements.

1. **Geomembrane**

Geomembrane shall be made of PVC or polythene sheets of at least 0.8 mm thickness, duly protected from ultra-voilet exposure with 2.5 per cent carbon black, in black colour, supplied in roll form with a minimum of 3 m width. The joints of these sheets shall be heatbonded or seamed for effective permeation cut off. While fixing on to a slope, they shall not be punctured or stappled to impair their use.

1. **Geotextile**

Geotextiles used for lining of drain trenches shall be as per the requirements. The type of geotextile to be used for drains shall be approved by the Engineer prior to starting the works.

1. **Drain Pipe**

Drain pipes shall be made of high density polyethylene, high pressure as approved by the Engineer. Jointing of pipes shall be done by fine-cutting and heating with equipment complying with the prescription of the HDP pipe manufacturer. Pipes may be jointed with angles to fit the requirements of the terrain, but angles shall not exceed the maximum specified by the manufacturer. The joints shall be watertight and develop the same strength as unjointed HDP material. The method of jointing shall be approved by the Engineer prior to starting the works. Drain pipes shall be provided with holes of minimum 5 mm diameter. The pipes shall be perforated by drilling minimum 50 holes per meter length on the upper half of the pipe in a staggered pattern uniformly distributed. The Engineer might adjust these specifications according to the site conditions.

##### CW.15.3. Construction

The detailed layout of the drainage network shall be as instructed by the Engineer, based on the general layout given in the Drawing.

The work shall start with construction at road side and then go up the slope by using already constructed drains as buttress for new drains.

The main drains shall be placed in naturally existing depressions. The tributary drains shall be at a maximum inclination of 450 to the main drain.

1. **Sub-surface Drains without Geotextile/Geomembrane**

Trench for sub-surface drain shall be excavated to the specified lines, grades and dimensions shown on the Drawing. Following considerations shall be made while excavating the drain and dumping excess materials.

(i) Depth of excavation shall be according to Drawing.

(ii) Top of structure shall be lower than natural ground.

(iii) No blasting shall be done in slides.

Wherever required or instructed by the Engineer, the Contractor shall provide trench struts and shoring as per approved design and shall execute in a manner to resist the earth pressure and in order to protect labour and work.

Where unsuitable material is encountered at the bed of trench, the same shall be removed to such depth as instructed by the Engineer and backfilled with approved material shall be compacted.

Laying of pipe in the trench shall be started at the outlet end and proceed towards the upper end, true to the lines and grades specified. Before placing the pipe, filter material shall be laid for the full width of the trench bed and compacted. Unless otherwise shown on the Drawing, the thickness of this layer shall be 150 mm.

After the pipe installation has been completed and approved filter/pervious material shall be placed over the pipe to the required level in horizontal layers not exceeding 150 mm and thoroughly compacted to 93% of the MDD (heavy compaction).

Pitching shall be done as per Clause 3 of Section 7. The finished slope shall be reshaped to facilitate proper surface drainage towards drains.

1. **Sub-surface Drains with Geotextile/Geomembrane**

Excavation and backfilling shall be carried in the same manner as described above in (a). After excavating the trench for sub-surface drain, the filter fabric shall be placed and then the pipe shall be installed in the position as shown on the Drawing. Surfaces receiving filter fabric shall be free of loose or extraneous material and sharp objects. Adjacent rolls of the fabric shall be overlapped to a minimum width 450 mm. The preceding roll shall overlap the following roll in the direction the material is being spread.

After the installation of pipe, the trench shall be backfilled with the filter material in the same manner as described above in (a).

##### CW.15.4. Tests and Standard of Acceptance

Copies of the manufacturer's certificates for geotextile/geomembrane and drain pipe to be used shall be furnished by the Contractor. In addition, the Engineer may ask for testing in independent laboratories. All test results shall meet the specified requirements.

Minimum one set of test for gradation analysis and compaction of filter material shall be checked for every 50 cu.m. and/or every change in source of material. The results shall meet specified requirements.

##### CW.15.5. Measurement

Sub-surface drain with/without geotextile/geomembrane shall be measured in running meter which shall be inclusive of earth excavation, backfill/filter, geotextile/geomembrane. Drain pipe shall be measured in running meters separately.

Pitching shall be measure as provided under respective clauses of these Specifications.

##### CW.15.6. Payment

Sub-surface drains with/without geotextiles/geomembranes, drain pipe and pitching shall be paid at the respective contract unit rates. The contract unit rates shall be the full and the final compensation to the Contractor to complete the works as per the Technical Specifications (Civil works).

## CW.16. PAINTING WORKS

No paints containing lead shall be permitted to be used. The contractor will have to submit the proposed paint along with all the relevant details for approval prior to the purchase or use.

##### CW.16.1. *Scope*

This specification covers different type of paintings in different surface in general and application of cement paint, enamel paint. Dry or oiled distemper, plastic emulsion paint etc. in wall/ceiling surface in particular with a petroleum base/water base paint in roof.

##### CW.16.2. Materials

Paints, oils, varnishes etc. of approved brand and manufacture shall be used. Only ready mixed Paint as received from the manufacturer without any admixture shall be used.

##### CW.16.3. Scaffolding

The scaffolding shall be double or single according to requirements and shall be provided by the contractor at his own expense. The scaffolding shall be erected with steel section or pipes, or bamboos of adequate strength to safe for all operation. The Contractor shall test all measures to ensure the safety of the work and working people. Any instruction of the Engineer in this respect shall also be compiled with. The Contractor shall be entirely responsible for any damage to property, or injury to persons resulting from ill erected scaffolding, defective ladders and materials or otherwise arising out of his default in this respect. Proper scaffolding shall be provided to allow easy approach to every part of the work. Overhead work shall not be allowed.

Wherever scaffolding is necessary, it shall be erected on double supports tied together by horizontal pieces, over which scaffolding planks shall be fixed. No ballies, bamboos or planks shall rest on or touch the surface which is being painted.

For all exposed brick work or tile work, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

**Note**

Where ladders are used, pieces of old gunny bags shall be tied on their tops to avoid damage or scratches to walls. For painting the ceiling, proper stage scaffolding shall be erected.

##### CW.16.4. Preparatory Work

Before new work is being painted, the surface shall be thoroughly brushed free from mortar droppings and foreign matter. The surface to be painted shall be prepared as specified by the manufacturer of the paint. The surface shall be thoroughly sand papered and cleaned from dirt, dust etc. by brushing and washing down with clean water. Any grease, oil paint or any other foreign material shall be removed by approved method.

Rough coat and pebble dash surface shall be thoroughly sand papered brushed and washed to remove dirt and dust and should be applied the primer for interior painting.

##### CW.16.5. Exterior Painting on Wall

**Materials**

Paints, oils, varnishes etc. of approved brand and manufacture shall be used. Only ready mixed Paint (Exterior grade) as received from the manufacturer without any admixture shall be used. If for any reason, thinning is necessary in case of ready mixed Paint, the brand of thinner recommended by the manufacturer or as instructed by the Engineer shall be used.

Approved Paints, oil or varnishes shall be brought to the site of work by the contractor in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight’s work. The materials shall be kept in the joint custody of the contractor and the Engineer. The empties shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the Engineer.

**Commencing Work**

Painting shall not be started until the Engineer has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Painting of external surface should not be done in adverse weather condition like hailstorm and dust storm. Painting, except the priming coat, shall generally be considered after practically finishing all other building work.

The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the Paint work being started.

**Preparation of Surface**

The surface shall be thoroughly cleaned and dusted off. All rust, dirt, scales, smoke splashes, mortar droppings and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer after inspection, before painting is commenced.

**Application**

Before pouring into smaller containers for use, the Paint shall be stirred thoroughly in its containers, when applying also, the Paint shall be continuously stirred in the smaller containers so that its consistency is kept uniform.

The crossing and laying off consists of covering the area over with Paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

Where so stipulated, the painting shall be done by spraying. Spray machine used may be (a) high pressure (small air aperture) type, or (b) a low pressure (large air gap) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.

Spraying should be done only when dry condition prevails. Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by thorough ventilation. Each coat except the last coat, shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off dust before the next coat is laid.

No left over Paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed.

No hair marks from the brush or clogging of Paint puddles in the corners of panels, angles of moldings etc. shall be left on the work.

In painting doors and windows, the putty round the glass panes must also be painted but care must be taken to see that no Paint stains etc. are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting. However, bottom edge of the shutters where the painting is not practically possible, need not be done nor any deduction on this account will be done but two coats of primer of approved make shall be done on the bottom edge before fixing the shutters.

On painting steel work, special care shall be taken while painting over bolts, nuts, rivets overlaps etc.

All paintings works of include primer.

**Brushes and Containers**

After work, the brushes shall be completely cleaned of Paint and linseed oil by rinsing with turpentine. A brush in which Paint has dried up is ruined and shall on no account be used for painting work. The containers when not in use, shall be kept closed and free from air so that Paint does not thicken and also shall be kept safe from dust. When the Paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

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##### CW.16.6. Measurements

The length and breadth shall be measured correct to a cm or half an inch. The area shall be calculated in sq.m or sq.ft (correct to two places of decimal), except otherwise stated.

Small articles not exceeding 10 sq. decimeter (0.1 sqm) of painted surfaces where not in conjunction with similar painted work shall be enumerated.

Painting upto 10 cm or 4 inches in width or in girth and not in conjunction with similar painted work shall be given in running meters or feet and shall include cutting to line where so required.

**Note *:*** *Components of trusses, compound girders, stanchions, lattices and similar work shall, however, be given in sq. metres irrespective of the size or girth of members. Priming coat of painting shall be included in the work of fabrication.*

In measuring painting, varnishing, oiling etc. of joinery and steel work etc. The coefficients as

Indicated in following tables shall be used to obtain the area payable. The coefficients shall be applied to the areas measured flat and not girthed.

**TABLE –S Equivalent Plain Areas of Uneven Surface**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Description of work** | **How measured** | **Multiplying**  **coefficients** |
| *1* | *2* | *3* | *4* |
| **I. Steel work doors, windows Etc**. | | | |
| 17. | Collapsible gates | Measured flat | 1.50 (for painting  all over) |
| **III. General** | | | |
| 19. | Expanded metal, hard drawn steel wire fabric of approved  quality, grill works and gratings  in guard bars, balustrades, railing partitions and MS Bars in  windows frames. | Measured flat overall; no deduction shall be made for open spaces; supporting members shall not be measured separately | 1 (for Paint all over) |
| 20. | Open palisade fencing and gates including standards, braces, rails stays etc. in timber  or steel | -do- (see note No. 12) | 1 (for Paint all over) |

**Explanatory Notes for Table -S**

Collapsible gates shall be measured for width from outside to outside of gate in its expanded position and for height from bottom to top of channel verticals. No separate measurements shall be taken for the top and bottom guide rails rollers, fittings etc.

Measurements of painting as above shall be deemed to include painting all iron fittings in the same or different shade for which no extra will be paid.

For painting open palisade fencing and gates etc., the height shall be measured from the bottom of the lowest rail, if the palisades do not go below it, (or from the lower end of the palisades, if they project below the lowest rail), upto the top of rails or palisades whichever are higher, but not up to the top of standards when the latter are higher than the top rails or the palisades. Width of moulded work of all other kinds, as in hand rails, cornices, architraves shall be measured by girth.

Painting of rain water, soil, waste, vent and water pipes etc. shall be measured in running metres of the particular diameter of the pipe concerned. Painting of specials such as bends, heads, branches, junctions, shoes, etc. shall be included in the length and no separate measurements shall be taken for these or for painting brackets, clamps etc. Measurements of wall surfaces and other work not referred to already shall be recorded as per actual.

**Precautions**

All furniture, fixtures, glazing, floors etc. shall be protected by covering and stains, smears, splashing, if any shall be removed and any damages done shall be made good by the contractor at his cost.

##### CW.16.7. Rate

The rates for items shall include cost of all materials (including grouting material) consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

## CW.17. PAINTING ON WOOD, IRON OR PLASTERED SURFACES

##### 

##### CW.17.1. Primer

The primer for iron work or plastered surface shall be as specified in the description of item. Primer for plaster/ Iron & Steel surfaces shall be as specified below:

**TABLE –T**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Surfaces** | **Primer to be used** |
|  | (B) Iron, Steel and Galvanized steel | ) Red Oxide Zinc chromate Primer  ( conforming IS 2074 |
| 4. | Cement/Conc/RCC/brick work, Plastered surfaces, non-asbestos surfaces to  receive Oil bound distemper or Paint finish. | Cement primer conforming to IS 109 |

The primer shall be ready mixed primer of approved brand and manufacture. Where primer for steel work is specified to be mixed at site, it shall be prepared from a mixture of red oxide, raw linseed oil and turpentine in the ratio of 2.8 kg : 1 litre : 1 litre.

The specifications for the base vehicle and thinner for mixed on site primer shall be as follows:

(a) *White oxide* : The White lead shall be pure and free from adulterants like barium sulphate and whiting. It shall conform to IS 103.

(b) *Red oxide :* This shall be in powder form and shall be pure and free from adulterants like brick dust etc. It shall conform to IS 102.

(c) *Raw Linseed Oil :* Raw linseed oil shall be lightly viscous but clear and of yellowish colour with light brown tinge. Its specific gravity at a temperature of 30 degree C shall be between 0.923 and 0.928.

***Note :*** *The oil shall be mellow and sweet to the taste with very little smell. The oil shall be of sufficiently matured quality. Oil turbid or thick, with acid and bitter taste and rancid odour and which remains sticky for a considerable time shall be rejected. The oil shall conform in all respects to IS 75. The oil shall be of approved brand and manufacture.*

(d) *Double Boiled Linseed Oil :* This shall be more viscous than the raw oil, have a deeper colour and specific gravity between 0.931 and 0.945 at a temperature of 30 degree C. It shall dry with a glossy surface. It shall conform in all respects to IS 77. The oil shall be of approved brand and manufacture.

***Turpentine :*** Mineral turpentine i.e. petroleum distillate which has the same rate of evaporation as vegetable turpentine (distillate product of oleeresin of conifers) shall be used. It shall have no grease or other residue when allowed to evaporate. It shall conform to IS 533.

All the above materials shall be of approved manufacture and brought to site in their original

packing in sealed condition.

##### CW.17.2. Preparation of Surface

**Iron & Steel Surface:** All rust and scales shall be removed by scrapping or by brushing with

steel wire brushes. Hard skin of oxide formed on the surface of wrought iron during rolling which becomes loose by rusting, shall be removed. All dust and dirt shall be thoroughly wiped away from the surface. If the surface is wet, it shall be dried before priming coat is undertaken.

***Plastered Surface:*** The surface shall ordinarily not be painted until it has dried completely.

Trial patches of primer shall be laid at intervals and where drying is satisfactory, painting shall then be taken in hand. Before primer is applied, holes and undulations, shall be filled up with plaster of paris and rubbed smooth.

**Application**

The primer shall be applied with brushes, worked well into the surface and spread even and smooth.

##### CW.17.3. Wall Painting With Plastic Emulsion Paint Distemper in The BoQ

The plastic emulsion Paint is not suitable for application on external, and iron surface and surfaces which are liable to heavy condensation. These Paints are to be used on internal surfaces. Plastic Emulsion Paint as per IS 5411 of approved brand and manufacture and of the required shade shall be used.

**Painting on New Surface**

The wall surface shall be prepared as specified above.

***Application :*** The number of coats shall be as stipulated in the item. The Paint will be applied in the usual manner with brush, spray or roller. The Paint dries by evaporation of the water content and as soon as the water has evaporated the film gets hard and the next coat can be applied. The time of drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces. The thinning of emulsion is to be done with water and not with turpentine. Thinning with water will be particularly required for the under coat which is applied on the absorbent surface. The quantity of water to be added shall be as per manufacturer’s instructions. The surface on finishing shall present a flat velvety smooth finish. If necessary more coats will be applied till the surface presents a uniform appearance.

***Precautions***

(a) Old brushes if they are to be used with emulsion Paints, should be completely dried of turpentine or oil Paints by washing in warm soap water. Brushes should be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the Paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing of surfaces treated with emulsion Paints shall not be done within 3 to 4 weeks of application.

**Painting on Old Surface**

***Preparation of Surface:*** This shall be done, generally as specified in 13.24.2.1 except that the surface before application of Paint shall be flattened well to get the proper flat velvety finish after painting.

***Application:*** The number of coats to be applied shall be as in description of item. The application shall be as specified for new surface, except that thinning with water shall not normally be required.

##### CW.17.4. Painting with Synthetic Enamel Paint

Synthetic Enamel Paint (conforming to IS 2933) of approved brand and manufacture and of the required colour shall be used for the top coat and an undercoat of ordinary Paint of shade to match the top coat as recommended by the same manufacturer as far the top coat shall be used.

**Painting on New Surface**

Preparation of surface shall be as specified here above, as the case may be.

***Application :*** The number of coats including the undercoat shall be as stipulated in the item.

(a) *Under Coat :* One coat of the specified ordinary Paint of shade suited to the shade of the top coat, shall be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.

