
GOVERNMENT OF WEST BENGAL

PROJECT: West Bengal Major Irrigation and Flood Management Project (WBMIFMP)

REQUEST FOR BID NO: 01/WBMIFMP/APD-IV/NCB/23-24/AMTA FIELD HOSTEL

NATIONAL OPEN COMPETITIVE PROCUREMENT

(Two-Envelope Bidding Process with e-Procurement)

(FOR ITEM RATE/ADMEASUREMENT CONTRACTS IN CIVIL WORKS)

NAME OF WORK

Contract Title: - “Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.”

PERIOD OF DOWNLOADING OF BIDDING DOCUMENT ONLINE	FROM 03/01/2024 (13: 00 Hours IST) TO 05/02/2024 (13:00 Hours IST)
LAST DATE AND TIME FOR RECEIPT OF CLARIFICATION BY BIDDERS	15/01/2024 UPTO 13:00 Hours (IST)
TIME AND DATE OF PRE-BID MEETING	17/01/2024 AT 14:00 Hours (IST)
START DATE AND TIME FOR SUBMISSION OF BID	22/01/2024 AT 13.00 Hours (IST)
LAST DATE AND TIME FOR RECEIPT OF BIDS	05/02/2024 UPTO 13:00 Hours (IST)
*TIME AND DATE OF OPENING OF BIDS – TECHNICAL PART	05/02/2024 AT 15:00 Hours (IST)
VALIDITY REQUIRED FOR BANK GURANTEEE FOR BID SECURITY	AT LEAST UPTO 19/07/2024
TIME AND DATE OF OPENING OF BIDS-FINANCIAL PART	<i>The firms that qualify technically shall be notified subsequently for opening of the financial part of their bids.</i>
PLACE OF OPENING OF BIDS	<p style="text-align: center;">Office of The Additional Project Director -IV DPMU-II, WBMIFMP</p> <p>Address: <i>Jalasampad Bhavan, (9th Floor), Bidhannagar</i> City: <i>Kolkata</i> ZIP Code: <i>700-091</i> Country: <i>India</i>, Telephone: <i>033-23341232</i> Electronic mail address : apd2019dpmu@gmail.com</p>
OFFICER INVITING BIDS	<i>The Additional Project Director -IV, DPMU-II, WBMIFMP</i>

**Should be the same as the deadline for submission of bids or promptly thereafter. The firms that qualify technically shall be notified subsequently for opening of the financial part of their bids.*

REQUEST FOR BIDS
(RFB)

GOVERNMENT OF WEST BENGAL
West Bengal Major Irrigation and Flood Management Project
(WBMIFMP)

REQUEST FOR BIDS (RFB) E-Procurement Notice
(Two-Envelope Bidding Process with e-Procurement)

NATIONAL OPEN COMPETITIVE PROCUREMENT

Name of Project: *West Bengal Major Irrigation and Flood Management Project (WBMIFMP)*

Contract Title: - “Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.”

Loan No/Credit Nos./ Grant Nos.: **IBRD-90250**

RFB Reference Nos.: **01/WBMIFMP/APD-IV/NCB/23-24/AMTA FIELD HOSTEL**

Date: **03/01/2024**

1. The Government of India **has received** for financing from the World Bank toward the cost of the **West Bengal Major Irrigation and Flood Management Project (WBMIFMP)** Project and intends to apply part of the proceeds toward eligible payments under the contract¹ for construction of works as detailed below.
2. Bidding will be conducted through national open competitive procurement using a Request for Bids (RFB) as specified in the World Bank’s “**Procurement Regulations for IPF Borrowers, July 2016 Revised August 2018 and November 2020**” (“Procurement Regulations”) and is open to all Bidders as defined in the Procurement Regulations.
3. The **DPMU-II, WBMIFMP** (*implementing agency*) now invites online Bids from eligible Bidders for the construction of works detailed below in the table. The bidders may submit bids for any or all of the lots indicated therein. Interested bidders may obtain further information and inspect the bidding document at the address given below during office hours. Bidders are advised to note the clauses on eligibility (Section I Clause 4) and minimum qualification criteria (Section III – Evaluation and Qualification Criteria), to qualify for the award of the contract. In addition, please refer to paragraphs 3.14 and 3.15 of the “Procurement Regulations” setting forth the World Bank’s policy on conflict of interest.

4. Bidders wishing to offer discounts in case they are awarded more than one lot will be allowed to do so, provided those discounts are included in the Letter of Bid.”
5. For submission of the bid, the bidder is required to have Digital Signature Certificate (DSC) from one of the Certifying Authorities authorised by Government of India for issuing DSC. Aspiring bidders who have not obtained the user ID and password for participating in e-procurement in this Project, may obtain the same from the website: <https://wbtenders.gov.in>.

Any bidder not having the DSC may obtain the same from NIC on payment of requisite fees before the bid submission deadline.

6. Bids comprise two Parts, namely the Technical Part and the Financial Part, and both parts must be submitted simultaneously online on <https://wbtenders.gov.in> on or before **05/02/2024** up to **13:00** hours IST and the ‘Technical Part’ of the bids will be opened publicly online on the same day at **15:00** hours IST. The “Financial Part” shall remain unopened in the e-procurement system until the second public Bid opening for the financial part. Any bid or modifications to bid (including discount) received outside e-procurement system will not be considered. If the office happens to be closed on the date of opening of the bids as specified, the bids will be opened on the next working day at the same time and venue. The electronic bidding system would not allow any late submission of bids.
7. All Bids must be accompanied by a Bid Security of the amount specified for the work in the table below, in the approved form, drawn in favour of **Additional Project Director – IV, DPMU – II, WBMIFMP** will have to be in any one of the forms as specified in the bidding document and shall have to be valid for 45 days beyond the validity of the bid. Procedure for submission of bid security is described in Para 8.
8. The bidders are required to submit (a) original bid security in approved form and (b) original affidavit regarding correctness of information furnished with bid document with **Additional Project Director – IV, DPMU – II, WBMIFMP, 9th floor, Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City, Ninth Floor, Kolkata - 700-091, West Bengal**, before the bid submission deadline, either by registered post/speed post/courier or by hand, failing which the bids will be declared non-responsive and will not be opened.
9. A pre-bid meeting will be held on **17/01/2024** at **14:00** Hours IST to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in ITB Clause 7.4 of ‘Instructions to Bidders’ of the bidding document. Bidders are advised to download the bidding document prior to the pre-bid meeting in order for bidders to have a good understanding of the scope of work under this contract for discussion and clarification at the pre-bid meeting.
10. Other details can be seen in the bidding document. The Employer shall not be held liable for any delays due to system failure beyond its control. Even though the system will attempt to notify the bidders of any bid updates, the Employer shall not be liable for any information not received by the bidder. It is the bidders’ responsibility to verify the website for the latest information related to this bid.

11. The bidding document / information is available online on **<https://wbtenders.gov.in>** **OR** **www.wbiwd.gov.in** from **03/01/2024 (from 13:00 Hours IST) to 05/02/2024 (upto 13:00 Hours IST)** free of cost. Bidders will be required to register on the website, which is free of cost. The bidders would be responsible for ensuring that any addenda available on the website is also downloaded and incorporated.
12. The address for communication is as under:
- (a) *Name & Designation of Officer: **Additional Project Director – IV, DPMU – II, WBMIFMP***
 - (b) *Official Address: **Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City, Ninth Floor, Kolkata - 700-091, West Bengal***
 - (c) *Email: apd2019dpmu@gmail.com*
 - (d) Telephone **033-23581315**

TABLE

Package No	Name of Work	Bid Security (Rs.)	Cost of Document (Rs.)	Period of Completion
1	2	3	4	5
01/WBMIFMP/APD-IV/NCB/23-24/AMTA FIELD HOSTEL	“Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.	3.50 LAKHS	Nil	365 days including rainy and all other seasons

**Additional Project Director - II,
DPMU – II, WBMIFMP
Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City
Ninth Floor, Kolkata - 700-091, INDIA**

Table of Contents

PART 1 – Bidding Procedures	8
Section II - Bid Data Sheet (BDS).....	36
Section III - Evaluation and Qualification Criteria.....	42
2. Financial Part.....	54
2.1 Margin of Preference - Not Applicable.....	54
2.2 Multiple Contracts –.....	54
2.3 Sustainable procurement (Section VII - Specifications) – Not Applicable	54
2.4 Alternative Completion Times (ITB 13.2) - Not Applicable	54
2.5 Alternative Technical Solutions for specified parts of the Works (ITB 13.4) - Not Applicable	54
2.6 Other criteria (if permitted under ITB 35.1(f)):Nil	54
Section IV - Bidding Forms.....	60
Section V - Eligible Countries.....	139
Section VI - Fraud and Corruption	140
PART 2 –Works’ Requirements.....	142
Section VII - Works’ Requirements	143
PART 3 – Conditions of Contract and Contract Forms.....	267
Section VIII - General Conditions of Contract.....	268
Section IX - Particular Conditions of Contract.....	307
Section X - Contract Forms	337

PART 1 – Bidding Procedures

Section I - Instructions to Bidders

A. General

1. Scope of Bid

1.1 In connection with the Specific Procurement Notice - Request for Bids (RFB), **specified in the Bid Data Sheet (BDS)**, the Employer, as **specified in the BDS**, issues this bidding document for the provision of Works as specified in Section VII, Works' Requirements. The name, identification and number of lots (contracts) of this RFB are **specified in the BDS**.

1.2 Throughout this bidding document:

- (a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, and fax, including if **specified in the BDS**, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;
- (b) if the context so requires, "singular" means "plural" and vice versa.
- (c) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Borrower. It excludes the Borrower's official public holidays; and
- (d) The term "ES" means environmental and social (including sexual exploitation and abuse (SEA) and sexual harassment (SH).
- (e) "**Sexual Exploitation and Abuse**" "**(SEA)**" means the following:
 - (i) "**Sexual Exploitation**" is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another.
 - (ii) "**Sexual Abuse**" is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
- (f) "**Sexual Harassment**" "**(SH)**" is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Contractor's Personnel with other Contractor's or Employer's Personnel;

(g) “Contractor’s Personnel” is as defined in Sub-Clause 1 (ii) of the General Conditions of Contract; and

(h) “**Employer’s personnel**” is as defined in GCC Sub-Clause 1 (nn) of the General Conditions of Contract.

A non-exhaustive list of (i) behaviors which constitute SEA and (ii) behaviors which constitute SH is attached to the Code of Conduct form in Section IV.

2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called “Borrower”) **specified in the BDS** has received or has applied for financing (hereinafter called “funds”) from the International Bank for Reconstruction and Development or the International Development Association (hereinafter called “the Bank”) in an amount **specified in the BDS**, toward the project **named in the BDS**. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this bidding document is issued.

2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank, and will be subject, in all respects, to the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, equipment, plant, or materials, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan (or other financing) Agreement or have any claim to the proceeds of the Loan (or other financing).

3. Fraud and Corruption

3.1 The Bank requires compliance with the Bank’s Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG’s Sanctions Framework, as set forth in Section VI.

3.2 In further pursuance of this policy, bidders shall permit and shall cause their agents (whether declared or not), subcontractors, sub-consultants, service providers, suppliers, and their personnel, to permit the Bank to inspect all accounts, records and other documents relating to any initial selection process, prequalification process, bid submission, proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

4. Eligible Bidders

4.1 A Bidder may be a firm that is a private entity, or a state-owned enterprise or institution subject to ITB 4.6, or any combination of them in the form of a joint venture (JV), under an existing agreement, or with the intent to enter into such an agreement supported by a letter of intent, unless otherwise **specified in the BDS**. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. This authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all members. Unless **specified in the BDS**, there is no limit on the number of members in a JV. The joint venture agreement shall be registered in the place **specified in BDS** so as to be legally valid and binding on members.

4.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:

- (a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or
- (b) receives or has received any direct or indirect subsidy from another Bidder; or
- (c) has the same legal representative as another Bidder; or
- (d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or
- (f) any of its affiliates has been hired (or is proposed to be hired) by the Employer or Borrower as Project Manager (Engineer) for the Contract implementation;
- (g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm;
- (h) has a close business or family relationship with a professional staff of the Borrower (or of the project

implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding document or specifications of the contract, and/or the Bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the procurement process and execution of the contract.

- 4.3** A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid, except for permitted alternative Bids. This includes participation as a Subcontractor in other Bids. Such participation shall result in the disqualification of all Bids in which the firm is involved. A firm that is not a Bidder or a JV member may participate as a subcontractor in more than one Bid.
- 4.4** A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.8. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub-consultants for any part of the Contract including related Services.
- 4.5** A Bidder that has been sanctioned by the Bank, pursuant to the Bank's Anti-Corruption Guidelines, in accordance with its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework as described in Section VI paragraph 2.2 d., shall be ineligible to be prequalified for, initially selected for, bid for, propose for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address **specified in the BDS**.
- 4.6** Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Bank, that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.
- 4.7** A Bidder shall not be under suspension from Bidding by the Employer as the result of the operation of a Bid-Securing or Proposal-Securing Declaration.
- 4.8** Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Borrower's

country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) 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 or contracting of works or services from that country, or any payments to any country, person, or entity in that country. When the Works are implemented across jurisdictional boundaries (and more than one country is a Borrower, and is involved in the procurement), then exclusion of a firm or individual on the basis of ITB 4.8 (a) above by any country may be applied to that procurement across other countries involved, if the Bank and the Borrowers involved in the procurement agree.

4.9 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.

**5. Eligible Materials,
Equipment and
Services**

5.1 The materials, equipment and services to be supplied under the Contract and financed by the Bank may have their origin in any country subject to the restrictions specified in Section V, Eligible Countries, and all expenditures under the Contract will not contravene such restrictions. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.

B. Contents of Bidding Document

6. Sections of Bidding Document

6.1 The bidding document consists of Parts 1, 2, and 3, which include all the sections specified below, and which should be read in conjunction with any Addenda issued in accordance with ITB 8.

PART 1 Bidding Procedures

- Section I - Instructions to Bidders (ITB)
- Section II - Bid Data Sheet (BDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Bidding Forms
- Section V - Eligible Countries
- Section VI - Fraud and Corruption

PART 2 Works' Requirements

- Section VII - Works' Requirements

PART 3 Conditions of Contract and Contract Forms

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

6.2 The Specific Procurement Notice - Request for Bids (RFB) issued by the Employer is not part of this bidding document.

6.3 Unless obtained directly from the Employer or downloaded from the official website specified in the 'E-Procurement Notice', the Employer is not responsible for the completeness of the bidding document, responses to requests for clarification, the minutes of the pre-Bid meeting (if any), or Addenda to the bidding document in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer or downloaded from the official website specified in the 'E-Procurement Notice' shall prevail.

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 document.

7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting

7.1 The electronic bidding system **specified in the BDS** provides for online clarifications. A Bidder requiring any clarification on the bidding document may notify the *Employer* online or raise its enquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. Clarifications requested through any other mode shall not be considered by the Employer. The *Employer* will respond to any request for clarification, provided that such request is received prior to the deadline for submission of Bids within a period **specified in the BDS**. Description of clarification sought and the response of the *Employer* shall be uploaded for information of all Bidders without identifying the source of

request for clarification. Should the clarification result in changes to the essential elements of the bidding document, the Employer shall amend the bidding document following the procedure under ITB 8 and ITB 22.2. It is the bidder's responsibility to check on the e-procurement system, for any addendum/ amendment/ corrigendum to the bidding document.

- 7.2** The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own 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** If **sospecified in the BDS**, the Bidder's designated representative is invited to attend a pre-Bid meeting and/or a Site of Works visit. 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 only through the e-procurement portal, not later than one week before the meeting. Clarifications requested through any other mode shall not be considered by the Employer.
- 7.6** Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be uploaded online on e-procurement system. 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. It is the bidder's responsibility to check on the e-procurement system, for any addendum/ amendment/ corrigendum to the bidding document. 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 deemed to have been communicated to all the bidders. The addendum will appear on the e-procurement system under "Latest Corrigendum" and email notification is also automatically

sent to those bidders who have started working on the tender, or as **otherwise specified in BDS**. The Employer shall not be liable for any information not received by the bidder. It is the bidders' responsibility to verify the website for the latest information related to this bid.

- 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 22.2.