(b) *Top Coat :* Top coats of synthetic enamel Paint of desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

Other details shall be as specified above for exterior painting, as far as they are applicable.

**Painting on Old Surface**

***Preparation of Surface :*** Where the existing Paint is firm and sound it shall be cleaned of grease, smoke etc. and rubbed with sand paper to remove all loose particles dusted off. All patches and cracks shall then be treated with stopping and filler prepared with the specified Paint. The surface shall again be rubbed and made smooth and uniform.

***Painting :*** The number of coats as stipulated in the item shall be applied with synthetic. enamel Paint. Each coat shall be allowed to dry and rubbed down smooth with very fine wet abrasive paper, to get an even glossy surface. If however, the surface is not satisfactory additional coats as required shall be applied to get correct finish.

Other details shall be specified here above for ‘Exterior painting on Wall’ as far as they are applicable.

##### CW.17.5. Sample to be Approved

Sample of approximately 1 sq.m. of painting work of all types of paint work shall be prepared, to be approved by the Engineer before further execution.

##### CW.17.6. Rate

The rate shall include all labour, materials and use of tools to carry out the following operation:

a. Supplying and mixing the paint as specified.

b. Scaffolding including erection and dismantling.

c. Preparation of the surface before painting.

1. Application of paints as specified.
2. Curing and protecting the painted surface.

## CW.18. STEEL WORKS

All finished steel shall be well and cleanly rolled to the dimensions and weight specified by BIS subject to permissible tolerances as per IS: 1852 – 1985. The finished material shall be reasonably free from cracks, surface floors, laminations, rough and imperfect edges and all other harmful defects. Steel sections, shall be free from excessive rust, scaling and pitting and shall be well protected. The decision of the Engineer regarding rejecting any steel section on account of any of above defects shall be final and binding.

The ordinary steel designated as ST: 32-0 conforming to IS: 1977 – 1975 shall be used for Doors. Window frames, Window bars, Grills, Steel Gates, Hand railing, Builders Hardware etc.

##### CW.18.1. Electrodes

The electrodes required for metal or welding shall be covered electrodes and shall conform to IS: 814 – 1991.

##### CW.18.2. Steel Work in Single Section

The steel work in single section of RS Joists, flats, tees, angles, fixed independently with or without connecting plate, shall be as described below

##### CW.18.3. Fabrication

The steel section as specified shall be straightened and cut square to correct lengths and measured with steel tape. The cut and exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to makeup the required length of a member. All straightening and shaping form shall be done by pressure. Bending or cutting shall be carried out in such a manner not to impair the strength of the metal.

##### CW.18.4. Painting

All surfaces are to be enamel painted, shall be dry and thoroughly cleaned to remove all loose scale and loose rust. Surfaces not in contact but inaccessible after shop assembling, shall receive the full-specified protective treatment before assembling.

##### CW.18.5. MS Tubes

MS tubes shall be of electric resistance or induction butt-welded (ERW pipes) conforming to IS: 1161-1979. These shall be of Heavy category with nominal bore as specified. All material before being fabricated shall be straightened. These pipes shall be bent to required shape at the free ends including welding 3mm blank (cover plate) to the pipe. The pipe railing to be supported on MS rounds / square bars. For purpose of payment the length of the MS pipe railing shall be recorded in RM.

##### CW.18.6. Measurement:

It shall be measured in kg.

##### CW.18.7. Rate:

Rate shall include welding, hoisting, fixing with necessary bedplates, bolts, painting etc., materials and labour complete.

## CW.19. STEEL TUBULAR TRUSSES AND STEEL TUBE PURLINS

##### CW.19.1. Material:

Steel tubes used in the trusses shall be finished tubes conforming to the requirements specified in IS: 1161 & IS : 806 – 1968.

##### CW.19.2. Fabrication:

The fabrication of trusses using steel tubes shall be done in accordance with IS: 800-1962, welding shall be done with reference to the IS: 820 and IS: 816-1956. The component parts of the structure shall be assembled in such a manner that they are neither twisted nor damaged. The fabricator shall submit fabrication shop drawing for approval. The members of the truss shall be assembled and welding done according to the drawing. All materials before assembly shall be straight ends, if necessary, unless required to be of a curvilinear form and shall be free from twist.

##### CW.19.3. 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 area of the bolt is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts of the parts to be bolted together and washers or appropriate thickness shall be provided to allow the nut to be completely tightened.

In all cases where the full bearing area of the bolt is to be the developed, the threaded portion of the bolt shall not be within the thickness of the parts to be bolted together and washers of the bolt shall not be within the thickness of the parts to be bolted together and washers or appropriate thickness shall be provided to allow the nut to be completely tightened.

Edges should be dressed to a neat workman like finish and be free from distortion where parts are to be in contact with metal.

##### CW.19.4. Sealing to Tubes:

Where the ends of a tube are 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 dry and free from loose scale.

##### CW.19.5. 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.

##### CW.19.6. Erection:

The Contractor must see to it that the base plates are in one level as shown in the drawing. The truss shall be erected only after the walls and columns have been constructed to the full height. The bolts shall be fitted loosely at first. The bolts shall be tightened hard only after two pieces of the truss have been closely fitted till then the truss should be supported fully from underneath by means of props. All the bolts in the truss for the whole building shall be tightened at one time. The Contractor is to pay special attention so those bolts are not bent due to mishandling of the truss.

##### CW.19.7. Painting:

All tubes shall unless specified otherwise shall be painted with one coat of zinc-chromic primer followed by two coats of polyurethane paint.

##### CW.19.8. Measurement:

380. It shall be measured in kg of truss and purlins. Rate shall include welding, hoisting, fixing with necessary bedplates, bolts, painting etc., materials and labour complete.

## CW.20. Random Rubble Masonry

##### CW.20.1. Dressing

Stones shall be hammer dressed, on the face, the sides and the beds, to enable it to come into close proximity with the neighbouring stone. The bushing in the face shall not project more than 4 cm in an exposed face, and one cm on a face to be plastered. The hammer dressed stone shall have a rough tooling for a minimum width of 2.5 cm along the four edges of the face of stone.

##### CW.20.2. Laying

Every stone shall be carefully fitted to the adjacent stones, so as to form neat and close joints. Stones may be brought to level courses at plinth, windowsills and roof level. Levelling up at plinth level, window sills and roof level shall be done with concrete comprising of one part of the mortar as used for the masonry and two parts of graded stone aggregate of 20mm nominal size and shall be‑included in the items. The bond shall be obtained by fitting in closely, the adjacent stones and by using bond‑stones. Face stones shall extend and bond well into the backing. These shall be arranged to‑break joints as much as possible, and to avoid long vertical lines of joints.

The hearting or interior filling of the wall shall consist of rubble stones, which may be of any‑shape but shall not pass through a circular ring of 15 cm inner diameter; thickness of these stones in any direction shall not be less than 10 cm. These shall be carefully laid, hammered down with a wooden mallet into position and solidly bedded in mortar, chips and spalls of stone being used wherever necessary to avoid thick mortar beds or joints and at the same time ensuring that no hollow spaces are left anywhere in the masonry. The hearting will be laid nearly level with facing and backing, except that at about one metre intervals, vertical 'Plumb' projecting about 15 cm to 20 cm shall be firmly embedded to form a bond between successive courses.

The chips shall not be used below the hearting stone to bring these upto the level of face stones. The use of chips shall be restricted to the filling of interstices between the adjacent stones in hearting, and then shall not exceed 20% of the quantity of stone masonry. The masonry in a structure shall be carried regularly. Where the masonry of one part has to be delayed the work shall be raked back at an angle not steeper than 45 degree.

##### CW.20.3. Bond Stones

Bond or through stones running right through the thickness of walls, shall be provided in walls upto 60 cm thick and in case of walls above 60 cm thickness, a set of two or more bond stones overlapping each other by atleast 15 cm shall be provided in a line from face to back.

In case of highly absorbent types of stones (porous lime stone and sand stone etc.) the‑bond stone shall extend about two‑ third into the wall. Through stones in such cases may give rise to‑damp penetrations therefore, for all thickness of such walls, a set of two or more bond stones overlapping‑each other by at least 15 cm shall be provided. Where bond stone of suitable lengths are not available cement concrete block of 1:3:6 mix (1 cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) conforming to sizes mentioned above shall be used.

At least one bond stone or a set of bond stones shall be provided for every 0.5 sq.m of the wall surface. All bond stones in stone masonry shall be marked suitably as directed by the Engineer‑in‑charge.

##### CW.20.4. Quoins or corner stone

The quoins shall be of selected stones neatly dressed with the hammer and / or chisel to form the required angle, and laid header and stretcher alternately. The length of these stones shall be 45cm or more and at least 25% of the stones shall be 50cm or more in length.

##### CW.20.5. Jambs

Stones used in jambs shall be similar to those in quoin, excepting the length of the stem, which shall be 45cm, or thickness of the wall whichever is less.

##### CW.20.6. Joints

Stones shall be so laid that all joints are fully packed with mortar and chips. Face joints shall not be thicker than 20 mm.

When plastering or pointing is not required to be done, the joints shall be struck flush and finished at the time of laying. Otherwise, the joints shall be raked to a minimum depth of 20 mm by raking tool during the progress of work, when the mortar is still green.

##### CW.20.7. Scaffolding

Single scaffolding having one set of vertical support shall be allowed. The supports shall be sound and string tied together by horizontal pieces, over which the scaffolding planks shall be fixed. The inner end of the horizontal scaffolding member may rest in a hole provided in the masonry. Such holes, however, shall not be allowed in pillars less than one metre in width or near the skew‑back of arches. The holes left in masonry work for supporting scaffolding shall be filled and made good with cement concrete 1:3:6 (1 cement: 3 coarse sand: 6 stone aggregate 20 mm nominal size).

##### CW.20.8. Curing

Masonry work in cement or composite mortar shall be kept constantly moist on all face for a minimum period of seven days. In case of masonry with fat‑lime mortar, curing shall commence two days after laying of masonry and shall continue for at least seven days thereafter.

##### CW.20.9. Protection

Green work shall be protected from rain by suitable covering. The work shall also be suitably protected from damage, mortar dropping and rain during construction.

##### CW.20.10. Measurement

The length, height and thickness shall be measured correct to 10 mm. The thickness of wall shall be measured at joints, excluding the bushings. Only specified dimensions shall be allowed; anything extra shall be ignored. The quantity shall be calculated in cubic metre nearest to two places of decimal.

##### CW.20.11. Pointing of Stonework

Pointing shall be of the following types:

A. FLUSH

B. RAISED & CUT

C. STRUCK AND WEATHERED

D. RULED

1. **Scaffolding**

For all exposed brick work, tile work or stonework independent double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong tied together with horizontal pieces over which scaffolding planks shall be fixed.

For all other work in building, single scaffolding shall be permitted. In such cases, the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one metre in width, or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering.

***Note :*** *In case of special type of work, scaffolding shall be got approved from Engineer in advance.*

1. **Preparation of surface**

The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scraping. The surface shall then be thoroughly washed with water, cleaned and kept wet before pointing is commenced.

In case of concrete surface if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface.

The joints shall be raked to such a depth that the minimum depth of the new mortar measured from either the sunk surface of the finished pointing or from the edge of the brick shall not be less than 12 mm.

1. **Mortar**

Cement mortar of 1:4 has to be used.

1. **Application and finishing**

The mortar shall be pressed into the raked out joints, with a pointing trowel, either flush, sunk or raised, according to the type of pointing required. The mortar shall not spread over the corner, edges or surface of the masonry. The pointing shall then be finished with the proper tool, in the manner described below:

***Flush Pointing :*** The mortar shall be pressed into the joints and shall be finished off flush and level with the edges of the bricks, tiles or stones so as to give a smooth appearance. The edges shall be neatly trimmed with a trowel and straight edge.

***Ruled Pointing :*** The joints shall be initially formed as for flush pointing and then while the

mortar is still green, a groove of shape and size as shown in drawings or as instructed, shall be formed by running a forming tool, straight along the centre line of the joints. This operation shall be continued till a smooth and hard surface is obtained. The vertical joints shall also be finished in a similar way. The vertical lines shall make true right angles at their junctions with the horizontal lines and shall not project beyond the same.

***Cut or Weather Struck Pointing :*** The mortar shall first be pressed into the joints. The top of the horizontal joints shall then be neatly pressed back about 3 mm or as directed, with the pointing tool so that the joints are sloping from top to bottom. The vertical joints shall be ruled pointed. The junctions of vertical joints with the horizontal joints shall be at true right angles.

***Raised and Cut Pointing :*** Raised and cut pointing shall project from the wall facing with its edges cut parallel so as to have a uniformly raised band about 6 mm raised and width 10 mm more as directed. The superfluous mortar shall then be cut off from the edges of the lines and the surface of the masonry shall also be cleaned off all mortar. The finish shall be such that the pointing is to the exact size and shape required and the edges are straight, neat and clean.

1. **Curing**

The pointing shall be kept wet for seven days. During this period it shall be suitably protected from all damages. The pointing lines shall be truly horizontal and vertical except where the joints are slanting as in rubble random masonry. Lines of joints from different directions should meet neatly at the junctions instead of crossing beyond.

1. **Measurements**

The measurement will be the actual quantity of work executed. The rates for items shall include cost of all materials (including grouting material) consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

1. **Rate**

The rate shall include the cost of all materials and labour involved in all the operations described above.

## BIOENGINEERING

**Sodding/Turfing:** Sodding of slopes with sods, eg lemon grass (30 cms centre to centre), local Dubo (1metre centre to centre) in contour lines. The sods should be placed even closer to each other if the slope is greater than 25 degree. Turfing of embankment with 30 x 30 cm turfs and fixed to the ground with wooden pegs, if slope is greater than 25 °

**Collected sods** (shallow or rooted plants) by uprooting using shovels ensuring that the roots are intact. Well in advance of the sodding operation, thoroughly make smooth the surface to be covered. It is important to obliterate all irregularities. Place the sods closely in contour lines & apply 5 cm layer of topsoil and compact by hand. Cut turfs (30x30cm) with sharp-edged shovels. Use khukuri/knife to cut the turfs to shape. Well in advance of the turfing operation, thoroughly make smooth the surface to be covered. It is important to obliterate all irregularities. On gravel-filled embankment/slope apply 5 cm layer of topsoil and compact by hand. Place the turfs closely, without gaps in between. On slopes greater than 25°, fix turfs with wooden pegs about 30 cm long and 3-5 cm dia hammered through the turfs to stop it from sliding. Once the slope has been satisfactorily covered, compact the turf with the wooden hammer. Finally water the fresh turfs thoroughly. QA/QC • The sods and turfs shall not be damaged and the roots should contain sufficient parent soil. • The turfs shall be placed closely, without any gap in between, fixed with wooden pegs to hold them from sliding. • Water the sods/turfs if there is no prospect of rains within the next 1-2 days.

**Measurement:** The length and breadth of the completed work shall be measured correct to 10 mm and area calculated nearest to two places decimal. In case of sodding in contour the finished work shall be measured in running meter.

**Rate:** The rate shall include the preparation, collection, and transportation of turfs/sods/wooden pegs to the site, preparation of the site and placing them and also including any other equipment required for the complete operation.

## DOORS & WINDOWS

**Fabrication Process**

Windows

The windows shall be 1.60 mm thick MS sheets (machine rolled) frame of size shown in drawings having width 230mm and rigidly fixed welded together by mechanical means, adjustable lugs with split end tail to each jamb including steel butt hinges of 6”, along with fabrication and installation of MS grill made with 8mm X 8mm solid core square rod as required all complete as per drawings, specification and instruction of the Engineer.

The shutters shall be 28.8mm thick made of 1mm thick 190mm wide sheet folded styles and mullions with 5 mm thick glass (wherever specified) panel at top and infill panel filled with 1mm thick x 100mm wide strip MS sheet in required shape and size with stiffening strips

**Doors**

Steel door frame of size shown in drawings manufacture from iron sheet of 1.60 mm thick having width 230mm with 6" ss premium hinges, jamb, lock jamb, head and hot phosphating pure polyster(PP) powder coated, welded on rigidly fixed together by mechanical means, adjustable lugs with split end tail to each jamb including steel butt hinges with mortar guards, reinforcing to door hardware, strike-plate, as required all complete as per drawings, specification and instruction of the Engineer.

The door shutter shall be made up of 25mm x 40mm x 1.5mm MS rectangle pipe fabricate to required size and shape stiles and mullions, infill panel filled with 1mm thick x 100mm wide strip MS sheet in required shape and size with stiffening strips including the required numbers and sizes hardware like hinges, tower-bolts, handles, aldrops with pad-lock, applying nine tank processing hot phosphating pure polyster(PP) powder coated, welded on rigidly fixed together by mechanical means, adjustable lugs with split end tail to each jamb including steel bush hinges with mortar guards, reinforcing to door hardware, strike-plate as required all complete as per drawings, specification and instruction of the Engineer.

**Coating Process:**

The powder coating shall by hot phosphating pure polyster (PP) application through nine tank dipping process.

**Hardware:**

The numbers and sizes of hardware like hinges, tower-bolts, handles, aldrops with padlock shall be of quality as per the approved sample by the Engineer. There shall not be any sharp edges and protrusions. All the fixtures shall be rivetted and not welded or screwed.

**Approval Process:**

Before the mass production, the contractor will submit one sample of Doors and Widows respectively. Once the sample is approved the mass production maybe undertaken.

**Packing and Delivery:**

Before the site dispatch and delivery, the contractor must submit a request for pre-delivery inspection. The items to be inspected should not be wrapped with plastic or packaged.

The packaging must be done with utmost care as not to damage the doors and windows during transportation and delivery.

The delivered components should be stored properly so as to not damage the components.

**Installations Process:**

The doors and windows will be installed only after the inspection at the site and after the completion of Brick works only. Therefore, necessary provisions must be made while laying the brick works.

Before the installation of the windows and doors, all the covering plastics must be removed.

## List of Approved Make of Materials (For Civil Works)

Specifications brands names of materials (refer materials, whichever are applicable for the scope of work) and finishes approved by the Engineer are listed below. However approved equivalent materials and finishes of any other specialized firms may be used, in case it is established that the brands specified below are not available in the market and subject to approval of the alternate brand by the Engineer.

|  |  |  |
| --- | --- | --- |
| Sl No | MATERIALS | MANUFACTURERS |
| 1 | Doors & Windows fixtures/ Fittings**:** | Everite, Hardima, Earl Bihari |
| 2 | Door Closer / Floor spring**:** | Doorking, Everite, Hardwyn, Amar Darmy. |
| 3 | Clear Glass/ Clear Float Glass: | Modi, Gujrat Guardian, Tata, Saint Gobain(SG) Toughened Glass |
| 4 | Synthetic Enamel Paints: | Berger (Luxol gold), Asian(Apcolite), ICI Dulux (Gloss), Nerolac (Full gloss hard drying) |
| 5 | Oil Bound Distemper: | Asian (Tractor), Berger (Bison), Nerolac (Super Acrylic). |
| 6 | Cement Paint: | Snowcem Plus, Berger (Durocem Extra), Nerolac (Nerocem with titanium),. |
| 7 | Other Paints/Primers: | ICI Dulux, Asian, Berger, Nerolac |
| 8 | Cement: | OPC 43 grade; conforming to BIS-8112 and approval of Engineer |
| 9 | Reinforcement Steel: | TMT steel conforming to BIS-1786 and approval of source by Engineer |
| 10 | Back-up Rod: | Supreme Industries or equivalent |
| 11 | M.S. Pipe: | Jindal Hisar, Prakash-Surya, BST, Kalinga |
| 12 | Polycarbonate Sheets: | GE Plastics or approved equivalent |
| 13 | Gyspum Board System: | India Gypsum, Laffarge, Boral |
| 14 | Sunken Portion Treatment: | Choksey, Roffe, Krytone,Sika |
| 15 | Admixtures for concrete: | Cico, Vam Organics, Roffe, Pidilite |
| 16 | Ceramic Tiles: | Johnson, Somany, Kajaria, Spartek, Nitco, Orient |
| 17 | Silicon Treatment: | GE-Silicon, Pidilite, Choksey, Wacker, Forsoc |
| 18 | Glazed Tiles: | Bell, Somany, Johnson, Kajaria, Cera. |
| 19 | PVC Water Stops: | Supreme, Fixopan or approved equivalent |
| 20 | White Cement: | Birla White, J.K. |
| 21 | Powder Coating Material Pure Polyester | Jotun , Berger, Goodlass Nerolac |
| 22 | Masking Tapes: | Suncontrol , Wonder Polymer. |
| 23 | Stainless Steel Screws For Fabrication and fixing of Windows: | Kundan , Puja , Atul |
| 24 | Proposed Treatment on MS Brackets: | Galvanised Brackets As per IS:4759-1996 610 gms./sqm.(microns) 80-90 |
| 25 | Dash Fasteners./Anchor bolts: | Hilti, Fischer, Bosch. |
| 26 | Stainless Steel Bolts, Washers Nuts: | Kundan, Puja, Atul. |
| 27 | Structural Silicon at butt joints: | Dow Corning, Wacker, GE |
| 28 | Water proofing / Injection Grouting: | Overseas Water Proofing Corporation |
| 29 | Door Locks: | ACME, Godrej, Harrison |
| 30 | Door Seal – Woolpile Weather Strip: | Anand -Reddiplex. |
| 31 | Aluminium Die-cast handles: | Giesse, Securistyle, Alu-alpha |
| 32 | Stainless steel D-handles: | D-line, Giesse, Dorma |
| 33 | Stainless Steel Pipes/Flats: | 304 Grade |
| 34 | Structural Steel: | Conforming to BIS 2062 and approval by Engineer |
| 35 | Ready Mix Concrete: | L&T,ACC,BIRLA,AHLCON |
| 36 | SBS bitumen based Self adhesive membrane Material: | Grace-Bituthene CP1.5, Texsa-Texself 1.5 |
| 37 | APP modified Bitumen water proofing membrane: | Lloyds, STP, Bitumat |
| 38 | Hand made ceramic tiles: | Raja Tiles, Saraswathi |
| 39 | Curtain wall: | Specialized Agency to be Approved by Engineer |
| 40 | Ply board: | Greenply, Kitply, Century |
| 41 | Inter-locking Concrete Blocks | Prefab, Sidhico |
| *Note : Wherever makes have not been specified for certain items, the same shall be as per National Standard and as per approval of Engineer* | | |

## 

## SW. SANITARY WORKS

## Section 1. Sanitary Fixtures

##### SW.1.1 Scope of work

1.1.1 Work under this section shall consist of furnishing all labour materials necessary and required to completely install all sanitary fixtures, chromium plated fittings and accessories required by the drawings, specified hereinafter or given in the schedule of quantities and approval of the Engineer.

1.1.2 Without restricting to the generality of the foregoing the sanitary fixtures shall include all sanitary fixtures, chromium plated fittings and accessories etc, necessary and required for the buildings.

1.1.3 Whether specifically mentioned or not all fixtures, appliances and accessories shall be provided with all fixing devices, nuts, bolts, screws, hangers as required and said by the Engineer.

##### SW.1.2 General requirements

1.2.1 Sanitary fixtures shall be of the best quality approved by the Engineer. Wherever particular makes are mentioned, the choice of selection shall remain with the Engineer.

1.2.2 All fixtures and fittings shall be provided with all such accessories and fixing devices as will be required to complete the item in working condition whether specifically mentioned in the schedule of quantities, specifications or drawings or not.

1.2.3 All fixtures and accessories shall be fixed in accordance with a set pattern matching the tiles or interior finish as per Engineer's/interior designer's requirements. Wherever necessary, the fittings shall be centered to dimensions and pattern desired.

1.2.4 Fixing screws shall be half round head brass/stainless steel screws with CP washers wherever required as per directions of Engineer.

1.2.5 Chromium plated fittings shall be cast brass chromium plated of the best quality approved by the Engineer.

1.2.6 All fittings and fixtures shall be fixed in a neat workmanlike manner true to level at heights shown on drawings and in accordance with the manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage shall be rectified at the Contractors expense.

1.2.7 Contractor shall provide poly-sulphide or any non-bio-degradable sealant appropriate for its use for all fixtures fixed on walls, marble and edges.

##### SW.1.3 Indian water closet

1.3.1 Indian pan shall be of porcelain with footrest shall be as specified in the Bill of Quantities. Each WC shall be provided with a 100mm dia. UPVC P or S trap.

##### SW.1.4 Urinals

1.4.1 Urinals shall be of white glazed model as specified in the Bill of Quantities, as compliance to the manufacturer’s specifications and approved by the Engineer.

1.4.2 Half stall urinals shall be provided with 15mm dia. spreader, 32 mm dia. PVC bottle trap with wall flange, and shall be fixed to wall with adequate means of support. Where screw fixing holes are provided, each urinal shall have not less than two fixing holes one each having a minimum diameter of 6.5mm or complete as recommended by manufacturer's directives.

1.4.3 Half stall urinals shall be fixed at height specified in drawing with CP brass/stainless steel screws.

1.4.4 Urinals shall be flushed with push type flush valves as given in the schedule of quantities and as model described in the item.

1.4.5 Waste pipes for urinals shall be of uPVC. Waste pipes shall be concealed by chasing into the walls as directed by the Engineer.

##### SW.1.5 Hand wash basins

1.5.1 Wash Basin shall be porcelain clay, shape and type specified in the schedule of quantities, as compliance to the manufacturer’s specifications and as shall be approved by the Engineer.

1.5.2 Each basin shall be supported on painted MS alternative one unit brackets with heavy SS Screw with expansion grip. The basin shall be securely fixed to wall with tap hole 25mm round. Placing of basin over the brackets without secure fixing shall not be accepted. They shall be provided & fixed in place early so that the built-up vanity may be installed in sufficient time to comply with completion dates.

1.5.3 Each basin shall be provided with 32mm dia CP waste with 32mm dia. PVC bottle trap with flange and PVC connecting pipe to stop cock and CP flange as given in the schedule of quantities.

* + 1. Each basin shall be provided with Pillar Tap as specified in the schedule of Quantities and as approved by the Engineer.

1.5.5 Basins shall be fixed at proper heights as shown on drawings. If heights is not specified, the rim level shall be 79cms.

1.5.6 The edge between the fixture and the wall or the counter shall be sealed with approved type of poly-supplied or any non-bio-degradable sealant.

1.5.6 Each wash basin faucet connection to cold shall be provided with CP angle valves with CP wall flange and PVC connecting pipe of required length.

##### SW.1.6 Mirrors

1.6.1 Mirrors shall be of superior sheet glass with edge rounded off. It shall be free from flaws, specks or bubbles and its thickness shall be 5.5mm of guaranteed quality of float glass and reputed make Asahai/Modiguard or equivalent, size shall be as specified in the schedule of quantities & the drawings. The image shall be clear and without waviness at all angles of vision. It shall be uniformly silver plated at the back and shall be free from silvering defects. Silvering shall have a protective uniform a protective uniform covering of red lead paint.

1.6.2 Mirrors shall be provided with backing of enamel painted over all surfaces of 12mm thick waterproof marine plywood and fixed with CP brass semi-round headed concealed screws and cup washers or CP brass clamps as specified or instructed by the Engineer.

##### SW.1.7 Accessories

1.7.1 The Contractor shall install all chromium plated and porcelain accessories as shown on the drawings in compliance to the manufacturer’s specifications directed by the Engineer, given in the Bill of Quantities and shown in the drawings.

1.7.2 All CP accessories shall be fixed with CP brass half round head screws and cut washer in wall with raw plugs and shall include cutting and making good as directed by the Engineer.

1.7.3 Porcelain accessories shall be fixed in walls and set in cement mortar 1:2 (1 cement 2 fine sand) and fixed in relation to the tiling work.

##### SW.1.8 Measurement

1.8.1 Rate for providing and fixing of sanitary fixtures, accessories, urinal partitions shall include all items, and operations stated in the respective specifications and Bill of Quantities, nothing extra is payable and shall be measured by numbers.

1.8.2 Rate for providing and fixing of mirror shall be measured by square meters.

1.8.3 Rates for all items under specifications per above shall be inclusive of cutting holes and chases and making good the same, CP screws, nuts, bolts and any fixing arrangement required and recommended by manufacturers, testing and commissioning.

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## Section 2. Water Supply System

##### SW.2.1 Scope of work

2.1.1 Work under this section consists of furnishing all labour, materials, equipment and appliances necessary and required to completely install the water supply system as required by the drawings, specified hereinafter and given in the schedule of quantities.

2.1.2 Without restricting to the generality of the foregoing, the water supply system shall include the following:

a) Connecting the mains supply to the designed tanks as per the drawings.

b) Control valve, masonry chambers and other appurtenances.

c) Connections to all plumbing fixtures and overhead tanks with isolation valves as per drawing and required.

d) Excavation and refilling of pipe trenches.

e) Pipe protection, clamping, sleeves and painting.

f) Pumps and controls.

##### SW.2.2 General requirements

2.2.1 All materials shall be new of the best quality conforming to specifications. All works executed shall be to the satisfaction of the Engineer.

2.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

2.2.3 Short or long bends shall be used on all main pipe lines as far as possible. Use of elbows shall be restricted for short connections.

2.2.4 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.

2.2.6 Pipes shall be securely leveled to the required slopes & fixed to walls and ceilings by suitable clamps at intervals specified.

2.2.7 Valves and other appurtenances shall be located to provide easy accessibility for operation, maintenance and repairs.

##### SW.2.3 CPVC (Chlorinated Poly Vinyl Chloride) Pipes, fittings and valves

2.3.1 All pipes inside the building and where specified, outside the building shall be of CPVC SDR 11 CTS 28.1kg/sqcm Floweguard or ISI Standard class as specified schedule of quantities, as compliance to the manufacturer’s specifications and as shall be approved by the Engineer

2.3.2 Fittings shall be CPVC fittings of specified make. All fittings shall have manufacturer's trade mark stamped on it. Fittings of CPVC pipes shall include reducer bushing, transition bushing, coupling, transition coupling, reducer coupling, brass coupling, tee, reducer tee, brass FPT tee, elbow 90 deg., reducer 90 deg., brass FPT 90 deg. Elbow, elbow 45 deg., male adapter CPVC / brass threads, female adapter CPVC / brass threads, union, cross, step over bend, plastic strap, elbow holder, tee holder.

2.3.3 Pipes and fittings shall be done with following procedure:

Cutting pipe with measure length and line shall be mark around the pipe with marker, beveling, fitting preparation using clean dry rag, wiping dirt and moisture from the fitting sockets and pipe end, applying a heavy and even coat of CPVC Solvent Cement of Flowguard 1-step adhesive solution (Yellow) ASTM F493 to the end of pipe and fitting, assembling immediately by inserting the pipe into the fitting socket and rotate the pipe ¼ to ½ turn while inserting and hold for approximately 10 seconds to allow the joint to set up, it required 10 to 20 minutes for perfect joint. Care shall be taken to remove butt from the end of the pipe after cutting by a round file and tools shall use only design for plastic pipe and fittings. Teflon tapes shall be use for threaded fittings. Care shall be taken to avoid air pockets. CPVC pipes inside toilets and rooms shall be fixed in wall chases well with marble cutter above the floor. No pipes shall be run inside a sunken floor unless specifically instructed. Pipes shall be run under the ceilings, wall at skirting level and other areas as shown on drawings. Provide vertical and horizontal supports using Plastic Straps only. Pressure testing shall be done before plastering and imbedding works take place. At the end where angle valves and taps were be install should be with brass elbow or brass tee.

##### SW.2.4 Clamps

2.4.1 CPVC pipes in shafts and other locations shall be supported by MS clamps of design approved by the Engineer. Pipes at ceiling level shall be supported on structural clamps teardrop shape fabricated on MS structural brackets as described as per drawings. Pipes in typical shafts shall be supported on square rod/channels as specified elsewhere.

##### SW.2.5 Unions

2.5.1 The Contractor shall provide adequate numbers of unions/flanges on all pipes to enable dismantling later. Unions shall be provided near each gunmetal valve, stop cocks or check valves and on straight runs as necessary at appropriate locations and required and/or directed by the Engineer.

##### SW.2.6 Flanges

2.6.1 Flanged connections shall also be provided on all equipment connections as necessary and required or as directed by the Engineer. Connections shall be made by the correct number and size of bolts and made with 3mm thick insertion rubber washers. Where hot water or steam connections are made insertion gasket shall be of 1.5mm thick compressed fiber gaskets approved by the Engineer. Bolt hole dia for flange shall conform to match the specification for CI sluice valve to IS 780 and CI butterfly valve to IS 13095.

##### SW.2.7 Trenches

2.7.1 All CPVC pipes below ground level shall be laid in trenches shall have a minimum cover of 60cms. Excavation for trenches shall be done as specified in subsequent pages of this tender but the width and depth of the trenches shall be as follows:

Dia of pipes Width of trenches Depth of trenches

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15mm to 50mm 30cms 75cms

65mm to 100mm 45cms 100cms

All CPVC pipes in trenches shall be protected with fine sand 15cms all-round before filling in the trenches.

##### SW.2.8 Gate/Globe Valves ¼ Turn-Nylon Bushed

2.8.1 Valves 50mm dia and below shall be heavy gunmetal valves or globe valves conforming to IS 778-1971 class I. Valves shall be tested at the manufacturer's with test results and their name stamped on it.

2.8.2 All valves shall be approved by the Engineer before they are allowed to be used in the works.

##### SW.2.9 Non return valves

2.9.1 Where specified non return valves shall be provided through which flow can occur in one direction only.

##### SW.2.10 Storage tanks and overhead tanks and overhead tanks

2.10.1 **Concrete tanks**

Tank shall be provided with adequate number of lockable type manhole frames and cast iron tank covers well cast and finished as specified in Bill of Quantities. Manhole covers shall be of sizes shown on drawings and shall be approved by the Engineer.

a) The Contractor shall provide puddle flanges fabricated from MS/GI heavy class pipes of required sizes and lengths and welded to 5mm MS plates. All puddle flanges must be fixed in true alignment and level and shall be back welded to the reinforcement to prevent movement during concreting.

b) The Contractor shall make connection of pipe lines laid and fixed by him to concrete, masonry as required at site. No additional payment shall be allowed for making connections.