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 English. 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 English, in which case, for purposes of interpretation of the Bid, such translation shall govern.
- 11. Documents
Comprising the
Bid** **11.1** The Bid shall comprise two Parts, namely the Technical Part and the Financial Part. These two Parts shall be submitted simultaneously.
- 11.2** The Technical Part shall contain the following:
- (a) **Letter of Bid– Technical Part** prepared in accordance with ITB 12 and ITB 14;
 - (b) **Bid Security** in accordance with ITB 19.1;
 - (c) **Alternative Bid – Technical Part**, if permissible, in accordance with ITB 13;
 - (d) **Authorization:** written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.3, and in accordance with ITB 20.4 in case of a JV;
 - (e) **Bidder's Eligibility:** documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to Bid;
 - (f) **Qualifications:** documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract if its Bid is accepted;

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- (g) **Conformity**: a technical proposal in accordance with ITB 16;
 - (h) **Construction methodology** as detailed in Para 1.1 of Section III Evaluation Criteria;
 - (i) Contractor Registration certificate (as per RFB);
 - (j) Any other document **required in the BDS**.

11.3 The **Financial Part** shall contain the following:

- (a) **Letter of Bid – Financial Part**: prepared in accordance with ITB 12 and ITB 14;
- (b) **Completed Schedules** including priced Bill of Quantities in accordance with ITB 12 and ITB 14, as **specified in BDS**;
- (c) **Alternative Bid - Financial Part**: if permissible in accordance with ITB 13; and
- (d) Any other document required **in the BDS**.

11.4 The Technical Part shall not include any information related to the Bid price. Where material financial information related to the Bid price is contained in the Technical Part the Bid shall be declared non-responsive.

11.5 In addition to the requirements under ITB 11.2, Bids submitted by a JV (where permitted) shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful Bid shall be signed by all members and submitted with the Bid, together with a copy of the proposed Agreement.

11.6 The Bidder shall furnish in the Letter of Bid – Financial Part information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

12. Process of Bid Submission

12.1 The Letter of Bid – Technical Part, Letter of Bid – Financial Part, Schedules including Bill of Quantities, and all documents listed under Clause 11, shall be prepared using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 20.3. All blank spaces shall be filled in with the information requested.

12.2 Entire Bid including the Letter of Bid and filled-up Bill of Quantity shall be submitted online on e-procurement system specified in ITB 7.1. Details and process of online submission of the tender and relevant documents are given in the website mentioned above. Scanned copies of documents listed in ITB Clauses 11 and 12.3 should also be uploaded on this website.

12.3 Submission of Original Documents: The bidders are required to separately submit (i) original demand drafts towards the cost of bid document and registration on e-procurement website (if not previously registered) (as per RFB); and (ii) original bid security in approved form; and (iii) original affidavit regarding correctness of information furnished with bid document, with the office **specified in the BDS**, before the Bid submission deadline, either by registered/speed post/courier or by hand, failing which the bids will be declared non-responsive and will not be opened. Hard copy of rest of the bid or any other document are not to be submitted.

13. Alternative Bids

13.1 Unless otherwise specified **in the BDS**, alternative Bids shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included **in the BDS** and the method of evaluating different alternative times for completion will be described in Section III, Evaluation and Qualification Criteria.

13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the bidding document must first price the *Employer's* design as described in the bidding document and shall further provide all information necessary for a complete evaluation of the alternative by the *Employer*, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the Bidder with the Most Advantageous Bid conforming to the basic technical requirements shall be considered by the *Employer*.

13.4 When specified **in the BDS**, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified **in the BDS** and described in Section *VII, Works* Requirements. The method for their evaluation will be stipulated in Section *III, Evaluation and Qualification Criteria*.

14. Bid Prices and Discounts

14.1 The prices and discounts quoted by the Bidder in the Letter of Bid –Financial Part and in the Schedules including Bill of Quantities shall conform to the requirements specified below.

14.2 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 IV - Bidding Forms alongwith the total bid price (both in figures and words). 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. Corrections if any, in the bid can be carried

out by editing the information before electronic submission on e-procurement portal.

- 14.3** The price to be quoted in the Letter of Bid – Financial Part, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered.
- 14.4** The Bidder shall quote any discounts and indicate the methodology for their application in the Letter of Bid – Financial Part in accordance with ITB 12.1.
- 14.5** Unless otherwise **specified in the BDS** and the Conditions of Contract, the prices quoted by the Bidder shall be fixed.
- 14.6** If so specified in ITB 1.1, Bids are invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer discounts 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. Discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all lots (contracts) are opened at the same time.
- 14.7** All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the deadline for submission of Bids, shall be included in the rates and prices and the total Bid price submitted by the Bidder.
- 14.8** Bidders may like to ascertain availability of tax/duty exemption benefits available in India to the contracts financed under World Bank loan/credits. They are solely responsible for obtaining such benefits which they have considered in their bid and in case of failure to receive such benefits for reasons whatsoever, the Employer will not compensate the bidder (Contractor). The bidder shall furnish alongwith his bid a declaration to this effect in the Declaration Format provided in Section IV of the bidding document.

Where the bidder has quoted taking into account such benefits, it must give all information required for issue of certificates in terms of the Government of India's relevant Notifications as per the declaration format. In case the bidder has not provided the required information or has indicated to be furnished later on in the Declaration Format, the same shall be construed that the goods/construction equipment for which certificate is required is Nil.

To the extent the Employer determines the quantities indicated therein are reasonable keeping in view the quantities in bill of quantities, construction program and methodology, the certificates will be issued within 60 days of signing of the contract and no subsequent changes will be permitted. In case of materials pertaining to Variation items and quantities, the certificate shall

be issued only on request from the Contractor when in need and duly certified by the Project Manager.

No certificate will be issued for items where no quantity/capacity of equipment is indicated in the statement.

If the bidder has considered the tax/duty exemption for materials/construction equipment to be bought for the work, the bidder shall confirm and certify that the Employer will not be required to undertake any responsibilities of the Government of India Scheme or the said exemptions being available during the contract execution, except issuing the required certificate. The bids which do not conform to the above provisions or any condition by the bidder which makes the bid subject to availability of tax/duty exemption for materials/construction equipment or compensation on withdrawal of any variations to the said exemptions will be treated as non-responsive and rejected.

Any delay in procurement of the construction equipment/machinery/goods as a result of the above shall not be a cause for granting any extension of time.

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| 15. Currencies of Bid and Payment | 15.1 The unit rates and prices shall be quoted by the Bidder and shall be paid for, entirely in Indian Rupees. |
| 16. Documents Comprising the Technical Proposal | 16.1 The Bidder shall furnish a technical proposal in the Technical Part of the Bid, including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV, Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work's requirements and the completion time. |
| 17. Documents Establishing the Eligibility and Qualifications of the Bidder | <p>17.1 To establish Bidder's eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid – Technical Part, included in Section IV, Bidding Forms.</p> <p>17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract, the Bidder shall provide the information requested in the corresponding information sheets included in Section IV, Bidding Forms.</p> |
| 18. Period of Validity of Bids | <p>18.1 Bids shall remain valid for 90 days or for the Bid Validity period specified in the BDS. The Bid Validity period starts from the date fixed for the Bid submission deadline (as prescribed by the Employer in accordance with ITB 22.1). A Bid valid for a shorter period shall be rejected by the <i>Employer</i> as nonresponsive.</p> <p>18.2 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</p> |

shall be made in writing. If a Bid Security is requested in accordance with ITB 19, it shall also be extended for forty five (45) 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, except as provided in ITB 18.3.

18.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial Bid validity period, the Contract price shall be determined as follows:

- (a) in the case of **fixed price** contracts, the Contract price shall be the Bid price adjusted by the factor **specified in the BDS**;
- (b) in the case of **adjustable** price contracts, no adjustment shall be made; or
- (c) In any case, Bid evaluation shall be based on the Bid price without taking into consideration the applicable correction from those indicated above.

19. Bid Security

19.1 The Bidder shall furnish as part of the Technical Part of its Bid, a Bid Security as **specified in the BDS**, in original form, and for the amount **specified in the BDS**.

19.2 A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.

19.3 *If a Bid Security is specified pursuant to ITB 19.1*, the Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:

- (a) an unconditional bank guarantee issued by a Nationalized or Scheduled bank located in India;
- (b) an irrevocable letter of credit issued by a Nationalized or Scheduled bank located in India;
- (c) a cashier's or certified check or demand draft issued by a Nationalized or Scheduled bank located in India;
- (d) another security **specified in the BDS**,

In the case of a bank guarantee, the Bid Security shall be submitted using the Bid Security Form included in Section IV, Bidding Forms. The form must include the complete name of the Bidder. The Bid Security shall be valid for forty-five (45) days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 18.2.

19.4 If a Bid Security is specified pursuant to ITB 19.1, any Bid not accompanied by a substantially *responsive* Bid Security in accordance with ITB 19.3 shall be rejected by the Employer as non-responsive.

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- 19.5** If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the Contract and furnishing the Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security pursuant to ITB 50.
- 19.6** If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security pursuant to ITB 50.
- 19.7** The Bid Security may be forfeited:
- (a) if a Bidder withdraws/modifies/substitutes its Bid during the period of Bid validity specified by the Bidder on the Letter of Bid - Technical Part and repeated in Letter of Bid - Financial Part, or any extension thereto provided by the Bidder; or
 - (b) if the Bidder does not accept the correction of its Bid Price pursuant to ITB 36; or
 - (c) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB 49; or
 - (ii) furnish a Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with ITB 50.
- 19.8** The Bid Security of a *JV* shall be in the name of the *JV* that submits the Bid. If the *JV* has not been constituted into a legally enforceable *JV*, at the time of Bidding, the Bid Security shall be in the names of all future members as named in the letter of intent mentioned in ITB 4.1 and ITB 11.2.
- 19.9** If a Bid Security is not required in the BDS, pursuant to ITB 19.1, and:
- (a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder in the Letters of Bid or any extended date provided by the Bidder; or
 - (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 49; or furnish a Performance Security and if required in the BDS, the Environmental and Social (ES) Performance Security in accordance with ITB 50;

the Borrower may, if provided for **in the BDS**, declare the Bidder ineligible to be awarded a contract by the Employer for a period of time as **stated in the BDS**.

20. Format and Signing of Bid

- 20.1** The Bidder shall prepare the Bid as per details given in ITB 21.
- 20.2** Bidders shall mark as “CONFIDENTIAL” information in their Bids which is confidential to their business.
- 20.3** The Bid 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 uploaded alongwith the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature.
- 20.4** In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives. Documents establishing authority to sign the bid on behalf of the JV shall be uploaded alongwith the bid.
- 20.5** Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Online Submission and Opening of Bids

21. Preparation of Bids

- 21.1** Bids, both Technical and Financial Parts, shall be submitted online on the e-procurement system specified in BDS 7.1. Detailed guidelines for viewing bids and submission of online bids are given on the website. The Request for Bids under this Project is published on this website. Any citizen or prospective bidder can logon to this website and view the Request for Bids and can view the details of works for which bids are invited. A prospective bidder can submit its bid online; however, the bidder is required to have enrolment/registration in the website, and should have valid Digital Signature Certificate (DSC) in the form of smart card/e-token obtained from any certifying agency authorised by the Government of India (for class of DSC **specified in BDS**). The bidder should register in the website using the relevant option available. Then the Digital Signature registration has to be done with the e-token, after logging into the website. The bidder can then login the website through the secured login by entering the password of the e-token & the user id/ password chosen during registration. After getting the bid schedules, the Bidder should go through them carefully and

submit the specified documents, alongwith the bid, otherwise the bid will be rejected.

21.2 The completed bid comprising of documents indicated in ITB 12, should be uploaded on the e-procurement portal alongwith scanned copies of requisite certificates as are mentioned in different sections in the bidding document and scanned copy of the bid security.

21.3 All the documents are required to be signed digitally by the bidder. After electronic on line bid submission, the system generates a unique bid identification number which is time stamped as per server time. This shall be treated as acknowledgement of bid submission.

21.4 Physical, e-mail, Telex, Cable or Facsimile bids will be rejected as non-responsive.

22. Deadline for Submission of Bids

22.1 Bids, both Technical and Financial Parts, must be uploaded online no later than the date and time **specified in the BDS**.

22.2 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.

23. Late Bids

23.1 The electronic bidding system would not allow any late submission of bids after due date & time as per server time.

24. Withdrawal, Substitution, and Modification of Bids

24.1 Bidders may modify their bids by using the appropriate option for bid modification on e-procurement portal, before the deadline for submission of bids. For this the bidder need not make any additional payment towards the cost of bid document. For bid modification and consequential re-submission, the bidder is not required to withdraw his bid submitted earlier. The last modified bid submitted by the bidder within the bid submission time shall be considered as the bid. For this purpose, modification/withdrawal by other means will not be accepted. In online system of bid submission, the modification and consequential re-submission of bids is allowed any number of times. A bidder may withdraw his bid by using the appropriate option for bid withdrawal, before the deadline for submission of bids, however, if the bid is withdrawn, re-submission of the bid is not allowed (or allowed **if specified in BDS**).

24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall not be opened.

24.3 No Bid may be withdrawn, substituted, or modified in the interval between 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. This will result in the forfeiture of the Bid Security pursuant to ITB 19.7.

E. Public Opening of Technical Parts of Bids

25. Public Opening of Technical Parts of Bids

25.1 The Employer shall publicly open Technical Parts of all Bids received by the deadline, at the date, time and place **specified in the BDS**, in the presence of Bidders' designated representatives and anyone who chooses to attend, and this could also be viewed by the bidders online. The Financial Parts of the bids shall remain unopened in the e-procurement system, until the subsequent public opening, following the evaluation of the Technical Parts of the Bids. In all cases, original documents submitted as specified in ITB 12.3 shall be first scrutinized, and Bids that do not comply with the provisions of ITB 12.3 will be declared non-responsive and will not be opened. Thereafter, bidders' names, the presence or absence of a Bid Security, if one was required, alternative bids – technical parts, if any, and such other details as the Employer may consider appropriate will be notified, online by the Employer at the time of bid opening.

In the event of the specified date of bid opening being declared a holiday for the Employer, the bids will be opened at the appointed time and location on the next working day.

25.2 The electronic summary of the bid opening will be generated and uploaded online. The Employer will also prepare minutes of the Bid opening, including the information disclosed and upload the same for viewing online. Only Technical Parts of Bids, and technical parts of alternative Bids if any, that are opened at technical Bid opening shall be considered further for evaluation.

F. Evaluation of Bids – General Provisions

26. Confidentiality

26.1 Information relating to the evaluation of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding process until information on Intention to Award the Contract is transmitted to all Bidders in accordance with ITB 45. In cases where ITB 45 is not applicable, such information shall not be disclosed until Notification of Award is transmitted in accordance with ITB 47.

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- 26.2** Any effort 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.
- 26.3** Notwithstanding ITB 26.2, from the time of Bid opening to the time of Contract award, if a Bidder wishes to contact the *Employer* on any matter related to the Bidding process, it shall do so in writing.
- 27. Clarification of Bids**
- 27.1** To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the *Employer* may, at its discretion, ask any Bidder for a clarification of its Bid giving a reasonable time for a response. 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, including any voluntary increase or decrease 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 36.
- 27.2** 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.
- 28. Deviations, Reservations, and Omissions**
- 28.1** During the evaluation of Bids, the following definitions apply:
- (a) "Deviation" is a departure from the requirements specified in the bidding document;
 - (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the bidding document; and
 - (c) "Omission" is the failure to submit part or all of the information or documentation required in the bidding document.⁴
- 29. Nonmaterial Nonconformities**
- 29.1** Provided that a Bid is substantially responsive, the *Employer* may waive any nonconformities in the Bid which do not constitute a material deviation, reservation or omission.
- 29.2** Provided that a Bid is substantially responsive, the *Employer* may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price or substance of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 29.3** Provided that a Bid is substantially responsive, the *Employer* shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for

comparison purposes only, to reflect the price of a missing or nonconforming item or component in the manner **specified in the BDS**.

G. Evaluation of Technical Parts of Bids

- 30. Evaluation of Technical Parts**
- 30.1** In evaluating the Technical Parts of each Bid, the Employer shall use the criteria and methodologies listed in this ITB and Section III, Evaluation and Qualification Criteria. No other evaluation criteria or methodologies shall be permitted.
- 31. Determination of Responsiveness**
- 31.1** The *Employer's* determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.
- 31.2** A substantially responsive Bid is one that meets the requirements of the bidding document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:
- (a) if accepted, would:
 - (i) **affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or**
 - (ii) **limit in any substantial way, inconsistent with the bidding document, the Employer's rights or the Bidder's obligations under the proposed Contract; or**
 - (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
- 31.3** The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, in particular, to confirm that all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission.
- 31.4** 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.
- 32. Qualification of the Bidder**
- 32.1** The *Employer* shall determine to its satisfaction whether the eligible Bidders that have submitted substantially responsive Bid - Technical Parts meet the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.

32.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1 The determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in the bidding document), or any other firm different from the Bidder.