C) CI tank cover 24”x24” (50kg) Square (locking type) shall be provided.

**2.10.2 Overhead polyethelyne storage tanks**

Tanks of the size and capacity described in the Bill of Quantities shall be of the best quality schedule of quantities, as compliance to the manufacturer’s specifications and as shall be approved by the Engineer shall be manufactured or by Hilltake Pvt. Ltd. Nepal. They shall be free of all defects and numbers shall be written at each of the tank. Each tank covers shall be lockable with adequate number of locks approved by the Engineer.

a) The outlet pipe shall be fixed 50 to 75mm above the bottom of the tank and fitted with a strainer. Tank shall be clean and water tight.

b) Tanks shall be placed in a position as to enable thorough inspection and cleaning to be carried out.

c) Tanks base shall be raised 7ft above the floor level, as specified detailed in drawings.

##### SW.2.11 Testing

2.11.1 All pipes, fittings and valves, after fixing at site, shall be tested by hydrastatic pressure of 10 kg/sqcm or 2 times the working pressure whichever is more. The open end of pipe line shall be temporarily closed with watertight CPVC end plug threads.

Pressure shall be maintained for a period of at twenty four hour without any measurable.

The pressure shall be applied by means of a manually operated test pump, or in the case of long mains or mains of large diameter, by a power driven test pump, provided that the pump is not left unattended.

Pressure gauges shall be accurate and shall preferably have been recalibrated before test.

Testing shall do by area or location of sanitary fixtures wise, upon system completion a total system test shall be undertaken using same criteria.

A test register shall be maintained and all entries shall be signed and dated by contractor(s) and the Engineer.

2.11.2 In main shall be tested in sectional as the work of laying proceeds, the contractor shall test the entire installation after connections to the overhead tanks or pumping system or the mains. He shall rectify all leakages, and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good during the defects liability period without any extra cost.

2.11.3 After commissioning of the water supply system, the contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above. Valves shall be tested under normal working pressure to ascertain leakage.

2.11.4 When the service line is complete, it shall be slowly and carefully charged with water, allowing all air to escape and avoiding all shock or water hammer by drawing off all taps and fixtures simultaneously during initial charging of water. The service shall then be inspected under working conditions of pressure and flow. When all draw off taps are closed, the service pipes and fixtures shall be absolutely watertight. All piping fittings and appliances shall be checked over for satisfactory support and protection from damage, corrosion and frost.

##### SW.2.12 Measurement

2.12.1 **Pipes**

Pipes above ground / below ground shall be measured per linear feet (to the nearest inch) and shall be inclusive of all fittings eg reducer bushing, transition bushing, coupling, transition coupling, reducer coupling, brass coupling, tee, reducer tee, brass FPT tee, elbow 90 deg., reducer 90 deg., brass FPT 90 deg. Elbow, elbow 45 deg., male adapter CPVC / brass threads, female adapter CPVC / brass threads, union, cross, step over bend, plastic strap, elbow holder, tee holder and flanges, deduction for valves shall be made. Rate quoted shall be inclusive of all fittings, excavation, backfilling and disposal of surplus earth, cutting holes, chases with marble cutter and making good and all items mentioned in the specifications and schedule of Quantities.

2.12.2 Gunmetal, brass butterfly and non return valves, level indicators and meters shall be measured by numbers.

2.12.3 **Structural support for tanks**

RS joists or other MS structural supports for storage tanks shall be paid by weight of actual length of member fixed at site multiplied by its theoretical weight given in the manufacturer's catalogue. Rate shall be inclusive of hoisting, cutting and making good the walls and all items described in the Schedule of Quantities and specifications.

##### SW.2.13 Painting

Separate payment shall not be admissible for enamel painting over MS clamps and supports.

## Section 3. Drainage (sewers & storm water)

##### SW.3.1 scope of work

3.1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary as required to completely install the drainage system as required by the drawings and specified hereinafter or given in the Schedule of Quantities.

3.1.2 Without restricting to the generality of the foregoing, the drainage system shall include: Sewer lines including excavations, pipelines, manholes, drop connections, underground storm water drains, including pipes, manholes, catch basins, open drains and culverts.

##### SW.3.2 general requirements

3.2.1 All materials shall be of the best quality conforming to specifications and subject to the approval of the Engineer.

3.2.2 Drainage lines shall be laid to the required gradients (1:100) and profiles.

3.2.3 All drainage connections work shall conform to the local municipal bye-laws. All slopes and run off shall conform to the best standard of the IS Hydraulic engineering practices.

3.2.4 The Contractor shall obtain necessary approval and permission for the drainage system from the municipal or any other competent authority as shall be required by local ordinances.

3.2.5 Location of all manholes, catch basins, etc, shall be confirmed by the Engineer before the actual execution of the work at site.

3.2.6 All works shall be executed as directed by the Engineer and subject to the final approval of the Engineer.

##### SW.3.3 alignment and grade

3.3.1 The sewers and storm water lines shall be laid to alignment and gradient shown on the drawings but subject to such modifications as shall be ordered by the Engineer from time to time to meet the requirements of the works. No deviations from the lines, depths of cutting or gradients of sewers shown on the plans and sections shall be permitted except at the express direction in writing of the Engineer.

##### SW.3.4 excavation

3.4.1 The excavation for sewers and storm water drains shall be laid in open cut trenches unless the permission of the Engineer for the ground to be tunneled is obtained in writing. Where sewers have to be constructed along narrow passages, the Engineer may order the excavation to be made partly in tunnel forms and in such cases the excavated soil shall be brought back to refill the trenches or tunnel as shall be approved by the Engineer for appropriateness.

3.4.2 **Opening out trenches**

In excavating the trenches etc, the soiling roads, metalling, pavement, kerbing, etc, and turf shall be placed on one side and preserved for reinforcement when the trenches or other excavation have been made good. The surface of all trenches and holes shall be restored as original and maintained to the satisfaction of the Engineer and of the owners of the roads or other property traversed and the contractor shall not cut out or break down any live fence or trees in the line of the proposed works but shall tunnel under them, unless the Engineer shall order to the contrary.

3.4.3 **Obstruction of roads**

The contractor shall not occupy or obstruct by his operation more than one half of the width of any road or street and insufficient space shall then be left for public and private transit. He shall remove the materials excavated to a place where there is no objection or contest of the transiting public and bring them back again when the trench is required to be refilled. The contractor shall obtain the consent of the Engineer in writing before closing any road to vehicular traffic. Foot works and promenades shall be clear at all times. The contractor shall have written approval in the case where the work is to be on public property from all the related authorities to the satisfaction of the Engineer prior to commencing the work. The contractor shall indemnify the employer against any claims for nuisance or damage from any person or authority in this matter.

* + 1. **Removal of filth**

All night soil, filth or any other offensive matter if met with during the execution of works, shall immediately be completely removed from any trench, pit, sewer or cess pool. The waste matter shall not be deposited on any street or drain or where it will become a nuisance to the neighborhood or passed into any sewer or drain, where blockage can occur. This waste matter shall be at once put into leak-spill proof carts and removed to a suitable place to be provided by the contractor that shall be approved by the Engineer so long as the location is not contested by any person or local authority and is not likely to create a nuisance to any person or place in any manner what-so-ever.

Pipe Bedding Sand should be free from rocks or objects which could puncture or deform the bedded pipe with a 4” cover on all sides before refilling begins.

3.4.5 **Refilling**

Only after the sewers and other related work has been laid, installed and proven after testing to be water tight, the trench and other excavations shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the sewer and other permanent works. The filling in the trenches up to 75cms above the crown of the sewer and other lines shall consists of the finest selected sand and related materials placed carefully in 15cms layers and flooded to consolidation. After this layer has been laid the trench and other excavation shall be refilled carefully in 15cms layers with materials taken from the excavation, each layer being compacted to assist in the consolidation unless the Engineer shall otherwise direct.

3.4.6 **Contractor to restore settlement and damages**

The contractor shall, at his own costs and charges, make good promptly during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, berms, footpaths, gardens, open spaces etc, whether public or private caused by his trenches or by other excavations of his and he shall be liable for any accidents caused thereby. He shall also, at his own expenses and charges repair and make good any damage done to buildings and other property. If in the opinion of the Engineer he fails to make good such works with all practicable despatch, the Engineer shall be at liberty to get the work done by other means and the expenses thereof shall be paid by the contractor or deducted from any money that may be or become due to him or recovered from him in any other manner according to the law of the land.

3.4.7 **Disposal of surplus or Undesirable soils**

The contractor shall at his own costs and charges provide places for disposal of all surplus materials not required to be used on the works. As each trench s refilled the surplus soil shall be immediately removed, the surface properly restored and road ways and sides left clear. The points where he disposes of his materials shall not be contestable by any person or organization and shall not create a nuisance to any person or place or the employer in no way shall be held responsible for any such negligence on the part of the contractor.

##### SW.3.5 Testing

a) All lengths of the sewer and drain shall be fully tested for water rightness by means of water pressure maintained for not less than 30 minutes. Testing shall be carried out from man hole to man hole. All pipes shall be subjected to a test pressure of at least, 1.5 meter head of water at the highest point. Pressure shall, however, not exceed 6 meter head at any point. The pipes shall be plugged preferably with standard design plugs with rubber plugs on both ends. The upper end shall, however, be connected to a pipe for filling with water and to achieve the required head.

b) A test register shall be maintained which shall be signed and dated by contractor(s) Engineer and the Engineer.

##### SW.3.6 upvc pipes for drainage

All drainage lines passing under buildings, floors of 6kg/sq.cm and roads of 10kg/sq.cm UPVC pipes. Position of such pipes shall generally be shown on the drawings, specified hereinafter and given in the schedule of quantities.

##### SW.3.7 fittings

Fittings used for uPVC drainage pipe shall conform to specified hereinafter and given in the schedule of quantities. Junctions from branch pipes shall be made by a Y and tee.

##### SW.3.8 joints

Joints between pipes shall be made with fixing rubber ring into the grove and applying jointing lubricant and solvent cement to the chamfer end of the pipe right upto the mark made or to the socket end of the fitting and shall be water tight.

##### SW.3.9 cleanout plugs

Cleanout plugs shall be provided on starting points of each drain and in between at locations indicated on plans or directed by the Engineer. UPVC Cleanout plugs shall be of size matching the full bore of the pipe.

##### SW.3.10 cement concrete and masonry works (for anaerobic baffel reactor, manholes and chambers, etc)

**3.10.1 manhole and chambers**

3.10.1.1 All manholes, chambers, septic tanks and other such works as specified shall be constructed in brick masonry in cement mortar 1:4 (1 cement 4 coarse sand) or as specified in the schedule of quantities. Interior finishing shall conform to AIA Standard.

3.10.1.2 The connection between the Inspection chamber to the septic tanks shall be connected by non-pressure NP2 class (light duty) RCC pipe with collar jointed with stiff mixture of cement mortar in the portion of 1:2 (1: cement: 2 fine sand)3.11.4.2 All manholes, chambers, septic tanks, etc, shall be supported on base of cement concrete of such thickness and mix as given in the schedule of quantities or shown on the drawings.

3.10.1.3 All manholes shall be provided with cement concrete benching in 1:2:4 mix (1 cement 2 coarse sand 4 stone aggregate 20mm nominal size). The benching shall have a slope of 10 cms towards the channel. The depth of the channel shall be the full diameter of the pipe. Benching shall be finished with a floating coat of neat cement.

3.10.1.4 All manholes shall be plastered with 12/15mm thick cement mortar 1:3 mix (1 cement 3 coarse sand) and finished with a floating coat of neat cement inside. Manholes shall be plastered outside as above but with rough plaster.

3.10.1.5 All manholes with depths greater than 1m shall be provided foot rest of PVC mix 30cms vertically and staggered.

3.10.1.6 All manholes shall be provided with cast iron covers and frames and embedded in reinforced cement concrete slab. Weight of the cover and frame shall be as specified in the schedule of quantities.

##### SW.3.11 measurements

**3.11.1 Saturated soil**

No extra payment for pumping and bailing out water shall be made for excavation with an average depth of 1.5m in saturated soil, or where surface water from rain falls or where broken pipelines or sieves and other similar sources produced water logging. An extra rate as quoted in the Schedule of Quantities shall be paid for excavation in saturated soil for pipe trenches above an average depth of 1.5m. No payment is admissible for water collected from surface source and broken pipe lines or sewers.

**3.11.2 Refilling, consolidation and disposal of surplus earth**

Rate quoted for UPVC pipe laying shall be inclusive of refilling, consolidation and disposal of surplus earth within a lead of 75m.

**3.11.3 swr upvc pipes**

UPVC pipes shall be measured for the finished length of the pipe line per feet.

a) Lengths between manholes shall be recorded from inside of one manhole to inside of other manhole inclusive of excavation, refilling and cement concrete or brick supports.

b) Lengths between gully traps and manholes shall be recorded between the socket of the pipe near the gully trap and the inside of manholes.

The rates for items shall include cost of all materials consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

**3.11.4 Gully traps**

Gully traps shall be measured by the number and rate which shall include all excavation, foundation concrete, brick masonry, cement plaster inside and outside, CI grating and sealed cover and frame.

**3.11.5 Manholes**

a) All manholes shall be measured by numbers and shall include all items specified in the preceding paras and Schedule of Quantities.

b) Manholes with depths greater than specified under the main item shall be paid for under "extra depth" and shall include all items as given for manholes. Measurement shall be done to the nearest inch. Depth of the manholes, shall be measured from the top of the manhole cover to the bottom of the channel.

## Section 4. Soil, Waste & Vent Pipes and Rain Water Pipes

##### SW.4.1 scope of work

4.1.1 Work under this section shall consist of furnishing all labour, materials, equipment and applications, necessary and required to completely install all soil, waste, vent and rain water pipes as required by the drawings, specified hereinafter and given in the Schedule of Quantities. All UPVC pipes shall have a pressure rating of 6kg/sqcm and as per the approved brands.

4.1.2 Without being restricted to the generality of the foregoing, the soil, waste, vent and rain water pipes system shall include:

a) Vertical and horizontal soil, waste, vent, rain water pipes and fittings, joints, clamps and connections to fixtures.

b) Connection of all pipes to sewer and storm water lines as shown on the drawings at ground floor levels.

c) Floor and urinal traps, cleanout plugs, inlet fittings and rain water collection heads.

d) Waste pipe connection from all fixtures eg. Wash basins, sinks, urinals, equipment and plant room equipment.

##### SW.4.2 general requirements

4.2.1 All materials shall be of the best quality conforming to the specifications and subject to the approval of the Engineer.

4.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

4.2.3 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages, etc. Fitting positions shall in all cases line up with & conform to access panels for ease of maintenance.

4.2.4 Pipes shall be securely fixed at least 5cm clear from the walls and ceiling by suitable clamps at intervals specified.

4.2.5 Access doors for fittings and cleanouts shall be so located that they are easily accessible for repair and maintenance, allowing for thermal movement.

4.2.6 All work shall be executed as directed by the Engineer.

##### SW.4.3 upvc pipes and fittings

4.3.1 Soil, waste, vent and anti-siphonage pipes shall be uPVC pipes.

4.3.2 UPVC pipes shall be straight and smooth and inside free from manufacturing defects.

##### SW.4.4 fittings

4.4.1 Fittings shall conform to the Indian Standard as for pipes. Contractor shall use pipes and fittings of matching specifications.

4.4.2 Fittings shall be of the required degree of curvature with or without access door as requirement and as the approval of the Engineer.

##### SW.4.5 fixing

4.5.1 All vertical pipes shall be fixed by MS clamps truly vertical. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard).

4.5.2 Horizontal pipes laid to the correct slopes running along ceilings shall be fixed on structurally adjustable clamps of special design shown on the drawings or as directed. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them.

4.5.3 The Contractor shall provide all sleeves, openings, hangers, inserts during the construction. He shall provide all necessary information to the building contractor for making such provision in the structure as necessary and as required.

##### SW.4.6 Jointing

Joints between pipes shall be made with fixing rubber ring into the grove and applying jointing lubricant and solvent cement to the chamfer end of the pipe right upto the mark made or to the socket end of the fitting and shall be water tight.

##### SW.4.7 Testing

4.7.1 Before use at site, all soil and waste pipes shall be tested by filling up with water for at least 10 minutes. After filling, pipes shall be struck with a hammer and inspected for blow holes and cracks. All defective pipes shall be rejected and removed from the site within 12 hours. Pipes with minor seating shall not be accepted at the discretion of the Engineer.

4.7.2 Pipes shall be tested after installation, by filling up the stack with water. All opening and connections shall be suitably plugged. The total head in the stack shall however not exceed 5m.

4.7.3 Alternately the contractor may test all soil and waste stacks with a smoke testing machine. Smoke shall be pumped into the stack after plugging all inlets and connections. The top end shall however be left open. The stack shall then be observed for leakage and all defective pipes and fittings removed or repaired as directed by the Engineer.

4.7.4 A test register shall be maintained and all entries shall be signed and dated by the contractor's Engineer.

##### SW.4.8 traps

**4.8.1 Floor traps**

Floor traps shall be UPVC with “P” trap proprietary fixtures deep seal with an effective seal of 50mm. The trap and waste pipes shall be set in cement concrete blocks firmly supported on the structural floor. The blocks shall be in 1:2:4 mix (1 cement 2 coarse sand 4 stone aggregate 20mm nominal size) and extended to 40mm below finished floor level. The Contractor shall provide all necessary shuttering and centering for the blocks.

**4.8.1.1 Floor trap inlets**

Bath room traps and connections shall ensure free and silent flow of discharging water. Joint between waste and hopper inlet sockets shall be solvent cement joints. Floor trap inlets, hoppers and the traps shall be set in cement concrete blocks without extra charge.

**4.8.2 CP/Stainless steel gratings**

Floor and urinal traps shall be provided with 100-150mm square or round CP/Stainless steel grating, with rim of approved design and shape. Minimum thickness shall be 6 mm or as specified in the schedule of quantities.

##### SW.4.9 cleanout plugs

Clean out plug for soil, waste and rain water pipes laid under floors shall be provided near pipe junctions bend, tees, “Ys” and on straight runs at such intervals as required as per site conditions. Cleanout plugs shall terminate flush with the floor levels. They shall be threaded and provided with key holes for opening.

The Contractor shall provide uPVC proprietary cleanout plugs as required. Cleanout plugs shall be threaded and provided with key holes for openings. Cleanout plugs shall be fixed to the pipe with a screw fixed collar internally splayed & fitted with neoprene gaskets.

##### SW.4.10 waste pipe from appliances

4.10.1 Waste pipe from appliances eg wash basins, sinks, urinals, water coolers shall be uPVC as given in the schedule of drawings.

4.10.2 All pipes shall be fixed in gradient towards the outfalls of drain. Pipes inside a toilet shall be chased unless otherwise shown in the drawings. Where required pipes may be run at ceiling level at a suitable gradient and supported from structural clamps. Spacing for clamps for such pipes shall be as follows:

Vertical Horizontal

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UPVC Pipes 180 cms 90 cms

##### SW.4.11 Rainwater pipes and fittings

4.11.1 All terraces and such areas that may be prone to the effects of rain shall be drained by providing down-takes uPVC rainwater pipes.

4.11.2 Rainwater pipes are separate and independent and connected to the strom water drainages system as shown on the drawings.

4.11.3 Rainwater in enclosed courtyards shall be collected in catch-basins and connected to storm water drains with casing slabs.

4.11.4 Fittings: Fittings shall be of compatible material and type and free from manufacturing defects of any kind.

**4.11.5 clamps**

4.11.5.1 MS clamps, shall be of standard design and fabricated from MS flat 40 x 3mm thick. They shall be painted with two coats of black bitumen paint or red oxide with enamel paint before fixing.

4.11.5.2 Where MS clamps are to be fixed on RCC column or slotted angles, walls or beam they shall be fixed with 40 x 3mm flat iron `U' type clamps with anchor fasteners of approved design or 5 cm nuts and bolts.

4.11.5.3 Structural clamps shall be fabricated from MS structural members eg rods, angles, channels, flats as per detailed drawings or as directed. The Contractor shall provide all nuts, bolts, welding and paint the clamps with one coat of red-oxide. Wooden saddles shall be provided free of cost but structural clamps shall be paid separately by weight.

4.11.5.4 Slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes as approved by the Engineer. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable expansion bolts or fasteners using electrical drilling for making holes. The spacing of support bolts horizontally shall not exceed 1m.

4.11.5.5 Wherever MS clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangements for making good with cement concrete 1:2:4 mix as directed by the Engineer.

4.11.5.6 CUTTING AND MAKING GOOD

Pipes shall be fixed and tested as building proceeds.

Contractor shall provide all necessary holes cut outs and chases in structural members as building work proceeds. Wherever holes are cut or left originally, they shall be made good with cement concrete 1:2:4 (1 cement: 2 course sand: 4 stone aggregate 20mm nominal size) or cement mortar 1:2 (1 cement: 2 course sand) and the surface restored as in original condition.

##### SW.4.12 measurement

**4.12.1 General**

4.12.1.1 Rates for all items quoted shall be inclusive of all work and items given in the above mentioned specifications and Schedule of Quantities and applicable for the work under floor, in shafts or at ceiling level at all heights and depths.

4.12.1.2 All rates are inclusive of preparing timber block-outs in RCC and chasing with masonry work and making good the same and even embedded wall.

4.12.1.3 All rates are inclusive of pre-testing and on site testing of all the installations and materials prior to commissioning to the satisfaction of the Engineer.

4.12.2 Pipes (Unit of measurement: feet to the nearest inches)

4.12.3 Slotted MS support and clamp shall be measured per kg of finished length and shall include support bolts and nuts embedded in masonry walls with cement concrete block and nothing extra will be paid for making good the same.

**4.12.4 Fittings**

Unit of measurement shall be the number of pieces. Floor and urinal traps, trap gratings, hoppers, cleanouts, plugs and fittings shall be measured by numbers and shall include all items described in the relevant specifications and Schedule of Quantities.

**4.12.5 Painting**

No extra payment shall be admissible with respect to Painting clamps.

**4.12.6 Structural clamps**

Structural clamps and U clamps shall be paid for by weight per kg. Rate shall be inclusive of all nuts, bolts, drilling, cutting, welding. Weight of clamps shall be calculated from the actual length used in structural members multiplied by its theoretical weight given in manufacturer's catalogues. Weight of nuts, bolts, shall not be taken into account.

**4.12.7 Excavation for pipes**

No extra payment shall be admissible with respect to excavation, refilling and disposal of surplus earth for soil and waste pipes.

**4.12.8 Pipes**

Pipes above ground / below ground shall be measured per linear feet (to the nearest inch) and shall be inclusive of all fittings

## SECTION 5. LIST OF APPROVED MAKES OF MATERIALS (sanitary)

**Sl No Description Brand Name**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

5.1 Water Closet and Urinal Parryware

5.2 Stainless Steel Pan Hulas

5.3 PVC Cistern Parryware

5.4 Bib Cock, Piller Cock, Angle Valve,

Shower Set, Grab bar etc. Jaquar

5.5 PVC Connecting Pipe and Urinal Flush Valve Parryware

5.6 Urinal Partition, Soap Holder and Paper Holder Parryware

5.7 UPVC Pipe, UPVC Fittings and PVC Floor Trap Panchakanya

5.8 PVC Tank Hilltake

5.9 Stainless Steel Basin Hulas

5.10 CPVC Pipe and Valves Astral

5.11 Non Return Valve and Y Strainer Leader

5.12 Water Purification System Euroguard

5.13 Insulation Tube Aeroflex

5.14 PVC Gutter Prince

5.13 Solar System Solahart

5.14 Fire Extinguishers Eversafe

5.15 Compressor Hitachi

5.16 Gas Type Ball Valve Leader

5.17 Outlet Point for Oxygen and Compressed Air

Ball valve and Nozzel TAS

5.18 Copper Pipe Mexflow

5.19 Manhole Cover Swastika

5.20 Pump Petrolla

5.21 Shower Curtain Ridder

## EW. ELECTRICAL WORKS

## ew.1 General

All electrical works related to proposed BMET building shall be carried out to the highest degree of technical quality and workmanship accepted for this category of work. Special attention shall be given to rigorous application of safety codes and accepted practices so that with the completed works, operation of electrical services may add to the overall efficiency of functions to be performed within the building without in any way detracting from the safety aspects required within the premises.

This subsection covers supply, delivery to the site, installation and testing of interior electrical wiring.

## ew.2. Interior electrification

Installation of electrical services shall be undertaken in a safe, simple, systematic and orderly fashion giving attention to labeling of circuits, colour codes and numbering of cables so that the completed installation can be effectively maintained by personnel with nominal understanding of electrical engineering.

## ew.3 System

Electrical power within the premises will be available at 400/230 VAC, three phase, four wire, 50 Hz directly from the power utility or from an outdoor sub-station where conversion of utility voltage will take place. All erection set‑up, tools, appliances and safety precautions to be used by the Contractor for electrical services within the building shall also be suitable for work under this Low Tension (LT) class of electrical work.

## ew.4 Standards

Where not specified within this specification, all materials and workmanship used in the installation works shall be in accordance to the latest edition of the related Indian Standard Specification (IS:732-Code of Practice for Electrical Wiring Installation-System Voltage not exceeding 650 V) or equivalent.

Not withstanding the stipulation of above standards, local electrical codes for electrical services in buildings, where such exist, shall also be followed. Adequate consideration shall also be given to compliance of the equipment and works with local environmental conditions such as temperature, altitude, humidity, dust, vermin, attitude of personnel who will occupy the premises etc.

## ew.5. Scope of work

The scope of works generally requires

a. the supply and delivery of all required materials, fixtures, electrical equipment, and appliances;

b. preparation of shop drawings, setting, wiring, fixing and electrical installation of all required materials, fixtures, electrical equipment and appliances;

c. testing and commissioning of the entire electrical installation; and

d. any other required works.

1. all works shall confirm to NEC/IS/BS codes applicable.

The works undertaken shall be fully coordinated with the civil works so that all electrical works are set and finished in conformity with the building civil and architectural works. The work schedule shall also be coordinated so that no components of work schedules are interrupted owing to defective programming.

Works to be undertaken are categorized under the following major sections:

a. laying of electrical conduit, outlet boxes, pull boxes and conduit accessories required for the electrical wiring of the system;

b. laying of concealed conduit, junction boxes, pull boxes and conduit accessories required for the telephone, fire alarm system, PA system, TV and computer net works wiring of the system;

c. wiring in concealed conduit or directly buried cables outdoor to achieve desired electrical sub - circuits for the given electrical layout;

d. installation and termination of wiring to light fixtures, signage, power outlets, ceiling /wall fans, controlling switches, switch panels, telephone outlets, computer outlet, PA system, exhaust fans etc.

e. installation of mains and sub‑mains cable from the utility LV take-off terminal to the main panel board and from the main panel board to distribution boards;

f. installation of the main panel board and distribution boards and ATS

g. installation of station earth; and

h. all other works required including testing, commissioning etc including sub contract works to connect to municipal system.

Works indicated shall include all civil and electrical works required to achieve a satisfactory electrical installation, whether or not such are specifically outlined in these specifications. The entire installation shall be suitable for a three phase, four wire, 400/230 VAC, 50 Hz system.

## ew.6. Shop drawings

Prior to commencing the electrical works, the contractor shall prepare the shop drawings considering the drawings provided by the owner/Engineer and propose the schedule of electrical works and submitted to the Owner/Engineer for approval. A set of the up-dated and approved drawings shall be available at the site at all times for inspection by the Engineer. If any changes are made during installation, such changes shall be immediately marked in the drawings.

Prior to commencing procurement, the Contractor shall submit for approval, shop drawings showing layout, dimensions, materials used, standards specified for the fabrication or procurement of items such as the main panel board, distribution panels and other items for which custom design is necessary.

## ew.7. Samples

Prior to commencing procurement, the Contractor shall submit for approval technical description, related catalog/brochures and a recommended brands of sample item each of all cable, conduit accessories, switchgears, switches, power outlets, lamps, fluorescent tubes, fixtures etc., which are to be procured and in­stalled.

## ew.8. Location of fixtures

Location of conduit, fixtures, switches, outlets, distribution boards and other electrical equipment and appliances shall generally be in accordance with the updated construction drawings; and in accordance with the specifications and mounting heights and location details mentioned herein. Notwithstanding the guidelines given in the drawings and specifications, the location of all electrical items, equipment and appliances in the buildings shall be approved by the Engineer prior to commencement of electrical installation works.

## ew.9. PVC conduit

PVC conduits used in the final sub‑circuits of the electrical services shall be of an approved manufacturer conforming to IS : 2509 - 1973 and shall be used only with corresponding approved accessories.

The size of the conduit shall be in accordance with the number and size of electrical cables to be drawn into the conduit. The number of cables that may be drawn in a conduit shall be as specified in the table below or as stipulated in the appropriate of the IS Code or equivalent. Minimum size of conduit shall be 20 mm diameter with 1.89 mm wall thickness.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cable size | No. of cables in conduit size (mm) | | | | | |
| (sq.mm.) |  | 19 | 25 | 32 | 38 | 51 |
| 1.5 |  | 6 | 10 | 14 | - | - |
| 2.5 |  | 5 | 10 | 14 | - | - |
| 4.0 |  | 3 | 6 | 10 | 14 | - |
| 6.0 |  | 2 | 5 | 8 | 11 | - |

Conduit shall be embedded in building structural works and conduit runs shall be straight and shall follow the shortest route between points or as shown in electrical drawings.

Conduits shall be identified by colour as follows:

Fire System: Red

Low Voltage: Blue

Computer/Tel: Yellow

Wherever necessary, bends or diversions may be achieved by bending the conduit or by employing approved bends, inspection bends, inspection pull boxes, elbows or similar fitting.

Conduit accessories such as ceiling outlets, junction boxes shall be of approved quality. The physical integrity of the conduit and accessories as an integral electrical component shall be ensured by approved means such as the use of water‑resistant cement bonding on all unscrewed conduit joints and terminations, and use of rubber gaskets in entry points to junction boxes or outlets or other approved means.

If required, 18 SWG galvanised `fish' wire shall be inserted during the time of conduit laying to facilitate drawing in of cables at a later stage.

## EW.10. Cables

Electrical cable used in the installation shall generally be stranded copper of the following types:

1. flexible cable for connection to fixtures, appliances and equipment from terminal points in outlet boxes, junction boxes etc.;
2. final sub‑circuit cable used for wiring from the distribution board to the terminal outlet box, junction box etc.
3. sub‑mains cable used for electrical distribution from the main panel board to several power distribution boards within the buildings;
4. mains cable used to interconnect the main switchboard (Main Panel Board) in the building to NEA line connection point.
5. all wire/cables shall be test for continuity prior to start of installation.

## ew.11. Flexible cable

Flexible cables used for the purpose mentioned shall not be less than twin core, 48/0.2 mm size, with copper conductor and thermoplastic insulation.

Where a light fitting is supported by one or more flexible cord, the maximum weight to which the twin flexible cords may be subjected shall be as follows:

|  |  |  |
| --- | --- | --- |
| Cross-sectional Area of Twin Flex (Sq.m.) | No/Dia. of Wires  (No./mm) | Max. Permissible Weight  (Kg.) |
| 1.5 | 48 / 0.20 | 3.5 |
| 2.5 | 80 / 0.20 | 8.8 |
| 4.0 | 128 / 0.20 | 14.0 |

## ew.12. Final sub‑circuit cable

Cables used for wiring in final sub‑circuits shall feature high conductivity, stranded copper conductors with PVC insulation rated at 500 VAC.

Colour coding of cables shall be maintained in the cables used in the final sub‑circuits in accordance with the following plan:

a. Phase I ‑ Red;

b. Phase II - Yellow;

c. Phase III - Blue;

d. Neutral ‑ Black;

e. Earth - Green.

Cables sizes used in the final sub‑circuits shall be standardized as follows unless indicated in the drawings or specified elsewhere:

a. single core, stranded, 4 sq mm cable for indoor power circuits; and

b. single core, stranded, 2.5 sq mm cable for indoor lighting.

Phase and neutral conductors in these cables shall be of the same cross-sectional area. A separate conductor of the size specified herein or indicated in the drawings shall be used in both types of sub‑circuits for earth continuity.

## ew.13. Mains and sub‑mains cable

Cables sizes used in the mains and sub mains shall be as indicated in relevant drawings. These cables shall be multi‑core cables with stranded copper/Aluminum conductors cables, PVC insulated, PVC sheathed and rated for 660/1100 VAC. Earthing conductor of less than 16 sq mm shall not be less than 50% of respective phase conductor.

## ew.14. Power outlets

Power outlets conforming to IS : 1293‑1977 shall be three pin switch sockets rated at 13/15 A, single phase. The outlets shall have an earth connection. Safety features shall be incorporated to ensure that when any appliance is plugged in, its earth continuity is first maintained prior to mating of the phase and neutral pins. Additional safety features shall include shutters, illuminated indicators and shrouded terminals. High grade brass sheet metal contact tubes shall ensure tight, spark‑free contacts with mating plugs. Power sockets, switches shall Clipsal make.

Controlling switches shall have high current capacity silver and silver cadmium oxide contacts, bounce free snap action, wiping action and making and breaking mechanism with minimum arcing.

All electrical parts shall be enclosed in a sturdy porcelain or thermoplastic housing. The power outlets shall preferably be screwed onto the junction box through a metal mounting plate. The cover plate over the switch socket assembly shall be of brass screwed onto the metal frame.

The outlets shall be flush mounted by means of recessed junction boxes, which have been fabricated precisely for the fixture dimensions. Such boxes shall be constructed of sturdy galvanized sheet steel and shall feature conduit knockouts on all sides. Proper threaded bushing shall be provided along the knockouts through which conduit will enter so that a watertight continuity of electrical installation is maintained. Where the outlet is not fixed such junction boxes shall be covered with insulated plates.