32.3 If a Bidder does not meet the qualifying criteria specified in Section III, Evaluation and Qualification Criteria, its Bid shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

32.4 Only Bids that are both substantially responsive to the bidding document, and meet all Qualification Criteria shall have the Financial Parts of their Bids opened at the second public opening.

33. Subcontractors

33.1 Unless otherwise stated **in the BDS**, the Employer does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Employer.

33.2 The subcontractor's qualifications shall not be used by the Bidder to qualify for the Works unless their specialized parts of the Works were previously designated by the Employer **in the BDS** as can be met by subcontractors referred to hereafter as 'Specialized Subcontractors', in which case, the qualifications of the Specialized Subcontractors proposed by the Bidder may be added to the qualifications.

33.3 Bidders may propose subcontracting up to the percentage of total value of contracts or the volume of works as **specified in the BDS**. Subcontractors proposed by the Bidder shall be fully qualified for their parts of the Works.

H. Public Opening of Financial Parts of Bids

34. Public Opening of Financial Parts

34.1 Following the completion of the evaluation of the Technical Parts of the Bids, and the Bank has issued its no objection (if applicable), the Employer shall notify in writing those Bidders whose Bids were considered non-responsive to the bidding document or failed to meet the Qualification Criteria, advising them of the following information:

- (a) the grounds on which their Technical Part of Bid failed to meet the requirements of the bidding document;
- (b) their Financial Part of Bid shall not be opened; and

- (c) notify them of the date, time, and location for public opening of Financial Parts of the Bids.

34.2 The Employer shall, simultaneously, notify in writing those Bidders whose Technical Part have been evaluated as substantially responsive to the bidding document and met all Qualifying Criteria, advising them of the following information:

- (a) their Bid has been evaluated as substantially responsive to the bidding document and met the Qualification Criteria;
- (b) their Financial Part of Bid will be opened at the public opening of the Financial Parts; and
- (c) notify them of the date, time and location for public opening of the Financial Parts of the Bids, **as specified in the BDS.**

34.3 The opening date should allow Bidders sufficient time to make arrangements for attending the opening. The Financial Part of the Bids shall be opened publicly in the presence of Bidders' designated representatives and anyone who chooses to attend, and this could also be viewed by the bidders online. The bidder's names, the Bid prices, per lot (contract) if applicable, including any discounts and Alternative Bid - Financial Part if any, and such other details as the Employer may consider appropriate, will be notified online by the Employer at the time of bid opening.

In the event of the specified date of bid opening being declared a holiday for the Employer, the bids will be opened at the appointed time and location on the next working day.

34.4 The electronic summary of the bid opening will be generated and uploaded online. The Employer will also prepare minutes of the Bid opening, including the information disclosed and upload the same for viewing online. Only Financial Parts of Bids, Financial Parts of Alternative Bids, and discounts that are opened at Bid opening shall be considered further for evaluation.

I. Evaluation of Financial Parts of Bids

35. Evaluation of Financial Parts

35.1 To evaluate the Financial Part, the Employer shall consider the following:

- (a) the Bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities for admeasurement contracts;
- (b) price adjustment for correction of arithmetic errors in accordance with ITB 36.1;
- (c) price adjustment due to discounts offered in accordance with ITB 14.4;

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- (d) Not used;
 - (e) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 29.3; and
 - (f) the additional evaluation factors are specified in Section III, Evaluation and Qualification Criteria.
- 35.2** 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.
- 35.3** If this bidding document allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated cost of the contract combinations, including any discounts offered in the Letter of Bid – Financial Part, is specified in Section III, Evaluation and Qualification Criteria
- 36. Correction of Arithmetical Errors**
- 36.1** Provided that the Bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis:
- (a) only for admeasurement 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;
 - (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
 - (c) if there is a discrepancy between 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) and (b) above..
- 36.2** Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 36.1, shall result in the rejection of the Bid and the Bid Security may be forfeited in accordance with ITB Sub-Clause 19.6.
- 37. Conversion to Single Currency**
- 37.1** Not used.
- 38. Margin of Preference**
- 38.1** Not applicable.
- 39. Comparison of Financial Parts**
- 39.1** The *Employer* shall compare the evaluated costs of all substantially responsive Bids established in accordance with ITB 35.1 to determine the Bid that has the lowest evaluated cost.

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- 40. Abnormally Low Bids**
- 40.1** An Abnormally Low Bid is one where the Bid price, in combination with other constituent elements of the Bid, appears unreasonably low to the extent that the Bid price raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid price.
- 40.2** In the event of identification of a potentially Abnormally Low Bid, the Employer, unless otherwise **specified in the BDS**, shall seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the bidding document.
- 40.3** After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.
- 41. Unbalanced or Front-Loaded Bids**
- 41.1** If the Bid for an admeasurement contract, which results in the lowest evaluated cost is, in the Employer's opinion, seriously unbalanced or, front loaded, the *Employer* may require the Bidder to provide written clarifications. Clarifications may include detailed price analyses (with breakdown of unit rates) to demonstrate the consistency of the Bid prices *with the scope of works, proposed methodology, schedule and any other requirements of the bidding document*.
- 41.2** After the evaluation of the information and detailed price analysis presented by the Bidder, the Employer may as appropriate:
- (a) accept the Bid without any additional Performance Security; or
 - (b) require that the amount of the Performance Security be increased at the expense of the Bidder to *a level not exceeding twenty percent (20%) of the Contract Price to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract; or*
 - (c) reject the Bid if the risk cannot be mitigated through additional performance security.
- 42. Most Advantageous Bid**
- 42.1** Having compared the evaluated costs of Bids, the Employer shall determine the Most Advantageous Bid. The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria and whose Bid has been determined to be:
- (a) substantially responsive to the bidding document; and
 - (b) the lowest evaluated cost.

- 43. Employer's Right to Accept Any Bid, and to Reject Any or All Bids** **43.1** 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 documents submitted and specifically, Bid securities, shall be promptly returned to the Bidders.
- 44. Standstill Period** **44.1** The Contract shall be awarded not earlier than the expiry of the Standstill Period. The duration of the Standstill Period is specified in the BDS. *Standstill period shall not apply where only one bid is submitted.*
- 45. Notice of Intention to Award** **45.1** When a Standstill Period applies, it shall commence when the Employer has transmitted to each Bidder (that has not already been notified that it has been unsuccessful) the Notification of Intention to Award the Contract to the successful Bidder. The Notification of Intention to Award shall contain, at a minimum, the following information:
- (a) the name and address of the Bidder submitting the successful Bid;
 - (b) the Contract price of the successful Bid;
 - (c) the names of all Bidders who submitted Bids, and their Bid prices as readout, and as evaluated;
 - (d) a statement of the reason(s) the Bid (of the unsuccessful Bidder to whom the letter is addressed) was unsuccessful, unless the price information in (c) above already reveals the reason;
 - (e) the expiry date of the Standstill Period;
 - (f) instructions on how to request a debriefing and/or submit a complaint during the standstill period.

J. Award of Contract

- 46. Award Criteria** **46.1** Subject to ITB 43, the Employer shall award the Contract to the successful Bidder. This is the Bidder whose Bid has been determined to be the Most Advantageous Bid as specified in ITB 42.
- 47. Notification of Award** **47.1** Prior to the expiration of the Bid Validity Period and upon expiry of the Standstill Period, specified in BDS ITB 44.1 or any extension thereof, or upon satisfactorily addressing a complaint that has been filed within the Standstill Period, the Employer shall transmit the Letter of Acceptance to the successful Bidder. The Letter of Acceptance shall specify the sum that the Employer will pay the Contractor in consideration of the execution of the contract (hereinafter and in the Conditions of Contract and Contract Forms called "the Contract Price").

47.2 Within ten (10) Business Days after the date of transmission of the Letter of Acceptance, the Employer shall publish the Contract Award Notice which shall contain, at a minimum, the following information:

- (a) name and address of the Employer
- (b) name and reference number of the contract being awarded, and the selection method used;
- (c) names of all Bidders that submitted Bids, and their Bid prices as read out at Bid opening, and as evaluated;
- (d) names of all Bidders whose Bids were rejected either as nonresponsive or as not meeting qualification criteria, or were not evaluated, with the reasons therefor; and
- (e) the name of the successful Bidder, the final total contract price, the contract duration and a summary of its scope.

47.3 The Contract Award Notice shall be published on a National website (GoI website <http://tenders.gov.in> or GoI Central Public Procurement Portal <https://eprocure.gov.in/cppp/>) or on the Employer's website with free access if available, or in the official gazette.

47.4 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

48. Debriefing by the Employer

48.1 On receipt of the Employer's Notification of Intention to Award referred to in ITB 45.1, an unsuccessful Bidder has three (3) Business Days to make a written request to the Employer for a debriefing. The Employer shall provide a debriefing to all unsuccessful Bidders whose request is received within this deadline.

48.2 Where a request for debriefing is received within the deadline, the Employer shall provide a debriefing within five (5) Business Days, unless the Employer decides, for justifiable reasons, to provide the debriefing outside this timeframe. In that case, the standstill period shall automatically be extended until five (5) Business Days after such debriefing is provided. If more than one debriefing is so delayed, the standstill period shall not end earlier than five (5) Business Days after the last debriefing takes place. In any case, irrespective of the circumstances, all debriefings shall be completed within 10 business days. The Employer shall promptly inform, by the quickest means available, all Bidders of the extended standstill period.

48.3 Where a request for debriefing is received by the Employer later than the three (3)-Business Day deadline, the Employer should provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of Public Notice of Award of contract. Requests for

debriefing received outside the three (3)-day deadline shall not lead to extension of the standstill period.

48.4 Debriefings of unsuccessful Bidders may be done in writing or verbally. The debriefing will cover only the bid of particular bidder requesting the debriefing, and not the bids of the competitors. The Bidder shall bear its own costs of attending such a debriefing meeting.

49. Signing of Contract

49.1 Promptly upon Notification of Award, the Employer shall prepare the Contract Agreement, and keep it ready in the office of the Employer for the signature of the Employer and the successful Bidder, within 21 days following the date of Letter of Acceptance. The Contract Agreement shall incorporate all agreements between the Employer and the successful Bidder.

49.2 Within twenty-one (21) days of receipt of the Letter of Acceptance, the successful Bidder shall (a) furnish the performance security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with ITB Clause 50 and revised construction methodology; (b) if the successful bidder is a JV, it shall also furnish the JV agreement duly signed by all the members, if it had submitted only a letter of intent to execute the JV agreement along with the bid; and (c) shall sign, date and return the Agreement to the Employer along with the documents stated at (a) and (b) above.

50. Performance Security

50.1 Within twenty-one (21) days of the receipt of the Letter of Acceptance from the *Employer*, the successful Bidder shall furnish the Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with the General Conditions of Contract, subject to ITB 41.2 (b), using for that purpose the Performance Security and ESHS Performance Security Forms included in Section X, Contract Forms. The performance security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security of a Joint Venture shall be in the name of the Joint Venture specifying the names of all members.

50.2 Failure of the successful Bidder to submit the above-mentioned Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) 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 Bidder offering the next Most Advantageous Bid.

50.3 Upon the successful Bidder's signing the Agreement and furnishing of the Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security pursuant to ITB Clause 50.1, the Employer

shall promptly notify the name of the winning bidder to each unsuccessful bidder and shall discharge the Bid Securities of the bidders pursuant to ITB Clause 19.5 and 19.6.

51 Adjudicator

51.1 The Employer proposes the person **named in the BDS** to be appointed as Adjudicator under the Contract, at the daily fee **specified in the BDS**, plus reimbursable expenses (actual boarding, lodging, travel and other incidental expenses). If the Bidder disagrees with this proposal, the Bidder should so state in his Bid. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the Particular Conditions of Contract (PCC) pursuant to Clause 23.1 of the General Conditions of Contract (GCC), to appoint the Adjudicator.

52 Procurement Related Complaint

52.1 The procedures for making a Procurement-related Complaint are **as specified in the BDS**.

Section II - Bid Data Sheet (BDS)

(Whenever there is a conflict, the provisions herein shall prevail over those in the
Section I-Instructions to bidders)

ITB Reference	A. General
ITB 1.1	<p><i>The number of the Request for Bids is: 01/WBMIFMP/APD-IV/NCB/23-24/AMTA FIELD HOSTEL</i></p> <p><i>The Employer is: The Additional Project Director – IV, DPMU-II, WBMIFMP</i> <i>The reference number of the Request for Bids (RFB) is:</i></p> <p>01/WBMIFMP/APD-IV/NCB/23-24/ AMTA FIELD HOSTEL</p> <p><i>The name of the RFB is: - “Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.”</i></p>
ITB 1.2	The Employer shall use the e-procurement system specified in BDS 7.1.
ITB 1.2 (c)	“Day” means calendar day, unless otherwise specified as “Business Day”. A Business Day is any day that is an official working day of the Borrower. It excludes the Sub -Borrower’s official public holidays.
ITB 2.1	<p>The Borrower is: Government of India. The sub-Borrower is: Irrigation and Waterways Department (IWD), Government of West Bengal – (Executing Agency) and the State Project Management Unit (SPMU), WBMIFMP is the (Implementation Agency/Employer).</p> <p>Loan or Financing Agreement amount: US\$ 145.0 Million (from IBRD) US\$ 145.0 Million (from AIIB)</p> <p>The name of the Project is: West Bengal Major Irrigation and Flood Management Project (WBMIFMP)</p>
ITB 4.1	<p>Bids from Joint ventures are acceptable.</p> <p>(a) Maximum number of members in the Joint Venture (JV) shall be: Two (2)</p> <p>(b) Place where the agreement to form JV to be registered is Kolkata, West Bengal</p> <p>(c) A statement to the effect that all members of the joint venture shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms, shall be included in the authorization nominating a Representative or member in charge, as well as in the Bid and in the Agreement [<i>in case of a successful bid</i>].</p> <p>(d) The joint venture agreement should define precisely the division of assignments to each member of JV. All members of JV should have active</p>

	participation in the execution during the currency of the contract. This should not be varied/ modified subsequently without prior approval of the Employer.
ITB 4.5	A list of debarred firms and individuals is available on the Bank’s external website: http://www.worldbank.org/debarr .
ITB 4.7	Deleted
B. Contents of Bidding Document	
ITB 7.1	<p>Electronic – Procurement System</p> <p>The Employer shall use the following electronic-procurement system to manage this Bidding process: West Bengal Government e-procurement system URL: https://wbtenders.gov.in, and www.wbiwd.gov.in</p> <p>The electronic-procurement system shall be used to manage the following aspects of the Bidding process: issue bidding document, Addendum, Corrigendum – if any, Submission/Opening/ Evaluation of Bids, Award of Contract Notification.</p> <p>Requests for clarification should be received by the Employer no later than: 20days prior to the deadline for submission of bids.</p>
ITB 7.4	<p>A Pre-Bid meeting “shall” take place.</p> <p>If a Pre-Bid meeting will take place, it will be at the following date, time and place: Date: 17/01/2024, at 14:00 Hours IST Place: Office of The Additional Project Director -IV, DPMU-II, WBMIFMP</p> <p>A site visit conducted by the Employer “shall not be” organized.</p> <p>However, the bidder is expected to make themselves thoroughly acquainted with the local conditions prevailing at site of implementation by undertaking field inspection and take into consideration all probable likely factors and difficulties involved during execution of the work as per specification, in all respects (e.g. - transportation of materials, communication facilities, Climate conditions, nature of soil, availability of local labour, market rate prevailing in the locality etc) and no claims whatsoever will be entertained on any such grounds in future. Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP, Onkarmal Jetia Road, P.O.- Botanical Garden, P.S. Shibpur, Howrah - 711103, West Bengal, may be contacted, for any assistance related to “Site Visit” only. The “Site” will mean the entire geographical spread where the proposed work/s is/are expected to be executed.</p>
ITB 8.1	The addendum will appear on the e-procurement system under “ Latest Corrigendum ” category and the interested bidders will be able to download these from the websites mentioned in ITB 7.1 above.