Exhaust fans shall be direct wired with proper connection in a 3”x3” metal box covered with blank plate.

## 

## ew.15. Switches and switch panels

Switches used in the electrical services for the control of lights and low power appliances shall be single pole, tumbler or rocker type switches rated at not less than 10 A or as indicated in the drawings. One way or two way switches shall be used as indicated in drawings. Switches used in the installation shall generally conform to IS 3854.1966 or equivalent and shall have high current capacity silver and silver cadmium oxide contacts, bounce free snap action, wiping action and making and breaking mechanism with minimum arcing.

All electrical parts shall be enclosed in a sturdy porcelain or thermoplastic housing. The switches shall preferably be screwed onto the junction box through a metal mounting plate. The cover plate over the switch socket assembly shall be of brass screwed on to the metal frame.

The switches shall be flush mounted by means of recessed junction boxes, which have been fabricated precisely for the fixture dimensions. Such boxes shall be constructed of sturdy galvanized sheet steel and shall feature conduit knockouts on all sides. Rubber gaskets shall be provided along the knockouts through which conduit will enter so that a watertight continuity of electrical installation is maintained.

## ew.16. Ceiling and wall fans

Ceiling and wall fans of Crompton Greeves manufacture shall be of the type and sweep diameter as shown in drawings. Fan regulators shall be remote controlled wired unit featuring 5 speed for ceiling fan and 3 speed for wall fan, push button type selectors or continuous speed selection with dimmer type electronic circuitry. Ceiling fans shall be suspended from the ceiling on U‑ hooks which are bonded to reinforcement rods of ceiling structural works.

## ew.17. Exhaust fans

Heavy duty exhaust fans of Crompton Greeves manufacture shall be of approximately 300 mm sweep integral metal units suitable for installation in walls or single or double panel windows. The fans shall be capable of delivery rate of not less than 700 m3/h at 1200 rpm. A louvred shutter shall be provided to close off the fan opening.

## ew.18. Light fixtures

Incandescent, PL and fluorescent light fixtures shall be supplied and installed as shown in the drawings. Major types of fixtures are as briefly described below. All fixtures described shall be of an approved manufacture indicated in the article N-52 Brand of manufacturers. If fixtures of an alternate manufacture are offered, sufficient testimony must be provided to substantiate its equality with the product recommended.

a. Fluorescent fixtures shall generally be surface mounted with 1x36 W, or 2x36 W energy efficient fluorescent tubes with good colour rendering qualities with sturdy, corrosion free metal body and mounting channel with required type of reflectors, diffusers or optical assemblies. High quality, low loss, high accuracy current ballast and chokes shall feature copper windings. A capacitor shall be included in the fixture to maintain power factor 0.8 lagging. High quality starters shall be of an approved manufacturer capable of generating adequate voltage to quickly ignite the type of tube used. A glow-switch and a radio interference suppressor capacitor shall be built into the starter assembly, which shall be moulded from high quality white polycarbonate canister with good insulation characteristics.

b. Ceiling compact fluorescent lamp luminaries in single or multi-configuration shall generally be 200 mm dia. clear glass spheres with ballast, pin holders even light diffusion characteristics housed in a non-corrosive sturdy spun metal body. An 11W CFL lamp or as recommend by the owner/Engineer for sufficient lumens shall be used with such fixtures.

c. Wall fixtures shall generally be decorative light fixtures compatible with interior decor. The fixtures shall be 200 mm dia. frosted sphere and shall have one 9/11 W PL lamps as shown in the drawings. The lamps shall be consoled in a high quality of decorative glass fixture. The housing shall be of sturdy non-corrosive spun metal (brass).

d. Light fixtures used for outdoor application either as Bulk head lights fixtures shall be integrally weatherproof with rubber gaskets or other approved means to exclude entry of water.

## ew.19. Miniature circuit breakers (MCBs)

Miniature circuit breakers shall be used to protect final sub‑circuits from the distribution board. Circuit breakers shall be in accordance with IEC : 898-1995 or IS : 8828-1996 and shall be of an approved manufacturer and shall incorporate the following safety features and ratings:

a. thermal overload protection;

b. magnetic short circuit protection;

c. at least 10 kA breaking capacity at 415 VAC, 50 Hz.

d. number of operating cycle :20000

e. impulse withstand voltage: 6 kV

Individual MCBs shall be grouped in multi-pole configurations as specified in the drawings. Assembly of MCBs in a distribution board shall be done on DIN type rails that will allow front mounting of the MCBs with brass screws.

The body of the MCBs shall preferably be of thermo-setting glass filled polyester to provide maximum safety against terminal burn-outs and fire hazards.

## ew. 20. Earth leakage circuit breaker

Earth leakage circuit breakers shall be used to protect leakage to earth. These circuit breakers shall operate at 30/100mA as shown in the drawings and install as incomer in each distribution board. A push button shall be provided in the ELCB for test purpose.

## ew.21. Moulded case circuit breakers (MCCBs)

MCCBs used shall be dead‑front, compact units, suitable for use in panel board. The operating mechanism shall feature quick‑make and quick‑ break contacts in roto-active breaking principle with a trip‑free handle. De‑ion arc chutes are preferred to minimize arcing between breaker contacts. Tripping on fault is clearly indicated by the operating handle which comes to a position between the ON and OFF when tripping occurs.

Protective features shall include

1. thermal elements of the indirectly heated bimetallic for delayed overload protection;
2. magnetic trip for instantaneous responds to short circuit

Clear indication shall be given to indicate the breaker having tripped automatically on fault.

## ew.22. Distribution boards (DBs)

Electrical distribution boards used in the electrical installation shall be manufactured from at least 16 SWG sheet steel, shall be suitable for flush/surface mounting, and shall be painted with a coat of enamel over two coats of primer & the painted colour conforming with surrounding decor. The Boards shall be integral units with appropriate conduit knockouts from the top and bottom. The construction shall be sturdy shall feature dust‑proof and vermin‑proof design. The interior shall have ample space for incoming and outgoing cables. Distribution boards shall be complete with

a. appropriately rated copper bus bars with heat shrinkable phase identifications;

b. neutral link and earth terminal;

c. labeling of circuit breakers;

d. clearly printed schedule of circuits; and

e. hinged front cover with locking device;

The number and configuration of moulded case circuit breaker or miniature circuit breakers and their rating shall as shown in the appropriate drawings (BOQ). The back of miniature circuit breakers shall be mounted on a metal brackets which can be detached from the distribution board frame.

## ew.23. Main panel board

The main panel board used in the installation shall be a modular, free standing/wall mounting, dead front fabricated from sheet steel not less than 16 SWG and painted with two coats of primer and finished in navy grey enamel. The switch board shall be completed with copper bus bars of suitable rating. The main Panel Board shall also consist of the followings:

a. cable entry knockouts;

b. earth terminals and neutral links;

c. clearly labelled incoming and outgoing MCCBs;

d. 0‑500V, flush mounted voltmeters with phase selector switch;

e. 0‑ 100 A, type, flush mounted, ammeter with phase selector switch; and

1. other accessories as specified in drawings;
2. Cable trays shall be supplied and installed as required.

The switchboard design shall feature dust, moisture and vermin proof characteristics.

## ew.24. Wiring

Wiring in the final sub‑circuits shall be looped with cable terminations in the distribution box and the related outlet box of the fixture or appliance. Use of intermediate junction boxes shall be discouraged. Joints in cable within the conduit shall be prohibited.

Cable shall be pulled into the conduit only after civil structural works are complete and outlet boxes etc. have been fixed satisfactorily.

Where it becomes necessary to terminate or join final sub‑circuit cables in outlet boxes, such terminations and joints shall be made in an approved manner.

## ew.25. Point wiring for light, fan

The point wiring of light and fans shall be carried in the manner each of which will confirm to the standard specification. All accessories such as switches and sockets shall be flush type. The point will have commenced from distribution board including circuits each having independent phase and neutral wires up to the outlet and switch box. The conduit pipe will be completed including wires and accessories, necessary junction box outlets and switch box, connector, ceiling rose switch, switch plate, low power socket and flush plate, necessary earth, connections, etc. Generally, a light circuit shall not contain more than 10 light points and total load shall not exceed 1200w for each light circuit.

## ew.26. Point wiring for power plug

Point wiring for power plugs shall be as mentioned in the schedule of quantities. Generally, each circuit have only two - three power plugs which shall be wired with SWG 2x4 sq mm PVC insulated copper cable and earthed with 1x2.5 sq mm PVC insulated copper cable from the nominated sub distribution board. The wiring shall be completed with a suitable deep metal boxe at nominated point for power plugs and termination in distribution board with all necessary accessories as per instructions. Each power circuits shall not feed more than 3kw.

## ew.27. Point wiring for telephone and computer network

The point wiring of telephone line shall be wired with 5 pair twisted telephone cables, carried in the manner each of which shall confirm to the standard specification. The wiring with all accessories for flush mounted outlet hair pin jacks type shall be completed with a suitable deep metal boxes at nominated point for telephone outlets and termination in telephone distribution board with all necessary junction box, connector and other accessories as per instructions. The point shall commence from distribution board including circuits each having 5 pair telephone cables up to the outlet box.

The point wiring of computer networking shall be wired with four pair networking cable category CAT6 for the data transmission up to 1000 Mbps. The layout of the networking cable shall be carried in the manner each of which will confirm to the BICSI standard. The wiring shall be completed with a suitable deep metal boxes with cover at nominated point for outlet. The point will commence from patch panel board including circuits each having independent four pair computer networking cable up to the outlet box.

## ew.28. Earthing

This specification covers supply, delivery, installation and testing of the complete grounding system as described below.

Station earth points shall be constructed to provide grounding points for all earth continuity conductors used in this installation. Station earths shall be as specified in the appropriate Indian Standards or equivalent.

All lap, cross and tee connections between two grounding conductors shall be made by thermo-welding process or compression type connector. The various joints shall have adequate mechanical strength as well as necessary electrical conductivity not less than that of the parent conductors of the joints. All accessories for grounding installation shall be of quality and design approved by the Engineer.

Ground conductors, when crossing underground trenches, directly laid underground pipe and equipment foundation, if any, shall be at least 300 mm below the bottom elevation of such trenches/pipes.

Complete installation of the ground, test link chamber, grounding of all but not limited to the equipment located in the building and substation as specified herein. The supply of grounding conductors, jointing materials and all accessories to complete this grounding installation so as to obtain the specified value of earth resistance shall be covered under this specification.

The installation shall be complete in all respects for efficient and trouble free service. All work shall be carried out in a first class neat workman like manner. Grounding conductors shall be handled carefully to avoid kinking and cutting of the conductors during laying and installation. All exposed ground conductors runs shall be taken in a neat manner, horizontal, vertical and parallel to building walls or columns and shall not be laid haphazardly.

For all connections made to equipment or to the structures, the grounding conductor, connectors and equipment enclosures shall have good clean contact surfaces. Grounding conductor connection to all electrical equipment, switchgear, motors, panels, conduit system, equipment enclosures, cable trays, distribution boards, equipment frames, bases, steel structure, etc. shall be by pressure type or bolting type connectors.

The earth resistance shall not exceed 5 ohms. On completion of the installation, either wholly or in sections, it shall be tested in compliance with relevant Code by the Contractor in presence of the Engineer. If the earth resistance cannot be obtained as per specified value, then additional earth electrode shall be installed and treated soil to obtain the required low ground resistance without any additional cost.

The earth electrode of earthing shall be size of 600X600X3.15 mm electrolytically pure copper plate, at least 2.5 meter below ground level surrounded by alternate layers of 150 mm with hydroscopic material such as 25 kg of coal and 50 kg of salt shall be poured into each earth pit around the electrode. Bonding of the station earth to the main earth terminal inside the building shall be with an earth conductor of 6 SWG. A HDP pipe shall be used for earth conductor as protection from erosion. Earth continuity conductor running from earth terminal to each floor distribution board shall not be less than 10 sq.mm of copper conductor.

## ew.29. Cabling

Laying of cables between two points shall follow the following methods.

a. laying of cables directly in the ground in outdoor applications; and

1. laying or supporting of cables in cable trays, trenches and ducts,

Where cables are to be laid direct in ground these shall be laid in cable trenches at least 1.0 m below ground surface. The cable laid shall be covered with 100 mm finely sifted sand and protected on the top with transverse bricks across the trench cross‑section. The trench shall then be backfield and compacted.

Where cable routes run under hard surfaces, or where cables have to be run inside masonry or structural components inside buildings, such cables shall be run in cable trays or cable ladder or in proper size conduits.

## ew.30. Diesel generator

The diesel generator set will be used in is synchronous mode only, i.e. automatic synchronizing facility to the non-maintained supply switchboard is not required. In case of a power loss on city supply, the emergency diesel generator shall supply essential loads. Auto Mains Failure with automatic transfer switch shall be installed to start the diesel generator during failure of city supply.

The diesel engine shall be designed for instantaneous starting and loading in cold condition by means of an electric starter motor. The load ability of the set after cold start shall be:

1. immediately 75%
2. after 30 s 90%
3. after 5 min 100%.

The overload ability shall be according to ISO 3046 (110% of ISO standard power for 1 hour in any period of 12 hours consecutive running).

The speed controlling device preferably be manual adjustable with a setting range of ± 10% of rated speed. It shall be located in the control cabinet of the diesel generator set.

For stop of the engine a normally closed magnetic fuel valve and manual fuel valve shall be used.

The engine-generator shall be flanged together and mounted by means of vibration dampers on a stiff base-frame, which shall be designed in a way that it can be placed directly on the floor of the diesel room, no special foundation work being necessary.

Alternatively, the engine-generator can be rigidly mounted on the base-frame, which is placed on the floor by vibration dampers.

The base-frame system shall be strong enough to withstand the forces caused by a short-circuit.

The diesel engine shall be protected against over crank:

1. vibration for the crank itself
2. connecting roots.

The fuel system shall include:

1. A built in oil tank capable for 12 – 14 hrs continuous operation with full load shall be provided.

The diesel engine shall have a complete lubrication system with low lube oil pressure trip device.

The combustion air intake shall have an oil-wetted air filter designed with regard to local ambient conditions.

The exhaust system shall include the silencer, the necessary piping, heat insulation and a flexible joint to absorb vibration. The cabinet of the generator shall be such that sound level of the generator shall not exceeds 70 dbm at one meter distance. The generator shall be soundproof type.

The engine shall be closed-loop circuit water-cooled with a radiator attached to it and a mechanically driven fan. The radiator shall be mounted to the same frame with the engine.

The diesel generator set shall be installed in a way that proper cooling airflow through the radiator is ensured. Cooling air inlet shall be so located that loop effect with exhaust system is prevented.

The starting system shall include:

1. an electric starter motor
2. a starter battery 12 DC
3. a battery charger
4. a low voltage alarm relay for battery voltage.

**Generator**

The generator shall be in accordance with IEC standards.

The generator shall be Y-connected synchronous machine for three-phase, 400 V, 50 Hz, equipped with amply dimensioned terminal box for termination and connection of cables. The neutral point shall be brought to the outside and can be loaded continuously with the rated current. The generator shall be self-ventilated, protection class IP 34.

**Exciter and voltage regulator**

The generator shall have a rotating brushless exciter and a static voltage regulator.

The output voltage shall not deviate more than ± 2.5% from nominal value in any loading conditions. The voltage setting range shall be ± 10% from nominal value in any loading conditions.

**Control panel**

The diesel generator set shall have a complete equipment for automatic start and stop sequences in case of mains supply break and return. The automatic starting should make three consecutive starting attempts and alarm after the third unsuccessful attempt. The control panel shall be microprocessor based and all protection and measurement signals shall be brought to it.

The automatic switching over from mains and back to mains shall be made by Auto transfer switch with interlock facility. The switchover back to mains shall be made after 1 min after the mains have recovered.

After the switchover back to mains, the set shall run on no-load long enough to prevent due to post heat (e.g. 3 min)

Manual start/stop equipment and a OFF/MANUAL/AUTO switch shall be included. The automatic operation shall be blocked when the switch is on MANUAL, and all operation when the switch is OFF.

An emergency stop push-button with latching contact shall be included in the control cabinet.

Protection and alarms:

1. generator overload
2. generator overcurrent
3. over/underspeed
4. over/undervoltage
5. low lube oil pressure
6. high cooling water temperature
7. neutral current (thermal relay)
8. low fuel-oil in day tank.

Measurements:

* Output voltage

1. Output current
2. kW meter
3. operation hour meter
4. Battery Voltage
5. Cooling water temp
6. Oil pressure
7. And other as recommended from manufactures

**Technical Data:**

Alternator stand by power 20 kVA

Out put voltage 400 V 3 phase four wire

Out put frequency 50 Hz

Power Factor 0.8 lagging

RPM 1500 rev/Min

Excitation Brushless type

Battery voltage 12 V

Charger Fully automatic

Governor Mechanical (adjustable type)

Cooling System Water cooled with forced air

## ew.31. Fire detection system

**General**

The purpose of the fire alarm system is to guarantee a reliable and fault-free early-warning system in the event of fire, so that orders for extinguishing the fire can be issued from a central point. The fire alarm system shall comply with the NFPA standards. All equipment is subject to approved standards.

**Fire alarm central station**

The function of the fire alarm central station is to receive fire warnings from the automatic and manual fire alarms connected to the dedicated protection systems and to alarm a fire automatically in the central control room. The fire alarm central station shall be microprocessor base system.

The fire alarm central station shall be of 4 zone with three zone in operation and one zone as spare for future extension.

The arrangement and functioning of the fire alarm central station shall be such as to permit the following at least:

1. The fire alarm and fault annunciation system shall be designed with optically and audible alarms. Whereas the audible alarm must be resettable, the optical indication shall persist until the annunciation is finally extinguished or the fault cleared.  
   If a fault warning is followed by a fire alarm annunciation, the fault indication must be stored and suppressed until the fire alarm condition has been cancelled.  
   Provision shall be made for clear audible identification of the alarm/fault signal. Furthermore, fire alarm signals and fault signals shall be built up in a strictly separated manner.
2. The individual fire alarm lines and important functional groups of the fire alarm central station shall be continuously monitored for faults and breakdowns e.g. for
3. wire breakage of each alarm line
4. short‑circuit of each alarm line
5. earth fault of the fire alarm system
6. power supply system faulty
7. main supply failure

All fault signals shall be optically and audibly indicated.

1. For checking out the functioning of the complete fire alarm system including the fire alarm lines and fire alarm devices, testing facilities shall be provided. When testing a circuit, it shall be prevented to initiate fire alarm warnings in external facilities. After testing, the tested circuit shall automatically reset to normal operation.

**Detection systems**

The fire detector system elements and the associated pedestals are to be provided with sturdy, corrosion-proofed plastic housings and are to remain fully effective at 100 % relative humidity, 50 °C ambient temperature and severe dust conditions.

The fire alarm detectors installed in close rooms are to be provided with optical means for signaling their activation (e.g. light-emitting diode), and are to be suitable for the connection of an additional optical external alarm indication.

The following automatic fire alarms as a minimum shall be used for fulfilling the requirements proposed building.

**Optical smoke detector**

For early identification of visible smoke generation, consisting of photo-electric unit, alarm electronics, optical alarm indication, detector socket and connection possibility of a parallel optical alarm indication.

**Heat Detectors**

For early identification of initiation fires with rapid temperature rise and little smoke generation, consisting of temperature sensor, alarm electronics, detector socket and connecting possibility of a parallel optical alarm indication.

**Manual operated alarms**

Push-button fire alarms are used for the manual initiation of an alarm and are to be connected to the fire alarm central station.

They are to be installed in the necessary number at readily accessible points located e.g. on escape routes, corridors and stairwells, exit doors, generator house, etc. and are to consist of:

1. pushbutton, only operable after smashing the replaceable glass window fitted in the housing
2. interlocking mechanism, which holds the pushbutton in the operated position and cannot be released until the glass window has been replaced or reset by key
3. plastics or aluminium housing, painted red, type of enclosure IP 54, in areas where there is an explosion hazard, cast-iron housings with suitable locking mechanisms are to be used
4. instructions for use in English are to be provided on the operating side as follows:
5. "Fire alarm"
6. "Break window"
7. "Pushbutton".

**Sirens/bells**

The protection degree of the sirens/bells for indoor and outdoor installation must be at least IP 54. The arrangement of the sirens/bells must be according to the requirements at site for satisfactory warning of the operation personnel. The control of the sirens shall be performed automatically by the fire alarm system, but manual operation from the central control room must also be possible.

**Cabling**

The cable of all detectors and alarm lines throughout the fire alarm system has to be self-extinguished highly flame resistant, neoprene insulated cable. The minimum cross section of the copper conductors of the control cables should be 1.5 mm2. The cables have to be laid with suitable spacing from power cables and other control cables.

All materials and equipment supplied and all works carried out shall comply in every respect with the technical NFPA standards.

## ew.32. Dc supply module

A switch mode power supply system with different output has been considered for each bench at electronic lab. These SMPS shall be capable to supply different voltages (5V, 12V,15V) as shown in the drawings. The nominal current for different voltages shall be 5A.

Input of the SMPS shall be 150 V – 260 V AC 50 Hz. The SMPS shall have surge protector and fuse at the input.

## ew.33. Variable dc power supply

Variable DC power supply has been considered for the electronic lab as a DC supply unit to test different electronic equipment. The variable DC supply shall be capable to supply 0 – 30V regulated DC supply with max 2% ripple voltage at 5 A load current at different output voltage.

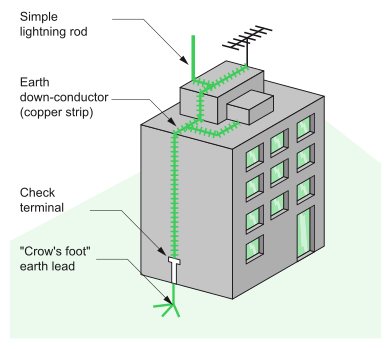
This variable DC supply shall have fine and coarse control at the front and shall have digital indication of out voltage and current. The unit shall operate with line voltage 160V – 260 V 50 Hz.

## ew.34. Lightening arrestor

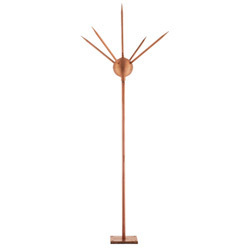
The lightning rod (simple rod or with triggering system)

A lightning arrester shall be located in the highest part of every building and it shall be connected by a conductor to an earth rod buried in the earth. The lightning arrester shall be so located that as much as possible of the building lies inside the surface of an imaginary cone having a vertex angle of 45 degrees and its apex at the top of the arrester.

The lightning rod is a metallic capture tip placed at the top of the building. It is earthed by one or more conductors (often copper strips)

[](http://www.electrical-installation.org/enw/index.php?title=File:DB422472_EN.svg&page=1)

*Lightning rod (simple rod or with triggering system)*



The lightning rod with taut wires

**Materials-**

a) Class I materials shall be used for systems on structures not exceeding 75 feet in height and Class II materials shall be used for systems on structures exceeding 75 feet above grade.

b) Copper shall be of the grade ordinarily required for commercial electrical work, generally designated as being 95 percent conductive when annealed. Aluminum conductors shall be of electrical grade aluminum.

c) Lightning protection materials shall be coordinated with building construction materials to assure compatibility. Aluminum lightning protection materials shall not be embedded in concrete or masonry, installed on or below copper surfaces, or used where contact with the earth is possible terminating 18” above grade level minimum. Copper lightning protection materials shall not be installed on aluminum surfaces. Copper system components within 2 feet of chimney exhausts shall be tin coated to protect against deterioration.

d) Strike termination devices shall be provided to place the entire structure under a zone of protection as defined by the Standards. Air terminals shall project a minimum of 10 inches above protected areas or objects. Air terminals shall be located within 2 feet of exposed corners and roof edges.

e) Metallic bodies having a thickness 3/16” or greater may serve as strike termination devices without the addition of air terminals. These bodies shall be made a part of the lightning protection system by connection(s) according to the Standards using main size conductors and bonding fittings with 3 square inches of surface contact area.

f) Cable conductors shall provide a two-way path from strike termination devices horizontally and downward to connections with the ground system. Cable conductors shall be free of excessive splices and sharp bends. No bend of a conductor shall form a final included angle of less than 90 degrees nor have a radius of bend less than 8 inches. Structural elements and design features shall be used whenever possible to minimize the visual impact of exposed conductors.

g) Cable down conductors may be concealed within the building construction or enclosed within PVC conduit from roof to grade level. Down conductors shall be spaced at intervals averaging not more than 100 feet around the protected perimeter of the structure. In no case shall any structure have fewer than two down conductors. Where down conductors are exposed to environmental hazards at grade level, guards shall be used to protect the conductor to a point 6 feet above grade.

h) In the case of structural steel frame construction, cable down conductors may be omitted and roof conductors shall be connected to the structural steel frame at intervals averaging not more than 100 feet around the protected perimeter of the structure.

i) Exposed cable conductors shall be secured to the structure at intervals not exceeding 3 feet – 0 inches. Fasteners, nails, screws, or bolts shall be of suitable configuration for the intended application and of the same material as the conductor or of electrolytically compatible materials. Galvanized or plated steels are not acceptable.

j) Connectors and splicers shall be of suitable configuration and type for the intended application and of the same material as the conductors or of electrolytically compatible materials.

k) Ground terminations suitable for the soil conditions shall be provided for each downlead conductor. Where the structural steel framework is utilized as main conductors for the system, perimeter columns shall be connected to the grounding system at intervals averaging 60 feet or less on the protected perimeter. For any structure in excess of 60 ft. in vertical elevation above grade, a ground loop interconnecting all ground terminals and other building grounded systems shall be provided.

l) Common interconnection of all grounded systems within the building shall be accomplished using main size conductors and fittings. Grounded metal bodies located within the calculated bonding distance as determined by the formulas of the Standards shall be bonded to the system using properly sized bonding conductors.

m) Surge suppression shall be provided at every system entrance to the structure to prevent massive lightning overvoltages from entering the structure. Additional surge protection for internal electronic equipment may be determined through cost-benefit analysis by a trained engineer.

**Installation** –

a) The installation of the lightning protection system components shall be done in a neat and workmanlike manner.

b) Roof penetrations required for down conductors or for connections to structural steel framework shall be made using through-roof assemblies with solid rods and appropriate roof flashings. The roofing contractor shall furnish the methods and materials required at roofing penetrations of the lightning protection components and any additional roofing materials or preparations required by the roofing manufacturer for lightning conductor runs to assure compatibility with the warranty for the roof. (Note: The roofing contractor will be responsible for sealing and flashing all lightning protection roof penetrations as per the roof manufacturer’s recommendations. The lightning protection roof penetrations and/or method of conductor attachment should be addressed in the roofing section of the specifications.)

c) LPI certification requires a signature by a representative of the owner for two stages of the installation – the concealed in-ground system and the exposed or roof level area at completion. LPI certification also requires photo documentation of the in-ground system and concealed portions of the installation. LPI certification requires inspection by their third-party field staff after completion of the installation. Upon completion of the lightning protection installation, the installing contractor shall provide to the owner an as-built drawing of the system, along with copies of the LPI Certificates of completion.

d) If the protected structure is an addition to or is attached to an existing structure that does not have a lightning protection system, the contractor shall certify that the system installed complies with the requirements of the Standards, and advise the owner of the lightning protection work required on the existing structure to obtain full certification for the structure. If the existing structure does have a lightning protection system, the contractor shall advise the owner of any additional work required on the existing system to bring it into compliance with current Standards and thus qualify for LPI certification.

## ew.35. Tests

The Contractor shall submit for approval, a technical description of the method which will be applied to test the electrical integrity of the entire installation including the measurement of obtained station earthing impedance and the insulation resistance of the installation. Tests shall be conducted on the completed installation to check the following:

a. polarity : to verify that all terminals are correctly connected with regard to line, neutral and earth;

b. insulation test between live and neutral conductors: to verify the Meager reading between line and neutral conductors is not below 1 Megohm with all switches and fuses on but fixtures and lamps out.

c. insulation test between all non‑earthed conductors and the earth on a live system is not below 1 Megohm from Meager reading.

d. earth resistance test including the earth-loop test; and

e. other tests to verify safety and integrity of the installation.

Fire Extinguisher:

Fire extinguisher shall have 5kg rating and ABC Type Minimax.

## ew.36. As‑installed drawings

After all tests on the completed installation have been approved, the Contractor shall submit two copies along with the original set of as‑installed Electrical Drawings in hard-bound covers and one digital copy for subsequent maintenance and operation. These shall clearly indicate

1. conduit runs and sizes with the number and size of cables enclosed in the conduit and the location of intermediate conduit accessories such as pull boxes, outlets etc;
2. distribution patterns and circuits in main and sub‑distribution and the controlling switchgear;
3. location of earth stations and conductors; location of all electrical appliances, equipment and components; underground and overground cable routes, sizes, cable trays and ducts provided.

## 37. MANUFACTURE LIST OF MATERIALS (ELECTRICAL)

Listed below are the make/brands of major materials to be used in the scope of works under the bill of quantities.

**Approved makes/brands or equivalent:**

1. Main panel board (MPB)-Hyonjan Engineering, M.K Metal, Corona engineering

2. Moulded Case Circuit Breaker (MCCB)- Merlin Gerin/ Siemens

3. Floor Distribution Boards (DB)- Hyonjan Engineering, M.K Metal, Corana Engineering

4. Minature Circuit Breaker (MCB)- Merlin Gerin/ Siemens/ Schneider

5. Cables/Wires- Prakash/ Pioneer/ Trishakti

6. Switches- Clipsal

7. Power Sockets - Clipsal

8. Telephone /Computer sockets - Clipsal/ D link

9. Fluorescent Fixtures - Wipro/ GE or Equivalent

10. Spherical ceiling and wall fixtures - Decon or Equivalent

11. Outdoor fixture - Decon or Equivalent

12. Ceiling /Wall/ Exhaust fans - Crompton Greeves

13 Generator-Cummins/Green Kriloskar/ Perkins or equivalent

14. Fire Alarm panel -Ademko, Bentel, LPC/C-TECK

15. Detectors -System Sensors/C-TECK

16. DC Power Supply -PARMA INDIA or equivalent

17. PA System - Ahuja or equivalent

18. PABX - Seimens/ Panasonic

19. Power supply panel - Local Make

#### **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.

As Per Agreement

#### **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*

1. *to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and*
2. *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:*

1. *Preamble;*
2. *Work Items (grouped into parts);*
3. *Day works Schedule;*

*d) Provisional Sums; and*

1. *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:*

6In lump sum contracts, delete “Bill of Quantities” and replace with “Schedule of Activities” throughout this section.

1. *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.*
2. *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**

###### 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]***

1. **Day work Schedule**
2. **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.

1. **Day work Labor**
2. 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.
3. 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.
4. **Day work Equipment**
5. The Contractor shall be entitled to payments in respect of Constructional Plant already on site and employed on day work at the basis of 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.
6. 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.
7. **Day work Materials**
8. 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;
   1. 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 stock piling at the Site.
   2. 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**

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 SCC should state the manner in which they will be used, and under whose authority (usually the Project Manager’s).

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

#### (attached separately, to be downloaded from the website [www.sosnepal.org.np](https://www.sosnepal.org.np/))

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### SECTION VII

### General Conditions of Contract

**General Conditions of Contract**

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

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| **General** | |
| **1. Definitions** | * 1. Bold face type is used to identify defined terms.      1. 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.      2. 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.      3. **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.      4. **Compensation Events** are those defined in GCC 50 hereunder.      5. The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 68.1.      6. 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.      7. The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer.      8. The **Contractor’s Bid** is the completed bidding document submitted by the Contractor to the Employer.      9. The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.      10. **Days** are calendar days; months are calendar-months.      11. **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.      12. A **Defect** is any part of the Works not completed in accordance with the Contract.      13. The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.      14. The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects.      15. **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract.      16. The **Employer** is the party who employs the Contractor to carry out the Works, as **specified in the SCC**.      17. **Equipment** is the Contractor’s machinery and vehicles brought temporarily to the Site to construct the Works.      18. **Force Majeure** means an exceptional event or circumstance: which is beyond |

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|  | 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.   1. The **Initial Contract Price** is the Contract Price listed in the Employer’s Letter of Acceptance. 2. **In writing** or **written** means hand written, type written, printed or electronically made, and resulting in permanent record. 3. 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. 4. **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. 5. **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works. 6. **Party** means the Employer or the Contractor, as the context requires. 7. **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 sub-surface 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 |

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|  | 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** | | * 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. 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).   3. The documents forming the Contract shall be interpreted in the following order of priority:      1. Contract Agreement,      2. Letter of Acceptance,      3. Letters of Bid,      4. Special Conditions of Contract,      5. General Conditions of Contract,      6. Specifications,      7. Drawings,      8. Bill of Quantities (or Schedules of Prices for lump sum contracts), and      9. 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**. |
| 1. Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer’s country when    1. 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 Borrower’s Country prohibits any import of goods from, or any payments to, a particular country, person, or entity. Where the borrower’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. |

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| **5. Assignment** | * 1. Neither Party shall assign the whole or any part of the Contract or any benefit or interested in or under the Contract. However, either Party      1. may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party; and      2. 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 Specifications 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 two copies of each of the Contractor’s Documents. |
|  | * 1. 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.   2. 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. |

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| **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. A notice shall be effective only when it is delivered. |
| **13. Subcontracting** | 13.1 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. |
| **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** | * 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.   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.   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. |

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| **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** | * 1. From the Start Date until the Defects Liability Certificate has been issued, the following are Employer’s risks:      1. 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. |
| **18. Contractor’s Risks** | 18.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Contractor’s risks:   * + 1. The risk of personal injury, death, or loss of or damage   to property (excluding the Works, Plant, Materials, and Equipment), which are due to   * + - 1. 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       2. 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.   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 a Contractor’s risk, viz.   * + 1. a Defect which existed on the Completion Date,     2. an event occurring before the Completion Date, which was not itself an Employer’s risk, or  1. the activities of the Contractor on the Site after the Completion Date. |
| **19. Insurance** | * 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:      1. loss of or damage to the Works, Plant, and Materials;      2. loss of or damage to Equipment;      3. loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and      4. 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 |