C. Preparation of Bids	
ITB 11.2 (i)	Contractor Registration Certificate: Not Required
ITB 11.2 (j)	The Bidder shall submit the following additional documents in its Bid: (i) Scanned copy of valid PAN card in the name of bidder/organization (ii) Scanned copy of income Tax Return of latest Assessment year or IT Return of immediately preceding Assessment year whichever latest available of Sole Bidder OR all JV partners, as applicable (iii) Scanned copy of GST registration certificate.
ITB 11.3 (b)	The following schedules shall be submitted with the bid: Completed Schedules as annexed with the Appendix to Financial Part of the Bid Document including priced Bill of Quantities for each Lots.
ITB 11.3 (d)	The Bidder shall submit the following additional documents in its Financial Bid: - NA
ITB 12	Note for Bidders: Bidders have to submit the bids on the e-procurement portal along with the relevant required documents. For this purpose, the bidders shall fill up online, the forms that are available for online filling on the e-portal. The rest of the forms shall be download by the bidders and filled up. The filled-up pages shall then be scanned and uploaded on the e-procurement portal along with the scanned copies of the supporting documents.
ITB 12.3	For submission of all original documents, the Employer's address is: Attention: Additional Project Director – IV, DPMU - II – WBMIFMP Street Address: Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City Floor/ Room number: Ninth Floor, City: Kolkata PIN/Postal Code: 700-091 Country: INDIA
ITB 13.1	Alternative Bids <i>shall not be</i> permitted.
ITB 13.2	Alternative times for completion <i>shall not be</i> permitted.
ITB 13.3	NA
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: NA
ITB 14.5	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.
ITB 18.1	The Bid validity period shall be 120 days.
ITB 18.3 (a)	NA
ITB 19.1	The Bidder shall furnish a Bid Security in the amount for INR 3.50 LAKHS

ITB 19.3(a)	The Bid Security shall be valid for forty-five (45) days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 18.2. To be specific the Bid Security shall be valid for a minimum period of one hundred and sixty-five (165) days beyond the last date of submission of the bid.
ITB 19.3(b) & (c)	Not Allowed
ITB 19.3 (d)	Other types of acceptable securities: None
ITB 20.3	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: (a) Legally valid Power of Attorney is required to demonstrate the authority of the signatory to sign the Bid; and (b) In the case of Bids submitted by an existing or intended JV, if permitted as per ITB 4.1, the authorization shall be evidenced by a Power of Attorney signed by legally authorized signatories of all the members.”
D. Online Submission and Opening of Bids	
ITB 21.1	Class of DSC required is: Class 3
ITB 22.1	The deadline for uploading the Bids is: Date: 05/02/2024 Time: 13:00 Hours IST
ITB 24.1	Re-submission of the bid is “ allowed ”, if withdrawn, within Bid submission date.
E. Public Opening of Technical Parts of Bids	
ITB 25.1	The online Bid opening of Technical Parts of Bids shall take place on: Office of Additional Project Director IV, DPMU – II, WBMIFMP Street Address: Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City, Floor/Room number: Ninth Floor, City: Kolkata – 700-091, West Bengal Country: INDIA Date: 05/02/2024 Time: 15:00 Hours IST
F. Evaluation of Bids – General Provisions	
ITB 29.3	The adjustment shall be based on the highest price of the item or component as quoted in other substantially responsive Bids, subject to a maximum of the estimated price of the item. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Employer shall use its best estimate.

G. Evaluation of Bids – Technical Parts	
ITB 33.1	At this time the Employer “ does not intend ” to execute certain specific parts of the Works by subcontractors selected in advance.
ITB 33.2	NA
ITB 33.3	Subcontracting NOT Allowed.
H. Public Opening of Financial Parts	
ITB 34.2 c)	<p>Following the completion of the evaluation of the Technical Parts of the Bids, the Employer will notify all Bidders of the date, time, and location of the public opening of Financial Parts.</p> <p>The online bid opening of Financial Parts of Bids shall take place at: Street Address: Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City, Floor/Room number: Ninth Floor, City: Kolkata - 700-091, West Bengal Country: INDIA Date: <i>XX/XX/2023</i> Time: <i>xx:00 PM (xx:00 Hours)</i></p> <p><i>[Note: The Financial Parts of the bids shall not be opened earlier than seven (7) days from the communication of technical evaluation results to the bidders]</i></p> <p>In addition to the above the Employer shall publish a notice of the public opening of the Financial Parts of the Bid on its website https://wbtenders.gov.in</p>
I. Evaluation of Bids - Financial Parts	
ITB 40.2	Provisions related to Abnormally Low Bids do not apply.
ITB 44.1	<p>The Standstill Period is 10 Business Days after the date the Employer has transmitted to all Bidders that submitted a Bid, the Notification of its Intention to Award the Contract to the successful Bidder.</p> <p>Note: Where a Bidder has previously received notification, in accordance with ITB 34.1, that its Technical Part of Bid failed to meet the requirements of the bidding document, the Bidder will not receive a Notification of Intention to Award the Contract.</p>
F. Award of Contract	
ITB 47.3	The Contract Award Notice shall be published on the Employer’s website https://wbtenders.gov.in . and www.wbiwd.gov.in
ITB 50.1 and 50.2	The successful Bidder shall be required to submit a Performance Security @ eight percent (8%) of the Contract Price and an Environmental, Social, Health and Safety (ESHS) Performance Security @ two percent (2%) of the Contract price plus Additional Security @ ten percent (10%) of the accepted Contract Amount for unbalanced bids in terms of ITB Clause 41.2.

	<p>Throughout this bidding document the term ‘performance security’, unless the context clearly indicates otherwise, means and includes both ‘the performance security and the ESHS performance security’ to be submitted by the successful bidder in the amounts stated here above and also specified in GCC/ PCC 54.</p>
<p>ITB 51</p>	<p>The Adjudicator proposed by the Employer is: Sri Subhamay Sarkar, Ex-Superintending Engineer, Irrigation & Waterways Department, Govt. of West Bengal, Address: "Ariana Heights", Flat Nos. 1A 1405, Survey Park, Kolkata-700075.</p> <p>The daily fee for this proposed Adjudicator shall be: Rs 10,000 per day.</p> <p>The biographical data of the proposed Adjudicator is as follows: Education: B.E. (Civil), M.Tech Experience: Worked in Irrigation & Waterways Department, Govt of W.B. for 33 years in the capacity of AE, EE & SE in survey, design, construction, formulation of different projects in drainage & flood management sectors in various North & South Bengal Districts. Age: 60 years Nationality: Indian Present Position: Former Superintending Engineer, I&WD, GoWB.</p>
<p>ITB 52.1</p>	<p>a) The procedures for making a Procurement related Complaint are detailed in the “Procurement Regulations for IPF Borrowers (Annex III).” If a Bidder wishes to make a Procurement related Complaint, the Bidder should submit its complaint following these procedures, in writing (by the quickest means available, that is either by email or fax), to:</p> <p>For the attention: <i>CE and Project Director, SPMU, WBMIFMP</i> Title/position: <i>CE and Project Director, SPMU, WBMIFMP</i> Employer: <i>CE and Project Director, SPMU, WBMIFMP</i> Email address: <i>ce.pd.wbmifmp@gmail.com</i></p> <p>In summary, a Procurement-related Complaint may challenge any of the following:</p> <ol style="list-style-type: none"> 1. the terms of the Bidding Documents; 2. the Employer’s decision to exclude a Bidder from the procurement process prior to the award of contract; and 3. the Employer’s decision to award the contract.

Section III - Evaluation and Qualification Criteria

This section contains all the criteria that the Employer shall use to evaluate Bids and qualify Bidders through post-qualification. No other factors, methods or criteria shall be used other than specified in this bidding document. The Bidder shall provide all the information requested in the forms included in Section IV, Bidding Forms.

1. Technical Part

1.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include

- (i) 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, material sourcing, and quality control/ assurance in sufficient detail and fully in accordance with the requirements stipulated in Section VII, Works' Requirements.

For this purpose, the Bidder should also submit:

A detailed note outlining its proposed methodology and program of construction including implementation of the Environmental, Social, Health and Safety (ESHS) obligations under this contract, backed with equipment planning and deployment, materials and manpower planning and deployment, duly supported with broad calculations and quality control system/assurance procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

- (ii) an assessment of the details of subcontracting elements of works amounting to more than 10% of the bid price; for each element proposed to be subcontracted furnish details whether the identified Sub-contractor possesses the required qualifications and experiences to execute that element satisfactorily. [Work should not be split into small parts and sub-contracted
- (iii) Bidders shall submit an undertaking from each proposed subcontractor to confirm that they have read, understand and will comply with the ES obligations and code of conduct for Contractor's Personnel.

1.2 Alternative Technical Solutions for specified parts of Works (ITB 13.4) – Not Applicable

1.3 Specialized Subcontractors: Not Applicable.

2.1 Qualification Criteria

Pursuant to ITB 32.1, the Employer shall assess each Bid against the following Qualification Criteria. Requirements not included in the text below shall not be used in the evaluation of the Bidder's qualifications.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
(1)	(2)	(3)	(4)	All members Combined (5)	Each Member (6)	At least one Member (7)	(8)
1. Eligibility							
1.1	Nationality	Nationality in accordance with ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.2	Conflict of Interest	No conflicts of interest in accordance with ITB 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	Bank Eligibility	Not having been declared ineligible by the Bank, as described in ITB 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.4	State-owned enterprise or institution of the Borrower country	Meets conditions of ITB 4.6	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.5	United Nations resolution or Borrower's country law	Not having been excluded as a result of prohibition in the Borrower's country laws or official regulations against commercial relations with the Bidder's country, or by an act of compliance with UN Security Council resolution, both in accordance with ITB 4.8 and Section V.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of contractor default since 1 st April 2016.	Must meet requirement	Must meet requirements	Must meet requirement ²	N/A	Form CON-2

¹ Nonperformance, as decided by the Employer, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

²This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
				All members Combined	Each Member	At least one Member	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2.2	Suspension Based on Execution of Bid/ Proposal Securing Declaration by the Employer or withdrawal of the Bid within Bid validity period	Not under suspension based on execution of a Bid/ Proposal Securing Declaration pursuant to ITB 4.7 or withdrawal of the Bid pursuant ITB 19.9	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
2.3	Pending Litigation	Bidder's financial position and prospective long term profitability sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 2
2.4	Litigation History	No consistent history of court/arbitral award decisions against the Bidder ³ since <i>1st April, 2016</i>	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form CON – 2
3. Financial Situation and Performance							
3.1	Financial Capabilities	(i)The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit ⁴ and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as follows: <i>INR 0.44 Cr.</i>	Must meet requirement	Must meet Requirement	Must meet at least 25% of the requirement as a minimum	Must meet at least 50% of the requirement as a minimum	Form FIN – 3.1, with attachments

³ The Bidder shall provide accurate information on the Letter of Bid about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last seven years. A consistent history of court/arbitral awards against the Bidder or any member of a joint venture may result in disqualifying the Bidder.

⁴ In case the bidder submits a letter of intent from a commercial bank with the bid, firm commitment from the bank to provide line of credit shall be required before contract signing

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
				All members Combined	Each Member	At least one Member	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		(ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments	Must meet requirement	Must meet requirement	N/A	N/A	
		(iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the last seven years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.	Must meet requirement	N/A	Must meet requirement	N/A	
3.2	Average Annual Construction Turnover	Minimum average annual construction turnover calculated as total certified payments received for contracts in progress and/or completed for the best Five financial years within the last Seven financial years (FY 2016-17, 2017-18, 2018-19, 2019- 20, 2020-21, 2021-22 & 2022-23) divided by five years as follows: INR 2.63 Cr.	Must meet requirement	Must meet requirement	Must meet 25%, (twenty five percent) of the requirement	Must meet 50%, (fifty percent) of the requirement	Form FIN – 3.2
4. Experience							
4.1 (a)	General Construction Experience	Experience under construction contracts as mentioned in para 4.2(a) & (b) below in the role of prime contractor, JV member, subcontractor, or management contractor for	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP – 4.1

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
(1)	(2)	(3)	(4)	All members Combined (5)	Each Member (6)	At least one Member (7)	(8)
		at least the last five years, starting 1 st April 2016.					
4.2 (a)	Specific Construction & Contract Management Experience	I. A minimum number of <i>[One]</i> ⁵ similar contracts specified below that have been satisfactorily and substantially ⁶ completed as a prime contractor, joint venture member ⁷ , management contractor or subcontractor ⁸ between <i>Ist</i>	Must meet requirement	Must meet requirement ⁹	Must meet the requirement for one contract of 25% value	Must meet the requirement for one contract of 50% value	Form EXP 4.2(a)

⁵Bidders should have completed at least one contract for similar work of value not less than 80% of the estimated contract value of the work for which bids are invited, during the last seven years. Cost of completed works of previous years shall be given weightage@5% per year based on rupees value to bring them to the price level of the financial year in which bids are received, as follows;

Financial Year	Weightage
Current (2022-23)	1.0
2021-2022	1.00
2020-21	1.05
2019-20	1.10
2018-19	1.15
2017-18	1.20
2016-17	1.25

⁶Substantial completion shall be based on 80% or more works completed under the contract.

⁷ For contracts under which the Bidder participated as a joint venture member or sub-contractor, only the Bidder's share, by value, shall be considered to meet this requirement

⁸ For contracts under which the Bidder participated as a joint venture member or sub-contractor, only the Bidder's share, by value, shall be considered to meet this requirement

⁹ In the case of JV, the value of contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value of a single contract has been met.

Instead, each contract performed by each member shall satisfy the minimum value of a single contract as required for single entity. In determining whether the JV meets the requirement of total number of contracts, only the number of contracts completed by all members each of value equal or more than the minimum value required shall be aggregated.

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
				All members Combined	Each Member	At least one Member	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		<p><i>April 2016</i> and bid submission deadline and fulfilling the criteria stated below:</p> <p><i>One contract of minimum value (INR 1.40 Cr);</i></p> <p>The similarity of the contracts stated at I above, shall be based on the physical size as stated below in the Subclause 4.2 (b).</p>					
4.2 (b)		<p>For the above contract stated at 4.2(a) above and any other contract(s) (substantially completed and under implementation), as prime contractor, joint venture member, or sub-contractor between 1st April 2016 and Application submission deadline, a minimum construction experience required in the following key activities successfully completed¹⁰:</p> <p>(i) Ordinary /Standard concrete (M20 and above) minimum 154.00 cum & Reinforcement Steel works, minimum 24.18 MT in the contract cited at 4.2 (a) and also other similar contract(s) executed during the same period, subject to the following provisions:</p> <p>(a) There may be separate sets of contracts for demonstrating the quantities</p>	<p>Must meet the following requirements for key activities listed below] <i>as given in Column 3</i></p>	<p>Must meet the following requirements for key activities listed below <i>as given in Column 3</i></p>	N/A	<p>Must meet the following requirements for key activities listed below <i>Column 3</i></p>	Form EXP – 4.2 (b)

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
(1)	(2)	(3)	(4)	All members Combined (5)	Each Member (6)	At least one Member (7)	(8)
		<p>of Laying of Ordinary /Standard concrete (M20 and above) and Reinforcement Steel Works, in case required quantities of both the items cannot be fulfilled in any particular contract (s).</p> <p>(b) Each of such contracts has the minimum executed quantities of either Ordinary /Standard concrete (M20 and above) and Reinforcement Steel Works or even both the items, at least 30% as per the threshold specified in the particular contract at 4.2(a) above.</p> <p>Note: I. For the above case, stated above,</p> <p>(i) Standard /Ordinary concrete as specified in IS 456:2000</p> <p>(ii) Nominal mix ordinary concrete executed with mix proportion of cement, sand and coarse aggregate by volume not leaner than 1:1.5:3, should be considered as equivalent to M20, if the grade is not explicitly mentioned in the specific construction experience.</p> <p>II. Under 4.2(a), specified requirements define similarity of contracts, whereas the key activities to be specified under 4.2 (b) define the required capability of the Applicant to execute the Works. There</p>					

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
Nos.	Subject	Requirement	Single Entity	Joint Venture (existing or intended) where permitted			Submission Requirements
(1)	(2)	(3)	(4)	All members Combined (5)	Each Member (6)	At least one Member (7)	(8)
		shall not be any inconsistency or repetition of requirement between 4.2(a) and 4.2(b).					
<p>NOTE: List the monthly or annual production rate for the key construction activity (or activities) in the proposed contract or works, e.g., “one million M³ of rock placed in rock fill dams in one year; X tons of asphalt concrete per month placed in road paving; Y M³ of concrete placed in. etc.” The rates should be a percentage (say about 80 percent) of the estimated production rate of the key activity (or activities) in the contract or Works as needed to meet the expected construction schedule with due allowance for adverse climatic conditions.</p> <p>Borrower should fill this after careful review of the requirements for the work. Where the elements of work are specialized, and it is proposed to accept employment of specialist sub-contractors, this could be so specified for that activity and bidders may be requested to name the sub-contractors and furnish their qualification and experience.</p>							
4.2 (d)	<p>Bid Capacity: Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity for construction work is equal to or more than the total bid value of the work. The available bid capacity will be calculated as under: Assessed Available bid capacity = (A*N*1.5-B) Where, A = Maximum value of civil engineering works executed in any one year during the last seven years (updated to the price level of the financial year at the rate of 5% per year), taking into account the completed as well as works in progress). N = Number of years prescribed for completion of the works for which bids are invited (period upto 6 months to be taken as half-year and more than 6 months as one year). B = Value, at the current price level, of existing commitments of on-going works to be completed during the period of completion of the works for which bids are invited. Note: the statements in Section IV showing the value of existing commitments of on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in charge, not below the rank of an Executive Engineer or equivalent.</p>						

Note: [For Multiple lots (contracts) specify financial and experience criteria for each lot under 3.1, 3.2, 4.2(a) and 4.2(b)]

Note: In case bids are being invited simultaneously for multiple packages (under separate IFB and Bid Documents), the Employer would assess the cumulative qualification of the bidders participating in multiple packages and the minimum experience requirement for multiple contracts will be the sum of the minimum requirements for respective individual contracts, unless specified otherwise. To be more specific, aggregation of AACT would be done and bid capacity will be re-evaluated at the stage of preparation of final Bid Evaluation Report (BER) of any particular contract, to consider the effect of any other contracts invited almost concurrently (one lot or more lots), which the bidder might have bagged, before finalization of the BER of this particular contract. L1 bidders failing to meet the cumulative requirement, will not be awarded more than one contract, and L2 bidders would be considered for awarding the contracts.

It is to be noted that the sequence of final evaluation of AACT, Cash flow and bid capacity in the BER would be coterminous with the opening of financial bid.

3. Key Personnel

The Bidder must demonstrate that it will have suitably qualified (and in adequate numbers) minimum Key Personnel, as described in the Table below, that are required to perform the Contract.

The Bidder shall provide details of the Key Personnel and such other Key Personnel that the Bidder considers appropriate, together with their academic qualifications and work experience. The Bidder shall complete the relevant Forms in Section IV, Bidding Forms. The Contractor shall require the Employer's consent to substitute or replace the Key Personnel (reference the Particular Conditions of Contract 9.1).

Key Personnel

Item Nos.	Position/ specialization	Relevant academic qualifications	Package	Minimum years of relevant work experience
1	<i>Project Engineer</i>	<i>BE Civil</i>	<i>1</i>	<i>10 years</i>
2	<i>Site Engineer</i>	<i>BE Civil</i>	<i>1</i>	<i>05 Years</i>
3	<i>Site Supervisor</i>	<i>Diploma Civil</i>	<i>1</i>	<i>05 Years</i>
4	<i>Surveyor</i>	<i>Diploma / ITI or equivalent</i>	<i>1</i>	<i>05 Years</i>
5	<i>Environment, Health and Safety Engineer</i>	<i>Graduate in Civil Engineering or Graduate in Environmental Engineering or PostGraduate in Environmental Sciences; preferably having additional qualification in Occupational Health and Safety for all the three categories stated above</i>	<i>1</i>	<i>05 Years</i>

The Bidder must not have in his employment:

- [i] the near relations (defined as first blood relations, and their spouses, of the bidder or the bidder's spouse) of persons of the Irrigation & Waterways Departments, Govt. of West Bengal.
- [ii] without Government permission, any person who retired as gazetted officer within the last two years.

The Bidder must have in his employment:

Personnel having valid electrical contractor's license. The license of such personnel should remain valid till completion of contract period. In case the validity is to expire during the tenure of the contract, steps must be taken adequately in advance for renewal of the same.

4. Equipment

The Bidder must demonstrate that it will have access to the key Contractor's minimum equipment listed hereafter:

Nos.	Equipment Type & Characteristics	Package
1	Rollers and other compaction equipment	01
2	Excavators	01
3	Tippers, /Dumpers and Water Browsers (Tankers)	02
4	Vibrating Plate Compactor Earth Rammers	01
5	Vibro Sinker	00
6	Arc Welding Apparatus	01
7	Gas Cutter	01
8	Concrete Mixer Machine with Digital Weigh Batcher (capacity 450 L)	01
9	Equipments of Shotcrete	1 Set
10	Survey Instruments	1 Set
11	DG Set 10 KVA	1 Set

Note : Based on the studies, carried out by the Project Manager the minimum suggested major equipment to attain the completion of works in accordance with the prescribed construction schedule is shown in the above list. The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations (detailed) as stated in Section IV to allow the employee to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV.

5. Multiple Contracts -

This Section describes criteria for qualification for each lot (contract) for multiple lots (contracts). The criteria for qualification is aggregate minimum requirement for respective lots as specified under items 3.1, 3.2, 4.2(a) and 4.2(b). However, with respect to the specific experience under item 4.2 (a) of Section III, the Employer will select as per below:

Minimum requirements for combined contract(s) shall be the aggregate requirements for each contract for which the Bidder has submitted Bids as follows, and N1, N2, N3, etc. shall be different contracts:

- (i) N1 contract, each of minimum value INR 1.40 Crores

2. Financial Part

2.1 Margin of Preference - Not Applicable

2.2 Multiple Contracts –

Pursuant to ITB 35.3 of the Instructions to Bidders, if Works are grouped in multiple contracts, evaluation will be as follows:

Award Criteria for Multiple Contracts [ITB 35.3]:

Packages –

2.3 Sustainable procurement(Section VII - Specifications) – Not Applicable

2.4 Alternative Completion Times (ITB 13.2) - Not Applicable

2.5 Alternative Technical Solutions for specified parts of the Works (ITB 13.4) - Not Applicable

2.6 Other criteria(if permitted under ITB 35.1(f)):Nil

Section IV - Bidding Forms

Letter of Bid – Technical Part

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

The Bidder must prepare this Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and business address.

Note: All italicized text is to help Bidders in preparing this form.

Date of this Bid submission: XX/YY/2024

RFB Nos.: 01/WBMIFMP/APD-IV/NCB/23-24/AMTA FIELD HOSTEL

[Retain only the Lot(s) for which bid(s) is(are) submitted]

To: *[insert complete name of Employer]*

We, the undersigned, hereby submit our Bid, in two parts, namely:

- (a) the Technical Part, and
- (b) the Financial Part

In submitting our Bid, we make the following declarations:

- (a) **No reservations:** We have examined and have no reservations to the bidding document, including Addenda issued in accordance with ITB 8;
- (b) **Eligibility:** We meet the eligibility requirements and have no conflict of interest in accordance with ITB 4;
- (c) **Conformity:** We offer to execute in conformity with the bidding document the following Works: *[insert a brief description of the Works]*
- (d) **Bid Validity Period:** Our Bid shall be valid for a period specified in BDS ITB 18.1 (or as amended if applicable) from the date fixed for the Bid submission deadline specified in BDS 22.1 (or as amended if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (e) **Performance Security:** If our Bid is accepted, we commit to obtain a performance security in accordance with the bidding document;
- (f) **One Bid Per Bidder:** We are not submitting any other Bid(s) as an individual Bidder or as a subcontractor, and we are not participating in any other Bid(s) as a Joint Venture member, and meet the requirements of ITB 4.3, other than alternative Bids submitted in accordance with ITB 13;
- (g) **Suspension and Debarment:** We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled

by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Employer's Country laws or official regulations or pursuant to a decision of the United Nations Security Council;

- (h) **State-owned enterprise or institution:** We are not a state-owned enterprise or institution/ We are a state-owned enterprise or institution but meet the requirements of ITB 4.6¹⁰;
- (i) **Binding Contract:** We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (j) **Not Bound to Accept:** We understand that you are not bound to accept the lowest evaluated cost Bid, the Most Advantageous Bid or any other Bid that you may receive; and
- (k) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption; and
- (l) **Adjudicator:** We accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator.

[or]

We do not accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator, and propose instead that *[insert name]* be appointed¹¹ as Adjudicator, whose daily fees and biographical data are attached.

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

Name of the person duly authorized to sign the Bid on behalf of the Bidder: ***[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid: *[insert complete title of the person signing the Bid]*

Signature of the person named above: *[insert signature of person whose name and capacity are shown above]*

Date signed *[insert date of signing]* **day of** *[insert month]*, *[insert year]*

*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

** : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid

¹⁰ Use one of the two options as appropriate

¹¹ In case appointment of Adjudicator was proposed from the list provided by an Institution in ITB 51, the replacement should also be proposed from the list of same institution.

Technical Proposal

Technical Proposal Forms

- **Key Personnel Schedule**
- **Equipment**
- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **Sub-contracting elements or works which in aggregate adds to more than 10% of Bid price (*for each the qualifications and experiences on the identified subcontractor in the relevant field should be given.*)**

Note: Work should not be split into small parts and sub-contracted; but sub-contracting specialized elements of works is acceptable.

- **Others**
- **Bidder's Qualification**
- **Form of Bid Security - Bank Guarantee**

Appendix to Technical Part: Personnel

Forms for Personnel

Form PER – 1: Key Personnel Schedule

Bidders should provide the names and details of the suitably qualified Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Key Personnel

1.	Title of position:	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
2.	Title of position:	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
3.	Title of position:	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
4.	Title of position:	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>

	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
5.	Title of position:	
	Name of candidate	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
6.	Title of position:	
	Name of candidate	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>

Appendix to Technical Part

Form PER-2:

Resume and Declaration Key Personnel

Name of Bidder

Position [#1]: [title of position from Form PER-1]											
Personnel information	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 2px;">Name:</td> <td style="padding: 2px;">Date of birth:</td> </tr> <tr> <td style="padding: 2px;">Address:</td> <td style="padding: 2px;">E-mail:</td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications:</td> </tr> <tr> <td colspan="2" style="padding: 2px;">Academic qualifications:</td> </tr> <tr> <td colspan="2" style="padding: 2px;">Language proficiency: <i>[language and levels of speaking, reading and writing skills]</i></td> </tr> </table>	Name:	Date of birth:	Address:	E-mail:	Professional qualifications:		Academic qualifications:		Language proficiency: <i>[language and levels of speaking, reading and writing skills]</i>	
Name:	Date of birth:										
Address:	E-mail:										
Professional qualifications:											
Academic qualifications:											
Language proficiency: <i>[language and levels of speaking, reading and writing skills]</i>											
Details	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 2px;">Address of employer:</td> </tr> <tr> <td style="width: 40%; padding: 2px;">Telephone:</td> <td style="padding: 2px;">Contact (manager / personnel officer):</td> </tr> <tr> <td style="padding: 2px;">Fax:</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Job title:</td> <td style="padding: 2px;">Years with present employer:</td> </tr> </table>	Address of employer:		Telephone:	Contact (manager / personnel officer):	Fax:		Job title:	Years with present employer:		
Address of employer:											
Telephone:	Contact (manager / personnel officer):										
Fax:											
Job title:	Years with present employer:										

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

Project	Role	Duration of involvement [From - To]	Relevant experience
<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role]</i>	<i>[describe the experience relevant to this position]</i>

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	Details
Commitment to duration of contract:	<i>[insert period (start and end dates) for which this Key Personnel is available to work on this contract]</i>
Time commitment:	<i>[insert the number of days/week/months/ that this Key Personnel will be engaged]</i>

I understand that any misrepresentation or omission in this Form may:

- (a) be taken into consideration during Bid evaluation;
- (b) my disqualification from participating in the Bid; (c) my dismissal from the contract.

Name of Key Personnel: *[insert name]*

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Appendix to Technical Part: Equipment Forms for 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 <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Specially manufactured <input type="checkbox"/> Leased	

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	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

Appendix to Technical Part

Site Organization

[insert Site Organization information]

Appendix to Technical Part

Method Statement

[insert method Statement – A detailed note should be submitted outlining bidders proposed methodology and program of construction, backed with equipment, materials and manpower planning and deployment, duly supported with broad calculations and quality control system/assurance procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per mile stones]

Appendix to Technical Part

Mobilization Schedule

[insert Mobilization Schedule]

Appendix to Technical Part

Construction Schedule

[insert Construction Schedule]

**Appendix to Technical Part
Others**

Appendix to Technical Part

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

Appendix to Technical Part

Form ELI -1.1: Bidder Information Form

Date: _____
 RFB Nos. and title: _____
 Page _____ of _____ pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Bidder's actual or intended year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.4 <input type="checkbox"/> Authorization to represent the firm or JV named in above, in accordance with ITB 20 <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.6 documents establishing: <ul style="list-style-type: none"> • Legal and financial autonomy • Operation under commercial law • Establishing that the Bidder is not under the supervision of the Employer
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Appendix to Technical Part Form

ELI -1.2: Information Form for JV Bidders

(Where permitted as per BDS ITB 4.1)
(to be completed for each member of Joint Venture)

Date: _____
RFB Nos. and title: _____
Page _____ of _____ pages

JV/Specialist Subcontractor Information
Bidder's Joint Venture or Subcontractor's name:
JV member's or Subcontractor's name:
JV member's or Subcontractor's country of registration:
JV member's or Subcontractor's year of constitution:
JV member's or Subcontractor's legal address in country of constitution:
JV member's or Subcontractor's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <ul style="list-style-type: none"> <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4. <input type="checkbox"/> Authorization to represent the firm or JV named in above, in accordance with ITB 20. <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and is not under the supervision of the Employer, in accordance with ITB 4.6. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Appendix to Technical Part

DETAILS OF PARTICIPATION IN THE JOINT VENTURE

PARTICIPATION DETAILS	FIRM 'A' (Lead Member)	FIRM 'B'	FIRM 'C'
Financial			
Name of the Banker(s)			
Planning			
Construction Equipment			
Key Personnel			
Execution of Work (Give details on proposed contribution of each)			

The Joint Venture should indicate the details of participation (in %) as above.

Appendix to Technical Part Form

**CON – 2: Historical Contract Non-Performance, Pending
Litigation and Litigation History**

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

RFB Nos. and title: _____

Page _____ of _____ pages

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur since 1st January 2016 specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract(s) not performed since 1st January 2016 specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (Rs)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for nonperformance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3.			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, SubFactor 2.3 as indicated below.			

Year of dispute	Amount in dispute (Rs)	Contract Identification	Total Contract Amount (Rs)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	
Litigation History in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4.			
<input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (Rs)
<i>[insert year]</i>	<i>[insert percentage]</i>	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Employer" or "Contractor"]</i> Reason(s) for Litigation and award decision <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

Appendix to Technical Part

Form CCC: Current Contract Commitments / Works in Progress

Bidders and each member of a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

(A) Existing commitments and on-going works:

Description of Work	Place and State	Contract number and date	Name of Address of Employer	Vale of Contract (in INR)	Stipulated period of completion	Value of works ¹² remaining to be completed (in INR)	Anticipated date of completion ¹⁷
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(B) Works for which bids already submitted and likely to be awarded – expected additional commitment.

Description of Work	Place and State	Name, Address of Employer	Estimated Value of Works (in INR)	Stipulated period of Completion (Date)	Date when decision is expected	Remarks, if any
(1)	(2)	(3)	(4)	(5)	(6)	(7)

¹² Attach certificate(s) from the Engineer(s)-in-Charge.

Appendix to Technical Part

Form FIN – 3.1: Financial Situation and Performance

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

RFB Nos. and title: _____

Page _____ of _____ pages

1. Financial data

Type of Financial information in (Rs)	Historic information for previous _____ years, _____ (amount in Rs)						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Statement of Financial Position (Information from Balance Sheet)							
Total Assets (TA)							
Total Liabilities (TL)							
Total Equity/Net Worth (NW)							
Current Assets (CA)							
Current Liabilities (CL)							
Working Capital (WC)							
Information from Income Statement							
Total Revenue (TR)							
Profits Before Taxes (PBT)							
Cash Flow Information							
Cash Flow from Operating Activities							

This information should be extracted from the Annual Financial Statements/ Balance sheets, which should be enclosed. Year 1 will be the latest year for which audited financial statements are available. Year 2 shall be the year immediately preceding year 1 and year 3 shall be the year immediately preceding Year 2.

This should be certified by a Chartered Accountant.

2. Sources of Finance

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

Nos.	Source of finance	Amount (Rs)
1		
2		
3		

3. Financial documents

The Bidder and its parties shall provide copies of financial statements for Seven (7) years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.2. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member, and not an affiliated entity (such as parent company or group member).
- (b) be independently audited or certified in accordance with local legislation.
- (c) be complete, including all notes to the financial statements.
- (d) correspond to accounting periods already completed and audited.

Attached are copies of financial statements¹³ for the _____ years required above; and complying with the requirements.