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|  | such insurance shall provide for compensation to be payable in the proportions of Nepalese Rupees required to rectify the loss or damage incurred.   * 1. 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.   2. Alterations to the terms of insurance shall not be made without the approval of the Project Manager.   3. 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** | * 1. The contractor shall be responsible for the design of permanent works as   **specified in SCC**.   * 1. 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.   2. 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.   3. The Project Manager’s approval shall not alter the Contractor’s responsibility for design of temporary works. |
| **24. Safety, Security and Protection of the Environment** | * 1. The Contractor shall, throughout the execution, and completion of the works and remedying of any defects therein:      1. 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.      2. 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 or for the |

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|  | safety and convenience of the public or others.   1. 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. 2. Ensure that any cut or fill slopes are planted in grass or other plant cover as soon as possible to protect them from erosion. 3. Any spoil or material removed from drains shall be disposed off to designated stable tipping areas as directed by the Project Manager. 4. Shall not use fuel wood as a means of heating during the processing or preparation of any materials forming part of the works. 5. 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. 6. Provide on the Site such life saving 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. |
| **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, Inspections and Audits** | * 1. The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.   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.   3. The Contractor shall permit the GoN/EMPLOYER and/or persons appointed by the GoN/EMPLOYER 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/EMPLOYER if |

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|  | | required by the GoN/EMPLOYER. 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/EMPLOYER’s inspection and audit rights provided for under this Sub-Clause constitute an obstructive practice subject to contract termination. |
| **29. Dispute Settlement** | | * 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.   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** | | 34.1 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. |
|  | **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 |

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|  | 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.   * 1. 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.   2. 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.   3. 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** | * 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.   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 Performance Security, Advanced Payment Guarantee and Insurance Policy with extended validity as well as revised work schedule. |
| **36. Acceleration** | * 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.   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. |

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| **38. Management Meetings** | * 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.   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** | * 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.   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** | * 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 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.   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 |

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|  | 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:   1. If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 2 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. 2. The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 10 percent, except with the prior approval of the Employer. 3. If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.   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. |
| * 1. The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.   2. 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.   3. 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.   4. The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.   5. 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 |

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|  | 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** | * 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.   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.   3. The value of work executed shall be determined by the Project Manager.   4. The value of work executed shall comprise:      1. 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      2. In the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule.   5. The value of work executed shall include the valuation of Variations and Compensation Events.   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** | * 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.   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.   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. |

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| **50. Compensation Events** | * 1. The following shall be Compensation Events:      1. The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 26.1.      2. The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.      3. The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.      4. The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.      5. The Project Manager unreasonably does not approve a subcontract to be let.      6. 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.      7. 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.      8. 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.      9. The advance payment is delayed.      10. The effects on the Contractor on any of the Employer’s Risks.      11. The Project Manager unreasonably delays issuing a Certificate of Completion.   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.   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.   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. |

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| **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** | * 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.   2. Adjustment Formulae7: The formulae will be of the following general type:   𝐿𝑛 𝑀𝑛 𝐸𝑛  𝑝𝑛 = 𝐴 + 𝑏 + 𝑐 + 𝑑 + 𝑒𝑡𝑐.  𝐿𝑜 𝑀𝑜 𝐸𝑜  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;  *A* is a constant, specified in the Bidding Forms- Table of Price Adjustment data, representing the nonadjustable portion in contractual payments;8b, 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 |

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

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.

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|  | Forms, which shall be subject to approval by the Project Manager.   * 1. 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.   2. 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. |
|  | * 1. 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 P =[R1 -(R0 ×1.10)]× Q  For unexpected decrease in price P  = [R1 -(R0 ×0.90)]× Q  Where:  “P” is price adjustment amount  “R1” is the present price of the construction material (Source of indices shall be those listed in the Bidding forms)  “R0” 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**..   * 1. The Price Adjustment amount shall be limited to a maximum of the initial Contract Amount **as specified in the SCC**.   2. 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 |

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|  | or the contract is a Lump sum Contract |
| **54. Retention** | * 1. The Employer shall retain from each payment due to the Contractor the proportion stated in the SCC until Completion of the whole of the Works.   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.   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:      1. at least eighty (80) percent of the whole works have been completed,      2. progress of the works is satisfactory in accordance with the Contract as per approved work schedule, and      3. it can be assured that the works can be completed at the intended completion date.   4. If retention money is substituted by bank guarantee in accordance with clause 54.2, 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** | * 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.   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 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 |

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|  | 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. |
| * 1. The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.   2. 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. |
| **58.** **Securities** | * 1. The Performance Security, including any additional security required as per ITB 32.5 and ITB 37.1, 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 acceptable to the Employer, and denominated in Nepalese Rupees. The Performance Security shall be valid until a date 30 days from the date of issue of the Defect Liability Certificate in the case of a bank guarantee.   Any additional performance security required as per ITB 32.5 shall be valid until a date 30 days from the date of issue of the certificate of Completion in the case of a bank guarantee.  Any additional performance security required as per ITB 37.1 shall be valid until a date 30 days from the date of issue of the certificate of DLP in the case of a bank guarantee.   * 1. The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by an Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal. |
| **59. Day works** | * 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.   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.   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 |

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|  | 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** | * 1. In this Clause, “Force Majeure” means an exceptional event or circumstance,      1. which is beyond a Party’s control;      2. which such Party could not reasonably have provided against before entering into the Contract;      3. which, having arisen, such Party could not reasonably have avoided or overcome; and      4. which is not substantially attributable to the other Party. |
|  | * 1. 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:      1. war, hostilities (whether war be declared or not), invasion, act of foreign enemies;      2. rebellion, terrorism, sabotage by persons other than the Contractor’s Personnel, revolution, insurrection, military or usurped power, or civil war;      3. riot, commotion, disorder, strike or lockout by persons other than the Contractor’s Personnel;      4. 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      5. 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. |

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| **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** | * 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      1. an extension of time for any such delay, if completion is or will be delayed, under GCC35 ; and      2. if the event or circumstance is of the kind described in sub-paragraphs         1. 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 Subcontractor** | 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. |
| * 1. Upon such termination, the Project Manager shall determine the value of the work done and issue a Payment Certificate, which shall include      1. the amounts payable for any work carried out for which a price is stated in the Contract;      2. 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; |

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|  | 1. other Costs or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works; 2. 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 3. 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** | * 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,      1. 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      2. 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** | * 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.   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** | * 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.   2. The Project Manager shall, within 30 days after receiving the Contractor’s application:      1. 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      2. reject the application, giving reasons and specifying the work required to |

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|  | 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** | * 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**.   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** | * 1. The Employer may terminate the Contract at any time if the contractor;      1. does not commence the work as per the Contract,      2. abandons the work without completing,      3. fails to achieve progress as per the Contract.   2. The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.   3. Fundamental breaches of Contract shall include, but shall not be limited to, the following :  1. The Contractor uses the advance payment for matters other than the contractual obligations, 2. 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; 3. the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days; 4. the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation. 5. a payment certified by the Project Manager is not paid by the Employer to the |

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|  | Contractor within 90 days of the date of the Project Manager’s certificate;   1. 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; 2. 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; 3. the Contractor does not maintain a Security, which is required; 4. 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 5. 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.    1. 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.    2. Notwithstanding the above, the Employer may terminate the Contract for convenience.    3. 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** | * 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.   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;   * + 1. “corrupt practice” is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party.     2. “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;     3. “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;     4. “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 |

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|  | 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/EMPLOYER’s inspection and audit rights provided for under GCC28.3. |
| **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 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:   1. 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. 2. If convicted from a court of law in a criminal offense liable to be disqualified for taking part in procurement contract, 3. 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** | * 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.   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 performance security shall be forfeited by the Employer.  In such case, amount to complete the remaining works as per the Contract shall be recovered from the Contractor as Government dues. |
| **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 |

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|  | 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 EMPLOYER Loan/Credit/Grant** | * 1. In the event that the EMPLOYER suspends the loan/ credit/grant to the Employer from which part of the payments to the Contractor are being made:      1. the Employer is obligated to notify the Contractor of such suspension within 7 days of having received the EMPLOYER's suspension notice; and      2. 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 Section V of the bidding document 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. Project Manager’ 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** | * 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.   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** | * 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.   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.   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 local District Development Committee (DDC) 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 DDC. |
| **86. Member of Government, etc,** | 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 |

|  |  |
| --- | --- |
| **not Personally Liable** | 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. |

### 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 .

### Special Conditions of Contract

|  |  |
| --- | --- |
| **A. General** | |
| **GCC 1.1 (q)** | The Employer is **SOS CHILDREN’S VILLAGES NEPAL.** |
| **GCC 1.1 (v)** | The Intended Completion Date for the whole of the Works shall be**Six Months from Contract Agreement Date.** |
| **GCC 1.1 (bb) & 10.1** | The Project Manager is **SOS CHILDREN’S VILLAGES NEPAL’S CIVIL ENGINEER*.***  The Project Manager and Engineer are synonyms. |
| **GCC 1.1 (ee)** | The Site is located at **Rambazar-15, Pokhara, Gandaki Province.** |
| **GCC 1.1 (hh)** | The Start Date shall be**Seven days from Contract Agreement Date*.*** |
| **GCC 1.1 (ll)** | The Works consist of **Renovation Works.** |
| **GCC 2.2** | Sectional Completions are **Not Appliciable.** |
| **GCC 2.3(i)** | The following documents also form part of the Contract:   * **Specification.** * **Drawings and Meeting Minutes.** |
| **GCC 3.1** | The language of the contract is **ENGLISH.**  The law that applies to the Contract is the law of **NEPAL.** |
| **GCC 11.1** | The Project Manager **may not**delegate any of his duties and responsibilities. |
| **GCC 14.1** | Schedule of other contractors: **Not Appliciable.** |
| **GCC 19.1** | All required Insurance shall be done by the Contractor and the Contractor shall quote the amount required for Insurance under Preliminary Works. 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.**   1. The maximum deductible for insurance of the Works and of Plant and Materials is: **1 % of sum insured** 2. The minimum cover for loss or damage to immovable Equipment/plants is :   **100% (i.e Replacement Cost)**   1. The maximum deductible for insurance of Equipment/plant is: **1 % of sum insured** 2. The minimum cover for loss of or damage to other property is **5,00,000.00** with unlimited number of occurrences 3. The maximum deductible for insurance of other property is: **1 % of sum insured** 4. The minimum cover for personal injury or death insurance |

|  |  |
| --- | --- |
|  | 1. for the Contractor’s employees is that specified in the Labor act of Nepal and 2. for ***other*** people is ***:* 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 **Not Applicable.** |
| **GCC 26.1** | The Site Possession Date(s) shall be **Fourteen days from the date of Contract Agreement Date.** |
| **GCC 30.1** | The place of arbitration shall be **Not Appliciable.** |
| **B. 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 **60 days.**  The amount to be withheld for late submission of an updated Program is NPR. **10,000.00*.*** |
| **C. Quality Control** | |
| **GCC 42.1** | The Defects Liability Period is **365**days. |
| **D. Cost Control** | |
| **GCC 49.1** | **As per prevailing interest rate fixed by NRB, Nepal.** |
| **GCC 53.1** | The Contract **is not** subject to price adjustment, and the following information regarding coefficients **does not** apply.  The coefficients and indices for adjustment of prices in Nepalese Rupees shall be as specified in the Table of Adjustment Data submitted by bidder together with the Letter of Price Bid which is approved by the Project manager. |
| **GCC 53.6** | Base Price of Construction Materials applicable for price adjustment shall be as per the Table of Adjustment Data submitted by Bidder together with the Letter of Price Bid which is approved by the Project **manager** and attached as Annex-1. |
| **GCC 53.7** | **Not Appliciable.** |
| **GCC 54.1** | The proportion of payments retained is: **5 (FIVE) percent.** |
| **GCC 55.1** | The liquidated damages for the whole of the Works are **0.05 Percent of the final Contract Price per day**. The maximum amount of liquidated damages for the whole of the Works is **10 Percent of the final Contract Price**. |
| **GCC 56.1** | **Not Appliciable.** |
| **GCC 57.1** | Total advance payment shall **be 20% of the Accepted Contract Amount** |
|  | **(Excluding VAT and Provisional Sums)**and shall be paid to the Contractor no later than **1st Interim Bill payment** in the currencies and proportions in which the Accepted Contract Amount is payable.   * First installment: **10% shall be made to the contractor upon submission of equivalent acceptable Bank Guarantee for advanced payment After agreement & Insurance Report.** * Second installment: **10% shall be made after execution of work, Submission of Materials Lab report.** |
| **GCC 57.3** | 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. |
| **GCC 58.1** | The amount of the of performance Security on the recommendation of tender evaluation committee according to rules 65(3) of public procurement rules 2064 (Amended) as per given below.  1) If bid price of the bidder selected for acceptance is up to 15 (fifteen) percent below the approved cost estimate, the performance security amount shall be 5 (five) percent of the bid price.  ii) For the bid price of the bidder selected for acceptance is more than 15 (fifteen) percent below of the cost estimate, the performance security amount shall be determined as follows:  **Performance Security Amount = [(0.85 x Cost Estimate – Bid Price) x 0.5] + 5% of Bid Price.**  **The Bid Price and Cost Estimate shall be inclusive of Value Added Tax of Price including Provisional and others.**  If the case of front loading occurs in the items of Boq, then ,the employer may impose the additional 8% of performance Security on the recommendation of tender evaluation committee according to rules 65(3) of public procurement rules 2064 (Amended). |
| **G. Finishing the Contract** | |
| **GCC 71.1** | The date by which operating and maintenance manuals are required is **365 days*.*** |
| **GCC 71.2** | The date by which **as built** drawings are required is **with Final Bill Payment.**  The amount to be withheld for failing to produce as built drawings and/or Operating and maintenance manuals is:**Rs.50,000.00** |
| **GCC 72.3 (i)** | The maximum number of days is: **200** |
| **GCC 80** | The Project Manager has to obtain the specific approval of the Employer for taking any of the following actions :   1. Approving subcontracting of any part of the works under General Conditions of Contract Clause 13; 2. Certifying additional costs determined under General Conditions of Contract |
|  | Clause 50;   1. Determining start date under General Conditions of Contract Clause 1; 2. Determining the extension of the intended Completion Date under General Conditions of Contract Clause 35; 3. 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. 4. 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 Advance Payment Security, when required, 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 Data/SCC]*** to you as your bid price ............................................ ***[insert amount in figures and words in Nepalese Rupees]*** as corrected and modified in accordance with the Instructions to Bidders is hereby selected as substantially responsive lowest evaluated bid.

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 lowest evaluated bid.]

### 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 dated ................................datefor execution of

the……………………..name of the contract and identification number, as given in the Contract Data/SCCfor the Contract price of Nepalese Rupees [insert amount

in figures and words in Nepalese Rupees],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 **NPR.** ………. 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.
   1. the Letter of Acceptance;
   2. the Letters of Bid;
   3. the Addenda Nos ................................... **Insert addenda numbers if any** ……………
   4. the Special Conditions of Contract;
   5. the List of Eligible Countries that was specified in Section V of the bidding document,
   6. the General Conditions of Contract;
   7. the Specification;
   8. the Drawings;
   9. Bill of Quantities (or Schedules of Prices for lump sum contracts), and
   10. Table of Price Adjustment Data (k)List of Approved Subcontractors

(l) **[Specify if there are any other document]**

1. 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.
2. 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 …………………………. Signed by ………………………….

for and on behalf the Contractor in the presence of for and on behalf the Contractor in the presence of

Witness, Name Signature, Address, DateWitness, 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: .............................................. Name and Address of Employer ………………….......

Date: ..................................................

Performance Guarantee No.:………………………………………………….

We have been informed that ...... ***[insert name of the Contractor]*** (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 ***[insert***

***name of the currency and amount in figures\*] (................ insert 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………………………..Day of \*\*, 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, ICC Publication No. 758.

**…………………………………………**

***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 ***Name and address of employer***

Date : …………………………………

Advance Payment Guarantee No……………………………..

We have been informed that ………………has entered into Contract No ***Name and Address of***

***Employer***………………***name of the Contractor***……………(hereinafter called "the Contractor")..reference number of the Contract……………dated …………… with you, for the execution of ...contract and brief description of Works ……………. (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum……………. name of the currency and amount in figures***\*…(.... amount in words )*** is to be made against an advance payment guarantee.

At the request of the Contractor, we............................ . ***name of the Bank*** hereby

irrevocably undertake to pay you any sum or sums not exceeding in total an amount of………………….name of the currency and amount in figures***\*... .................... .(…… amount in words )*** upon receipt by us of your first demand in

writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the ....... day of \*\*, 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, ICC Publication No. 758.

**…………………………………………………… 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 Applicant") 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 Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of ***[insert amount in figures]* ( ) *[amount 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 Applicant 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 …. day of ……, 2… 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, ICC Publication No. 758.

*[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.*