¹³ If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

Appendix to Technical Part Form
FIN - 3.2: Average Annual Construction Turnover

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

RFB Nos. and title: _____

Page _____ of _____ pages

Annual turnover data (construction only)	
Year	Amount in Rs
<i>[indicate year]</i>	<i>[insert amount]</i>
Year 1	
Year 2	
Year 3	
Year 4	
Year 5	
Year 6	
Year 7	
Average Annual Construction Turnover for best 5 years *	

* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2. Annual construction turnover calculated as total certified payments received for work in progress or completed, for best 5 years, out of last 7 years. This should be certified by a Chartered Accountant.

Appendix to Technical Part
JOINT VENTURE

Names of all partners of a joint venture
1. Member in charge
2. Member
3. Member

Total value of annual construction turnover, in terms of work billed to clients, in Rupees

Annual Turnover Data (Construction only; in Rs *) (Best 5 Years)							
Member	Form 2page Nos.	Year 1	Year 2	Year 3	Year 4	Year 5	Average
1. Member in charge							
2. Member							
3. Member							
TOTALS							

*** To be certified by a chartered accountant**

Name and address of Bankers to the Joint Venture

Appendix to Technical Part

Form FIN - 3.3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Section III, Evaluation and Qualification Criteria.

Source of financing	Amount (Rs)
1.	
2.	
3.	
4.	

FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CASH FLOW

[To be given from a Nationalized or Scheduled Bank in India-No substitute other than this will be acceptable]

Clause 3.1(ii) of Section III – Qualification Criteria

(1) AVAILABILITY OF CASH FLOW (WORKING CAPITAL)

This is to certify that M/s. _____ is a reputed company with a good financial standing.

If the contract for the works, namely _____ [funded by the World Bank] is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. equivalent _____ to meet their capital requirements for executing the above contract.

-- Sd. --

Name of Bank Manager

Senior Bank Manager

Address of the Bank

*** Change the text as follows for Joint venture:**

This is to certify that M/s. who has formed a JV with M/s. and M/s. for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely [funded by the World Bank] is awarded to the above Joint Venture, we shall be able to provide overdraft/credit facilities to the extent of Rs. to meet the working capital requirements for executing the above contract.

[This should be given by the JV members in proportion to their financial participation.]

Form EXP - 4.1: General Construction Experience

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

RFB Nos. and title: _____

Page _____ of _____ pages

[Identify contracts that demonstrate continuous construction work over the past [7] years pursuant to Section III, Qualification Criteria and Requirements, Sub-Factor 4.1. List contracts chronologically, according to their commencement (starting) dates.]

Starting Month/ Year	Ending Month/ Year	Contract Identification	Role of Bidder ["Contractor" or "Subcontractor" or "Contract Manager"]
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	

Appendix to Technical Part

Form EXP - 4.2(a): Specific Construction and Contract Management Experience

[The following table shall be filled in for contracts performed by the Applicant, each member of a Joint Venture, and specialist sub-contractors]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

RFB Nos. and title: _____

Page _____ of _____ pages

Work performed as prime Contractor or Sub-Contractor or Management Contractor (in the same name and style) on construction works of a similar nature and volume, during the current financial year and also over the last seven financial years¹⁵. [Attach certificate mentioning date of Completion (For fully completed work) OR Date of Substantial Completion (for at least 80% completed work), as the case may be including quantity actually executed and amount thereof, in regard to the similar items as specified in 4.2 (b), of Section III, from the Engineer-in-charge.]

Similar Contract Nos.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount ¹⁶				Rs *
If member in a JV or subcontractor, specify participation in total Contract amount			*	
Employer's Name:				
Address:				
Telephone/fax number				
E-mail:				

¹⁵ Immediately preceding the financial year and current financial year in which bids are received.

¹⁶ Contract price for fully completed works and 80% of Contract Price for substantially completed works.

Form EXP - 4.2(a) (cont.) Specific Construction and Contract Management Experience (cont.)

Similar Contract Nos.	Information
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount ¹⁴	
2. Physical size of required works items ¹⁵	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

¹⁴Amount means executed amount, which may not be paid.

¹⁵Physical size means quantity executed.

Appendix to Technical Part

Form EXP - 4.2(b): Construction Experience in Key Activities

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

Subcontractor's Name¹⁶ (as per ITB 33.2 and 33.3): _____

RFB Nos. and title: _____

Page _____ of _____ pages

Subcontractor's Name (as per ITB 33.2 and 33.3): _____

All subcontractors for key activities must complete the information in this form as per ITB 33.2 and 33.3 and Section III, Qualification Criteria and Requirements, Sub-Factor 4.2.

Key Activity: (i) Ordinary /Standard Concrete (M20 & above) as explained in the Note in Col.3 against SI.4.2(b) in the Table of Eligibility & Qualification Criteria, Compliance Requirement and Documentation in Section III.

		Information			
Contract Identification					
Award date					
Completion date					
Role in Contract		Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub- contractor <input type="checkbox"/>
Total Contract Amount				Rs	
Quantity (Volume in each of the contracts including that cited in EXP 4.2(a)), performed under the contract per year or part of the year in the last 7 years, including the current financial year <i>Use this format separately for each of the contracts</i>		Total quantity in the contract (i)		Percentage participation (ii)	
				Actual Quantity Performed (i) x (ii)	
Current Year					
Year 1					
Year 2					
Year 3					
Year 4					

¹⁶ If applicable.

Year 5			
Year 6			
Year 7			
Employer's Name ¹⁷ :			
Address:			
Telephone/fax number			
E-mail:			

¹⁷ Attach certificate from the Engineer-in-charge

Appendix to Technical Part

Form EXP - 4.2(b): Construction Experience in Key Activities

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

Subcontractor's Name¹⁸ (as per ITB 33.2 and 33.3): _____

RFB Nos. and title: _____

Page _____ of _____ pages

Subcontractor's Name (as per ITB 33.2 and 33.3): _____

All subcontractors for key activities must complete the information in this form as per ITB 33.2 and 33.3 and Section III, Qualification Criteria and Requirements, Sub-Factor 4.2.

Key Activity: (i) Reinforcement Steel Works as explained in the Note in Col.3 against Sl.4.2(b) in the Table of Eligibility & Qualification Criteria, Compliance Requirement and Documentation in Section III.

	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub- contractor <input type="checkbox"/>
Total Contract Amount				Rs
Quantity (Volume in each of the contracts including that cited in EXP 4.2(a)), performed under the contract per year or part of the year in the last 7 years, including the current financial year <i>Use this format separately for each of the contracts</i>	Total quantity in the contract (i)	Percentage participation (ii)		Actual Quantity Performed (i) x (ii)
Current Year				
Year 1				
Year 2				
Year 3				
Year 4				

¹⁸ If applicable.

Year 5			
Year 6			
Year 7			
Employer's Name ¹⁹ :			
Address:			
Telephone/fax number			
E-mail:			

¹⁹ Attach certificate from the Engineer-in-charge

Appendix to Technical Part

Form....

(Name of the Project)

(Declaration regarding tax/duty exemption for materials/construction equipment bought for the work)-

(Bidder's Name and Address)

To:

(Name of the Employer &

address) Dear Sir:

Re: [Name of Work]

Certificate for Import/Procurement of Goods/Construction Equipment

Government Order/Circular Number under which tax/duty Exemption is being sought: ...

1. We confirm that we are solely responsible for obtaining tax/duty waivers which we have considered in our bid and in case of failure to receive such waivers for reasons whatsoever, the employer will not compensate us.
2. We are furnishing below the information required by the Employer for issue of the necessary certificates in terms of the Government of India's relevant Notifications.
3. The goods/construction equipment for which certificates are required are as under:

Items <i>(modify the list suitably for each specific work)*</i>	Make/ Brand Name	Capacity <i>[where applicable]</i>	Quantity	Value	State whether it will be procured Locally or imported <i>[if so from which country]</i>	Remarks regarding justification for the quantity and their usage in works.
Construction Equipment						

4. We agree that no modification to the above list is permitted after bids are opened.
5. We agree that the certificate will be issued only to the extent considered reasonable by the Employer for the work, based on the Bill of Quantities and the construction program and methodology as furnished by us along with the bid.

6. We confirm that the above goods and construction equipment will be exclusively used for the construction of the above work and the construction equipment will not be sold or otherwise disposed of in any manner for a period of five years from the date of acquisition.

Date: _____

(Signature) _____

Place: _____

(Printed Name) _____

(Designation) _____

(Common Seal)

[This certificate will be issued within 60 days of signing of contract and no subsequent changes will be permitted.]

*** Modify the above to suit the requirements given in Government of India's Notification as current of date of bidding.**

Appendix to Technical Part: Bid Security

Form of Bid Security - Bank Guarantee

[Guarantor letterhead or SWIFT identifier code]

Bank Guarantee No.....[insert guarantee reference number]

Date.....[insert date of issue of the guarantee]

WHEREAS, _____ [name of Bidder]²⁰ (hereinafter called "the Applicant") has submitted his Bid dated _____ [date] or will submit his Bid for the construction of _____ [name of Contract] (hereinafter called "the Bid") under Request for Bids No.....[insert number] (hereinafter called "the RFB")

KNOW ALL PEOPLE by these presents that We _____ [name of bank] of _____ [name of country] having our registered office at _____ (hereinafter called "the Bank") are bound unto _____ [name of Employer] (hereinafter called "the Employer") in the sum of _____ ²¹for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20____.

THE CONDITIONS of this obligation are:

- (1) If after Bid opening the Applicant (a) withdraws his bid during the period of Bid validity specified in the Letter of Bid, ("the Bid Validity Period"); or (b) does not accept the correction of the Bid Price pursuant to ITB 36;

Or

- (2) If the Applicant having been notified of the acceptance of his bid by the Employer during the period of Bid validity:
- (a) fails or refuses to execute the Contract Agreement in accordance with the Instructions to Bidders, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instruction to Bidders.

we undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the

²⁰Insert name of the Bidder, which in the case of a joint venture shall be (a) the name of the joint venture that submits the bid if the JV has been constituted into a legally enforceable JV, or (b) the names of all future members of the JV as named in the letter of intent to execute the JV Agreement submitted by the bidder along with its bid.

²¹The Applicant should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 19.1 of the Instructions to Bidders.

amount claimed by him is due to him owing to the occurrence of one or any of the four conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____ (_____²⁶days) 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.

DATE _____

SIGNATURE OF THE BANK

WITNESS _____

SEAL _____

_____ [signature,
Name, and address]

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

²⁶45 days after the end of the validity period of the Bid.

Letter of Bid - Financial Part

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

The Bidder must prepare this Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and business address.

Note: All italicized text in black font is to help Bidders in preparing this form.

Date of this Bid submission: *[insert date (as day, month and year) of Bid submission]*

Request for Bid Nos.: 01/WBMIFMP/APD-IV/NCB/23-24/ AMTA FIELD HOSTEL

[Retain only the Lot(s) for which bid(s) is(are) submitted]

Alternative Nos.²²: NOT APPLICABLE

To: *[insert complete name of Employer]*

We, the undersigned, hereby submit the second part of our Bid, the Bid Price and Bill of Quantities. This accompanies the Letter of Technical Part.

In submitting our Bid, we make the following additional declarations:

(a) **Bid Validity Period:** Our Bid shall be valid for a period specified in BDS 18.1 (or as amended if applicable) from the date fixed for the Bid submission deadline specified in BDS 22.1 (or as amended if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(b) **Bid Price:** The total price of our Bid, excluding any discounts offered in item (c) below is:
[Insert one of the options below as appropriate]

[Option 1, in case of one lot:] Total price is: [insert the total price of the Bid in Rs in words and figures];

Or

[Option 2, in case of multiple lots:] (a) Total price of each lot [insert the total price of each lot in Rs in words and figures]; and (b) Total price of all lots (sum of all lots) [insert the total price of all lots in Rs. words and figures];

(c) **Discounts:** The discounts offered and the methodology for their application are:

(i) The discounts offered are: *[Specify in detail each discount offered]*

(ii) The exact method of calculations to determine the net price after application of discounts is shown below: *[Specify in detail the method that shall be used to apply the discounts];*

²² Delete if not applicable

- (d) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the Bidding process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*.

Name of Recipient	Address	Reason	Amount

(If none has been paid or is to be paid, indicate “none.”)

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

Name of the person duly authorized to sign the Bid on behalf of the Bidder: *** [insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid: *[insert complete title of the person signing the Bid]*

Signature of the person named above: *[insert signature of person whose name and capacity are shown above]*

Date signed *[insert date of signing]* **day of** *[insert month]*, *[insert year]*

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder.

** : Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules

Appendix to Financial Part: Schedules Bill of Quantities

Objectives

The objectives of the Bill of Quantities are:

- (a) to provide sufficient information on the quantities of Works to be performed to enable bids to be prepared efficiently and accurately; and*
- (b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic measurement and 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 contents of the Bill of Quantities should be as simple and brief as possible.

Daywork Schedule

A Daywork 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 Daywork Schedule should normally comprise the following:

- (a) A list of the various classes of labor, materials, and Constructional Plant for which basic daywork rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor shall be paid for work executed on a daywork basis.*
- (b) Nominal quantities for each item of daywork, to be priced by each Bidder at daywork rates as Bid. The rate to be entered by the Bidder against each basic daywork 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 priced Bill of Quantities. Additional provisional sums for environmental or social (including Sexual Exploitation, sexual abuse and sexual harassment) requirements may also be added, if required. 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 Particular Conditions of Contract should state the manner in which they shall 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.

These Notes for Preparing a Bill of Quantities are intended only as information for the Employer or the person drafting the bidding document. They should not be included in the final bidding document.

Bill of Quantities

Note:

1. *Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities (refer: ITB Clause 14.2 and GCC Clause 45.4).*
2. *Unit rates and prices shall be quoted by the bidder in Indian Rupees (refer: ITB Clause 14.1 and ITB Clause 15.1).*
3. *Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern (refer: ITB)*

Name of Work: **“Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.”**

Sl. Nos.	Description of Items	Unit	Qty	Rate (Rs.)		Amount ¹¹ (Rs)
				In figures	In words ¹²	
1.00	Surface Dressing of the ground in any kind of soil including removing vegetation inequalities not exceeding 15 cm depth and disposal of the rubbish within a lead upto 75 m as directed.	Sqm	830.00			
2.00	Dismantling all types of masonry excepting cement concrete plain or reinforced, stacking serviceable materials at site and removing rubbish as directed within a lead of 75 m. a) In ground floor including roof.	Cum	101.380			
2.01	Dismantling all types of masonry excepting cement concrete plain or reinforced, stacking serviceable materials at site and removing rubbish as directed within a lead of 75 m. a) In First floor including roof.	Cum	53.780			
2.02	Dismantling all types of masonry excepting cement concrete plain or reinforced,	Cum	17.430			

	stacking serviceable materials at site and removing rubbish as directed within a lead of 75 m. a) In Second floor including roof.					
3.00	Dismantling all types of plain cement concrete works, stacking serviceable materials at site and removing rubbish as directed within a lead of 75 m. In ground floor including roof. (a) upto 150 mm. thick.	Cum	17.850			
4.00	Dismantling R.C. floor, roof, beams etc. Including cutting rods and removing rubbish as directed within a lead of 75 m. including stacking of steel bars.(a) In ground floor including roof.	Cum	24.750			
4.01	Dismantling R.C. floor, roof, beams etc. Including cutting rods and removing rubbish as directed within a lead of 75 m. including stacking of steel bars. In First floor including roof.	Cum	20.840			
4.02	Dismantling R.C. floor, roof, beams etc. Including cutting rods and removing rubbish as directed within a lead of 75 m. including stacking of steel bars. In Second floor including roof.	Cum	5.420			
5.00	Dismantling carefully terraced floor only (including floor finish if any) or lime terracing in ground floor roof and removing rubbish as directed within a lead of 75 m. b) Second floor	Cum	5.700			
6.00	Stripping off worn out plaster and raking out joints of walls, celings etc. upto any height and in any floor including removing rubbish within a lead of 75m as directed.	Sqm	1475.300			
7.00	Removal of rubbish, earth etc. from the working site and disposal of the same beyond the compound, in conformity with the Municipal / Corporation Rules for such disposal, loading into truck and cleaning the site in all respect as per direction of Engineer in charge	Cum	316.930			

8.00	Earth work in excavation of foundation trenches or drains, in all sorts of soil (including mixed soil but excluding laterite or sandstone) including removing, spreading or stacking the spoils within a lead of 75 m. as directed. The item includes necessary trimming the sides of trenches, levelling, dressing and ramming the bottom, bailing out water as required complete.(a) Depth of excavation not exceeding 1,500 mm.	Cum	157.850			
8.01	(b) Depth of excavation for additional depth beyond 1,500 mm. and upto 3,000 mm. but not requiring shoring.	Cum	73.440			
8.02	(c) Depth of excavation for additional depth beyond 3000 mm. upto 4000mm. excluding cost of shoring as necessary.	Cum	1.540			
9.00	Earth work in filling in foundation trenches or plinth with good earth, in layers not exceeding 150 mm. including watering and ramming etc. layer by layer complete. (Payment to be made on the basis of measurement of finished quantity of work) (a) With earth obtained from excavation of foundation.	Cum	43.884			
10.00	Pre-Constructional Anti-termite measures: Anti termite treatment to the top surface of the consolidated earth within plinth walls with chemical emulsion by admixing chloropyrofos emulsifiable concentrates (1% concentration) with water by weight at the rate of 5 Litres per Sqm of the surface before sand bed or sub-grade is laid. Holes upto 50 mm. to 75 mm. deep at 150 mm. centre to centre both ways shall be made with 12 mm, diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion. The work shall be carried out as per specification described in para 6.4 of code IS-	Sqm	221.580			

	6313 (part -II) 1981. (Mode of measurement will be per Sqm of plan area of plinth treated.)					
10.01	d) Treatment to the back filling of R.C.C. foundation with chemical emulsion by admixing chloropyrofos emulsifiable concentrate (1% concentration) with water by weight at the rate of 7.5 ltr. per Sqm of the vertical surface of the substructure of each side of the foundation. The work shall be carried out as per specification as described in para 6.3.1 of code IS- 6313 (part-II) 1981 (Mode of measurement will be per Sqm of vertical area of foundation treated).	Sqm	353.380			
11.00	Supplying and laying Polythene Sheet (150gm / Sqm) over damp proof course or below flooring or roof terracing or in foundation or in foundation trenches.	Sqm	379.030			
12.00	A) Filling in foundation or plinth by silver sand in layers not exceeding 150 mm as directed and consolidating the same by thorough saturation with water, ramming complete including the cost of supply of sand. (payment to be made on measurement of finished quantity)	Cum	186.48			
13.00	Single Brick Flat Soling of picked jhama bricks including ramming and dressing bed to proper level and filling joints with local sand.	Sqm	430.150			
14.00	Ordinary Cement concrete (mix 1:2:4) with graded stone chips (20 mm nominal size) excluding shuttering and reinforcement, if any, in ground floor as per relevant IS codes. (i) Pakur Variety.	Cum	126.850			
15.00	Ordinary Cement concrete (mix 1:1.5:3) with graded stone chips (20 mm nominal size) excluding shuttering and reinforcement if	Cum	127.530			

	any, in ground floor as per relevant IS codes. (i) Pakur Variety.					
15.01	Ordinary Cement concrete (mix 1:1.5:3) with graded stone chips (20 mm nominal size) excluding shuttering and reinforcement if any, in ground floor as per relevant IS codes. (i) Pakur Variety.1st Floor	Cum	58.380			
15.02	Ordinary Cement concrete (mix 1:1.5:3) with graded stone chips (20 mm nominal size) excluding shuttering and reinforcement if any, in ground floor as per relevant IS codes. (i) Pakur Variety 2nd Floor	Cum	6.700			
16.00	Hire and labour charges for shuttering with centering and necessary staging upto 4 m using approved stout props and thick hard wood planks of approved thickness with required bracing for concrete slabs, beams and columns, lintels curved or straight including fitting, fixing and striking out after completion of works (upto roof of ground floor) (c) Steel shuttering or 9 to 12 mm thick approved quality ply board shuttering in any concrete work In Ground Floor.	Sqm	667.670			
16.01	Hire and labour charges for shuttering with centering and necessary staging upto 4 m using approved stout props and thick hard wood planks of approved thickness with required bracing for concrete slabs, beams and columns, lintels curved or straight including fitting, fixing and striking out after completion of works (upto roof of ground floor) (c) Steel shuttering or 9 to 12 mm thick approved quality ply board shuttering in any concrete work For First Floor	Sqm	385.620			

16.02	Hire and labour charges for shuttering with centering and necessary staging upto 4 m using approved stout props and thick hard wood planks of approved thickness with required bracing for concrete slabs, beams and columns, lintels curved or straight including fitting, fixing and striking out after completion of works (upto roof of ground floor)(c) Steel shuttering or 9 to 12 mm thick approved quality ply board shuttering in any concrete work For Second Floor	Sqm	52.160			
17.00	Brick work with 1st class bricks in cement mortar (1:4) (a) In foundation and plinth	Cum	19.500			
17.01	(b) In superstructure, ground floor	Cum	48.790			
17.02	(b) In superstructure, First floor	Cum	45.610			
17.03	(b) In superstructure, Second floor	Cum	20.800			
18.00	125 mm. thick brick work with 1st class bricks in cement mortar (1:4) in ground floor.	Sqm	63.050			
18.01	125 mm. thick brick work with 1st class bricks in cement mortar (1:4) in For First Floor	Sqm	77.540			
19.00	Reinforcement for reinforced concrete work in all sorts of structures including distribution bars, stirrups, binders etc initial straightening and removal of loose rust (if necessary), cutting to requisite length, hooking and bending to correct shape, placing in proper position and binding with 16 gauge black annealed wire at every intersection, complete as per drawing and direction.(a) For works in foundation and upto roof of ground floor/upto 4 m (i) Tor steel/Mild Steel. II. JSW/JSPL/SHYAM/	M.T.	20.020			

	SRMB/BMASL/ELECROSTEEL/SSL a) For works in foundation and upto roof of ground floor/upto 4 m					
19.01	Reinforcement for reinforced concrete work in all sorts of structures including distribution bars, stirrups, binders etc initial straightening and removal of loose rust (if necessary), cutting to requisite length, hooking and bending to correct shape, placing in proper position and binding with 16 gauge black annealed wire at every intersection, complete as per drawing and direction.(a) For works in foundation and upto roof of ground floor/upto 4 m (i) Tor steel/Mild Steel. II. JSW/JSPL/SHYAM/SRMB/BMASL/ELECROSTEEL/SSL For First Floor	M.T.	9.185			
19.02	Extra over the rate of ground floor/initial 4 m for each basement floor and each additional floor below/ above ground floor. For First Floor	Qntl.	91.850			
19.03	Reinforcement for reinforced concrete work in all sorts of structures including distribution bars, stirrups, binders etc initial straightening and removal of loose rust (if necessary), cutting to requisite length, hooking and bending to correct shape, placing in proper position and binding with 16 gauge black annealed wire at every intersection, complete as per drawing and direction.(a) For works in foundation and upto roof of ground floor/upto 4 m (i) Tor steel/Mild Steel. II. JSW/JSPL/SHYAM/SRMB/BMASL/ELECROSTEEL/SSL Second Floor	M.T.	1.021			
19.04	Extra over the rate of ground floor/initial 4 m for each basement floor and each additional floor	Qntl.	10.210			

	below/ above ground floor. For First Floor For 2nd Floor					
20.00	Supplying, fitting and fixing Fan Hook for ceiling with 1 metre long 16mm. dia rod complete including mending damages. Payment for damage and repair to be made separately	Each	16.000			
21.00	25 mm. thick damp proof with cement concrete (1:1.5:3) (with graded stone aggregate 10 mm. normal size) and painting the top surface with a coat of bitumen [VG.40] using 1.7 kg. per Sqm including heating the bitumen and cost and carriage of all materials complete. [Bitument to be supplied by the Agency]	Sqm	25.090			
22.00	Neat cement punning about 1.5mm thick in wall, dado, windowsill, floor etc. NOTE: Cement 0.152 cu.m per100 Sqm	Sqm	206.11			
23.00	Extra rate for using water proofing and plasticising admixture @ 0.2% by weight of cement (or at manufacturer's specified rate) for concrete of various grades	kg.	51.190			
24.00	Labour for Chipping of concrete surface before taking up Plastering work.	Sqm	166.410			
25.00	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar a) 20 mm thick plaster in Ground Floor.	Sqm	499.170			

25.01	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar a) 20 mm thick plaster in First Floor.	Sqm	485.780			
25.02	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar a) 20 mm thick plaster In second Floor	Sqm	41.030			
25.03	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar (b) 15 mm thick plaster In Ground Floor.	Sqm	616.570			
25.04	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar	Sqm	294.620			

	(b) 15 mm thick plaster For First Floor					
25.05	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar (b) 15 mm thick plaster For second Floor	Sqm	130.210			
25.06	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor).[Excluding cost of chipping over concrete surface] i) With 1:4 cement mortar (c) 10 mm thick plaster In Ground Floor.	Sqm	330.760			
25.07	Extra for each additional floor over the rate for ground floor items (c) 10 mm thick plaster In First Floor	Sqm	344.34			
25.08	Plaster (to wall, floor, ceiling etc.) with sand and cement mortar including rounding off or chamfering corners as directed and raking out joints including throating, nosing and drip course, scaffolding/staging where necessary (Ground floor). [Excluding cost of chipping over concrete surface]i) With 1:4 cement mortar(c) 10 mm thick plaster In Second Floor	Sqm	13.480			
26.00	Wood work in door and window frame fitted and fixed in position complete including a protective coat of painting at the contact surface of the frame exluding cost of concrete, Iron Butt Hinges and	Cum	0.540			

	M.S clamps. (The quantum should be corrected upto three decimals). In Ground Floor.(e) Sal : Malayasian					
26.01	Wood work in door and window frame fitted and fixed in position complete including a protective coat of painting at the contact surface of the frame excluding cost of concrete, Iron Butt Hinges and M.S clamps. (The quantum should be corrected upto three decimals). In Ground Floor.(e) Sal : Malayasian For First Floor.	Cum	0.117			
26.02	Wood work in door and window frame fitted and fixed in position complete including a protective coat of painting at the contact surface of the frame excluding cost of concrete, Iron Butt Hinges and M.S clamps. (The quantum should be corrected upto three decimals). In Ground Floor.(e) Sal : Malayasian For Second Floor	Cum	0.039			
27.00	Panel shutters of door and window, as per design (each panel consisting of single plank without joint), including fitting and fixing the same in position but excluding the cost of hinge and other fittings. In ground floor. (In case of non-supply of single plank, penal rate of reduction of 20% will be made) 35mm thick shutters with 19mm thick panel of size 30 to 45 cm. (Single leaf) (a) Ordinary Teak Wood.	Sqm	32.260			
27.01	Panel shutters of door and window, as per design (each panel consisting of single plank without joint), including fitting and fixing the same in position but excluding the cost of hinge and other fittings. In First floor. 35mm thick shutters with 19mm thick panel of size 30 to 45 cm. (Single leaf)	Sqm	8.300			

	(a) Ordinary Teak Wood.					
27.02	Panel shutters of door and window, as per design (each panel consisting of single plank without joint), including fitting and fixing the same in position but excluding the cost of hinge and other fittings. In Second floor. 35mm thick shutters with 19mm thick panel of size 30 to 45 cm. (Single leaf) (a) Ordinary Teak Wood.	Sqm	2.100			
28.00	Supplying, fitting and fixing fibre reinforced polymer (FRP) Composite door frame as per approved section with glass fibre reinforced plastic moulded skins and a special sandwich core, so as to impart monolithic composite structure as per approved technology of Department of Science and Technology (DST) to satisfy IS: 4020 door testing performance criteria. (i) 66mm x 90mm	Metre	25.750			
29.00	Supplying, fitting & fixing fibre reinforced polymer (FRP) Composite door shutters as per approved design with glass fibre reinforced plastic moulded skins and a special sandwich core, so as to impart monolithic composite structure as per approved technology of Department of Science and Technology (DST) to satisfy IS:4020 door testing performance criteria. In ground floor. (i) 32 mm thick.	Sqm	2.000			
29.01	Supplying, fitting & fixing fibre reinforced polymer (FRP) Composite door shutters as per approved design with glass fibre reinforced plastic moulded skins and a special sandwich core, so as to impart monolithic composite structure as per approved technology of Department of Science and Technology (DST) to satisfy IS:4020 door testing	Sqm	7.980			

	performance criteria. In First floor. (i) 32 mm thick.					
30.00	(a) M.S.or W.I. Ornamental grill of approved design jointscontinuously welded with M.S, W.I. Flats and bars of windows,railing etc. fitted and fixed with necessary screws and lugs in ground floor.(i) Grill weighing above 10 Kg./Sqmtr and up to 16 Kg./sq. mtr	Qntl	8.342			
30.01	(a) M.S.or W.I. Ornamental grill of approved design joints continuously welded with M.S, W.I. Flats and bars of windows,railing etc. fitted and fixed with necessary screws and lugs in ground floor. (i) Grill weighing above 10 Kg./Sqmtr and up to 16 Kg./sq. mtr For First Floor.	Qntl	7.929			
30.02	(a) M.S.or W.I. Ornamental grill of approved design joints continuously welded with M.S, W.I. Flats and bars of windows,railing etc. fitted and fixed with necessary screws and lugs in ground floor. (i) Grill weighing above 10 Kg./Sqmtr and up to 16 Kg./sq. mtr 2nd floor	Qntl	0.122			
30.03	(a) M.S. or W.I. Ornamental grill of approved design joints continuously welded with M.S, W.I. Flats and bars of windows, railing etc. fitted and fixed with necessary screws and lugs in ground floor. . (ii) Grill weighing above 16 Kg./Sqmtr For Second Floor	Qntl	5.598			
31.00	ii) Brass hasp bolt of approved quality fitted and fixed complete (oxidised) with 16mm dia rod with centre bolt and round fitting. b) 250 mm long	Each	18.000			

32.00	Supplying, fitting and fixing M.S. clamps for door and window frame made of flat bent bar, end bifurcated with necessary screws etc. by cement concrete(1:2:4) as per direction. (Cost of concrete will be paid separately) (a) 40mm X 6mm, 250mm Length	Each	66.000			
33.00	Anodised aluminium barrel / tower / socket bolt (full covered) of approved manufactured from extruded section conforming to I.S. 204/74 fitted and fixed with cadmium plated screws: (ix) 300mm long x 10mm dia. bolt.	Each	96.000			
34.00	Anodised aluminium butt hinges of approved quality manufactured from extruded section conforming to I.S. specification (I.S. 205/66) and fitted and fixed with cadmium plated screws: i) 50 x 45 x 2.5mm.	Each	32.000			
34.01	vii)100 x 75 x 4.0mm.	Each	32.000			
35.00	Anodised aluminium D-type handle of approved quality manufactured from extruded section conforming to I.S. specification (I.S. 230/72) fitted and fixed complete: (a) With continuous plate base (Hexagonal/ Round rod) (v) 125 mm grip x 12 mm dia rod.	Each	32.000			
36.00	Item Nos. 19i Page Nos.143 PWD(Building) (i) Door stopper (Brass)	Each	32.000			
37.00	Supplying 'Godrej' mortice lock chromium plated with keys 6 levers including fitting & fixing complete.	Each	16.000			
38.00	Supplying, fitting and fixing hinge cleat in position excluding the cost hinge and other fittings a) with 50mm iron Butt-hinge. ii) Sal : Malayasian	Each	32.000			
39.00	ii) Godrej Hydraulic door closer fitted and fixed complete (b) Medium type	Each	16.000			

40.00	<p>Supplying and laying true to line and level Double Charge Vitrified Tiles of approved brand conforming to IS 15622: 2006 (Group B I a) and tested as per IS 13630:2006 (relevant parts) [Non-modular sizes for tiles with Water Absorption (av.) $\leq 0.08\%$] in floor, skirting etc. using polymerised adhesive of 6mm thick layer applied directly over finished artificial stone loor/Mosaic etc without any backing course and jointsgrouted with admixture of white epoxy grout materials of approved brand including spacer - 2mm as directed and removal of wax coating of top surface of tiles with warm water and polishing the tiles using soft and dry cloth upto mirror finish complete including the cost of materials,labour and all other incidental charges complete as per direction of Engineerin-Charge. (Note: This work should not be executed without specific permission of Superintending Engineer)</p> <p>a) In Ground Floor:(size not less than 600mmX 600 mm X 9.5 mm thick)</p>	Sqm	376.040			
40.01	<p>a) In First Floor: (size not less than 600mmX 600 mm X 9.5 mm thick)</p>	Sqm	155.420			
41.00	<p>Supplying, fitting and fixing Marble Slab/tile of 15 to 18 mm thickness in floor, lobby, stair, landing & treads etc. over 20 mm (av.) thick base of Cement mortar (1:2) laid with white cement slurry @ 4.4 kg/Sqm before placing marble & jointed with white cement slurry @ 2.0 kg/Sqm with necessary pigments including grinding and Granite polishing as per direction of Engineering -in - Charge in Ground Floor. {White cement and Pigment to be supplied by the Agency}</p> <p>(a) With Makrana plain pink / Adranga Pink / Garbh Gulabi /</p>	Sqm	74.710			

	Udaypur pink / Udaypur Green / Black Bhaslana (i) Area of each Slab/tile upto 0.3 Sqm In ground Floor					
41.01	Supplying, fitting and fixing Marble Slab/tile of 15 to 18 mm thickness in floor, lobby, stair, landing & treads etc. over 20 mm (av.) thck base of Cement mortar (1:2) laid with white cement slurry @ 4.4 kg/Sqm before placing marble & jointed with white cement slurry @ 2.0 kg/Sqm with necessary pigments including grinding and Granite polishing as per direction of Engineering -in - Charge in Ground Floor. {White cement and Pigment to be supplied by the Agency] (a) With Makrana plain pink / Adranga Pink / Garbh Gulabi / Udaypur pink / Udaypur Green / Black Bhaslana (i) Area of each Slab/tile upto 0.3 Sqm First Floor	Sqm	59.870			
42.00	Extra cost of labour for prefinished and premoulded Nosing to treads of steps, railing, window sill etc. of Marble Stone.	Meter	48.000			
43.00	Extra cost of labour for Marble Stone Floor in treads of Steps.	Sqm	48.000			
44.00	Grinding to marble / mosaic floor including remaining stone,if necessary, after cutting with manual labour / machine,where necessary	Sqm	134.590			
45.00	Supplying, fitting and fixing Black Stone slab used in Kitchen slab, alcove, wardrobe etc. laid and jointed with necessary adhesive Cement mortar (1:2) including grinding or polishing as per direction of Engineer-in -Charge. In Ground Floor. b) slab thick ness above 25mm and up to 37.5 mm	Sqm	13.880			
46.00	Supplying, fitting & fixing 1st quality Ceramic tiles in walls and floors to match with the existing work & 4 nos. of key stones (10mm) fixed with araldite at the back of each tile & finishing	Sqm	48.250			

	<p>the joints with white cement mixed with colouring oxide if required to match the colour of tiles including roughening of concrete surface, if necessary or by synthetic adhesive & grout materials etc.</p> <p>A) Floor With Sand Cement Mortar (1:4) 20 mm thick & 2 mm thick cement slurry at back side of tiles using cement @ 2.91 Kg/Sqm & joint filling using white cement slurry @ 0.20kg/Sqm (a) Area of each tile upto 0.09 Sqm (i) Coloured decorative In Ground Floor.</p>					
46.01	<p>A) Floor With Sand Cement Mortar (1:4) 20 mm thick & 2 mm thick cement slurry at back side of tiles using cement @ 2.91Kg/Sqm & joint filling using white cement slurry @0.20kg/Sqm(a) Area of each tile upto 0.09 Sqm(i) Coloured decorative In First Floor.</p>	Sqm	17.000			
46.02	<p>(B) Wall With Sand Cement Mortar (1:3) 15 mm thick & 2 mm thick cement slurry at back side of tiles using cement @ 2.91Kg/Sqm & joint filling using white cement slurry @ 0.20kg/Sqm (a) Area of each tile upto 0.09 Sqm (i) Coloured decorative In Ground Floor</p>	Sqm	189.710			
46.03	<p>(B) Wall With Sand Cement Mortar (1:3) 15 mm thick & 2 mm thick cement slurry at back side of tiles using cement @ 2.91Kg/Sqm & joint filling using white cement slurry @ 0.20kg/Sqm (a) Area of each tile upto 0.09 Sqm (i) Coloured decorative In First Floor.</p>	Sqm	72.660			

47.00	<p>Providing and fixing of 15mm thick Mineral Fibre Acoustic Ceiling Tiles of approved pattern and size 595mm X 595mm should be placed in the Grid module to form a False Ceiling with NRC value ≥ 0.6 Material class: A2-s1, d0 as per EN 13501-1, Fire: REI – REI120 as per EN 13501- 2, Surface Burning Characteristics: Class 1 or A as per ASTM E 84) with powder coated exposed G.I. grid suspension system (interlocking T-Grid, having load carrying capacity with mid span deflection not exceeding 1/360 span with hanger spacing of 1200mm c/c) consisting of Main Runner 3600 mm long, Cross Tee 1200 mm / 600 mm long and Wall Angle. The Wall Angle shall be fixed on PVC Dash Fasteners on the perimeter of the wall by steel screws with distance 300mm c/c. The Main Runners to be placed @ 1200 mm. The Cross Tee 1200mm will be inserted in the pre-cut slots of Main Runner at a regular interval of 600 mm to form a modular grid of 1200mm X 600mm. Additional Cross Tees of 600 mm shall be placed perpendicular to the Cross Tee 1200 mm long to finally form a grid of 600 mm X 600 mm. Grid of module size 600 mm X 600 mm shall be supported by 6 mm dia G.I. wire from purlins/ soffit. All complete as per the drawing & directions of Engineer-in-charge. In 1st floor</p> <p>a) With 15 mm thick mineral fibre false ceiling tile (NRC ≥ 0.6 as per ASTM C 423 & Sound attenuation - 34dB as per EN ISO 10848)</p>	Sqm	322.860			
48.00	<p>French polishing to wood work including preparing surface (ordinary gloss)</p> <p>a) On new wood work</p>	Sqm	43.606			

49.00	Wood work in upper rails of railing, hand rail of staircase, balcony etc. including necessary bend, moulding fitted and fixed complete (for purpose of payment section will be measured in the square). (c) Sishu, Gamar, Champ, Badam, Bhola, Morga, Hallak. In Ground Floor	Cum	0.033			
49.01	Wood work in upper rails of railing, hand rail of staircase, balcony etc. including necessary bend, moulding fitted and fixed complete (for purpose of payment section will be measured in the square). (c) Sishu, Gamar, Champ, Badam, Bhola, Morga, Hallak. In First Floor	Cum	0.033			
50.00	Collapsible gate with 40mm x 40mm x 6mm Tee as top and bottom guide rail, 20mm x 10mm x 2mm vertical channels 100mm apart in fully stretched position 20mm x 5mm M.S. flats as collapsible bracings properly rivetted and washered including 38mm steel rollers including locking arrangements, fitted and fixed in position with lugs set in cement concrete and including cutting necessary holes, chasing etc. in walls, floors etc. and making good damages complete. In ground floor.	Sqm	4.050			
51.00	Rendering the Surface of walls and ceiling with White Cement base WATER PROOF wall putty of approved make & brand.(1.5 mm thick)	Sqm	1603.430			
52.00	Applying Interior grade Acrylic Primer of approved quality and brand on plastered or concrete surface old or new surface to receive Distemper/ Acrylic emulsion paint including scraping and preparing the surface throughly, complete as per	Sqm	1819.120			

	manufacturer's specification and as per direction of the EIC. (b) Two Coat ii) Solvent based interior grade Acrylic Primer					
53.00	Applying Acrylic Emulsion Paint of approved make and brand on walls and ceiling including sand papering in intermediate coats including putty: (Two coats) Luxury Quality.	Sqm	1819.120			
54.00	Applying Exterior grade Acrylic primer of approved quality and brand on plastered or concrete surface old or new surface to receive decorative textured (matt finish) or smooth finish acrylic exterior emulsion paint including scraping and preparing the surface thoroughly, complete as per manufacturer's specification and as per direction of the EIC. In Ground Floor: (b) Two Coats	Sqm	722.690			
54.01	Applying Exterior grade Acrylic primer of approved quality and brand on plastered or concrete surface old or new surface to receive decorative textured (matt finish) or smooth finish acrylic exterior emulsion paint including scraping and preparing the surface thoroughly, complete as per manufacturer's specification and as per direction of the EIC. For First Floor (b) Two Coats	Sqm	363.620			
54.02	Applying Exterior grade Acrylic primer of approved quality and brand on plastered or concrete surface old or new surface to receive decorative textured (matt finish) or smooth finish acrylic exterior emulsion paint including scraping and preparing the surface thoroughly, complete as per manufacturer's specification and as per direction of the EIC. For Second Floor (b) Two Coats	Sqm	130.210			

55.00	Protective and Decorative Acrylic exterior emulsion paint of approved quality, as per manufacturer's specification and as per direction of Engineer-in-Charge to be applied over acrylic primer as required. The rate includes cost of material, labour, scaffolding and all incidental charges but excluding the cost of primer. In Ground floor (Two Coat) b) Premium 100% Acrylic Emulsion	Sqm	722.690			
55.01	Protective and Decorative Acrylic exterior emulsion paint of approved quality, as per manufacturer's specification and as per direction of Engineer-in-Charge to be applied over acrylic primer as required. The rate includes cost of material, labour, scaffolding and all incidental charges but excluding the cost of primer. In Ground floor (Two Coat) b) Premium 100% Acrylic Emulsion For First Floor	Sqm	363.620			
55.02	Extra for each additional floor over the rate for ground floor on items 55.01	Sqm	363.620			
55.03	Protective and Decorative Acrylic exterior emulsion paint of approved quality, as per manufacturer's specification and as per direction of Engineer-in-Charge to be applied over acrylic primer as required. The rate includes cost of material, labour, scaffolding and all incidental charges but excluding the cost of primer. In Ground floor (Two Coat) b) Premium 100% Acrylic Emulsion For Second Floor.	Sqm	130.210			

55.04	Extra for each additional floor over the rate for ground floor on items 55.03	Sqm	130.210			
56.00	Bordering (upto 75 mm. width) in distemper including cost of materials by two coats acrylic distemper and one coat solvent based acrylic primer.	Metre	163.780			
57.00	(a) Priming one coat on steel or other metal surface with synthetic oil bound primer of approved quality including smoothening surfaces by sand papering etc.	Sqm	232.430			
57.01	b) Priming one coat on timber or plastered surface with synthetic oil bound primer of approved quality including smoothening surfaces by sand papering etc.	Sqm	81.320			
58.00	A) Painting with best quality synthetic enamel paint of approved make and brand including smoothening surface by sand papering etc. including using of approved putty etc. on the surface, if necessary: With super gloss (hi-gloss) iv) Two coats (with any shade except white) a) On timber or plastered surface:	Sqm	81.320			
58.01	b) On steel or other metal surface: With super gloss (hi-gloss) - (iv) Two coats (with any shade except white)	Sqm	232.430			
59.00	Providing and fixing of factory made uPVC Sliding window (White Colour) complete, (U value=1.9-1.3 W/m ² K, flame resistant, self extinguishing, lead free) comprising uPVC multi-chambered frame having in-built uPVC roller track on top and uPVC sash with wall thickness of 2.3mm (±0.2 mm) duly reinforced with G.I. section 1.6 mm (±0.2 mm), wherever required. All corners of frame and sash will be fusion welded. After placing 5 mm Clear	Sqm	14.280			

	<p>Annealed glass in the sash, uPVC glazing bead, interlock, EPDM gasket, brush shall be provided including touch lock and rollers & proper drainage system shall be provided. Window frame will be fixed to the wall with 100mm long and 8mm dia. Fasteners and after fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size, of approved quality complete in all respect as per as per approved drawing & direction of Engineer-In-Charge. (Note: Profile manufacturer & Window Manufacturer must be one & same, Only manufacturer Warranty is acceptable)</p> <p>a) 2 Track 2 Sash window frame of size 67 x 54 mm & Sash of size 64 x 47 mm both having wall thickness of 2.3 ± 0.2 mm</p>					
59.01	<p>b) 3 Track 3 Sash window frame of size 122 x 54 mm & Sash of size 64 x 47 mm both having wall thickness of 2.3 ± 0.2 mm</p>	Sqm	72.180			
60.00	<p>Supplying, fitting & fixing UPVC pipes A- Type and fittings conforming to IS:13592-1992 with all necessary clamps nails, including making holes in walls, floor etc. cutting trenches in any soil through masonry concrete structures etc if necessary and mending good damages including joining with jointing materials (Spun Yarn, Valamoid/Bitumen/M-Seal etc) complete.</p> <p>A) UPVC Pipes: ii) 110 mm. Dia.</p>	Metre	128.000			
60.01	<p>B) UPVC Fittings: a) Plain Tee (ii) 110 mm. Dia.</p>	Nos.	78.000			
60.02	<p>c) Bend 87.5 degree ii) 110 mm. Dia</p>	Nos.	78.000			

60.03	d) Shoe (ii) 110 mm. Dia.	Nos.	156.000			
61.00	Hire and labour charges for shoring work (including necessary close plank walling, framing, ucalyptus/Jhou bulla piling, strutting etc) complete as per direction of the Engineer-in-charge for foundation excavation (vertical surface are in contact with supported earth is to be measured.) (This item should be executed on specific direction of the Enginner in charge). b) For additional depth beyond 1.5 m. and upto 3.00m	Sqm	340.290			
61.01	(c) For additional depth beyond 3.00 m.	Sqm	17.580			
62.00	Providing and fixing Heat Resistant Terrace Tiles (300mm X 300mm X 20mm) with SRI (solar refractive index) > 78, solar reflection > 0.70 and initial emittance > 0.75 on waterproof and sloped surface of terrace, laid on 20 mm thick cement sand mortar in the ratio of 1:4 (1 cement : 4 coarse sand) and grouting the joint with mix of white cement & marble powder in ratio of 1:1, including rubbing and polishing of the surface upto 3 cuts complete, including providing skirting upto 150 mm height along the parapet walls in the same manner.	Sqm	161.430			
63.00	Supplying & laying 3mm thick pre-fabricated plastomericwater proofing membrane conforming to EN 12311-1 &ASTMD 5147, manufactured with atactic poly propylene(APP) modified premium grade asphalt , specially reinforcedwith non-woven polyester core with polyester reinforcement@160 gms per sqm & both faces covered with thermo-fusiblepolyethylene film /Mineral on top face over a coat of primer@ 0.40 lit/sqm of manufacturer's specification onsmooth, clean dry	Sqm	470.858			

	<p>surface prepared wherever required. Lap joint shall be provided of 75 mm in longitudinal & 100 mm in transverse direction and fused using LPG/ Propane torch employing extra care ensuring full bondage, complete removal of entrapped air and sealing edges into grooves in appropriate manner as per direction of Engineer-in-charge all complete including materials, labour and applicable taxes. (Payment shall be made on the basis of finished surface area.). Membrane Property: Softening Point > 150 deg C, Cold Flexibility < -6 deg C, Tensile Strength, N/cm : 600 (longitudinal), 450 (transverse), Tearing Strength, N: 300 (longitudinal), 200 (transverse)</p>					
64.00	<p>Dismantling artificial stone flooring upto 50 mm. thick by carefully chiselling without damaging the base and removing rubbish as directed within a lead of 75 m.a)</p> <p>In ground floor including roof.</p>	Sqm	237.210			
65.00	<p>Supplying & laying as per IRC-SP:063-2004 paver unit of any shade of approved quality as per relevant IS code, laid in pattern as directed in pavement, footpath, driveway (paver block only), etc including necessary underlay complete in all respect with all labour and material. [Border concrete if necessary to be paid separately]. Note: Sub-grade CBR should not be less than 5.</p> <p>c) 60 mm thick interlocking designer concrete paver block M 35 grade for light-traffic zone, commercial & office complex, tourist resort as per IS: 15658-2006 (over 20-40 mm medium sand bed on 250mm thk WBM/ WMM base course & 250</p>	Sqm	229.500			

	mm thk bound gnaular /granular sub-base course including cost of sand for sand bed but excluding cost of base ,sub-base course & subgrade preparation.) (ii) Coloured Decorative					
66.00	Painting with ready mixed Black Japan of approved make and brand (b) Two coats	Sqm	358.985			
67.00	Supplying P.V.C. water storage tank of approved quality with closed top with lid (Black) - Multilayer (c) 1500 litre capacity	Nos.	1.000			
68.00	Labour for hoisting plastic water storage tank.(i) Upto 1500 litre capacity.a) Upto 1st story from G.L.	Nos.	1.000			
68.01	b) Extra for each additional story	Nos.	1.000			
69.00	Supplying, fitting and fixing E.W.C. in white glazed vitreous chinaware of approved make complete in position with necessary bolts, nuts etc. (a) With 'P' trap (with vent)	Nos.	10.000			
70.00	Supplying, fitting and fixing 10 litre P.V.C. low-down cistern conforming to I.S. specification with P.V.C. fittings complete, C.I. brackets including two coats of painting of bracket etc.	Nos.	10.000			
71.00	Supplying, fitting and fixing Flat back urinal (half stall urinal) in white vitreous chinaware of approved make in position with brass screws on 75 mm X 75 mm X 75 mm wooden blocks complete.. (i) 635 mm X 395 mm X 420 mm	Nos.	11.000			
72.00	Supplying, fitting and fixing P.V.C pipes of approved make of (medium duty) conforming to ASTM D - 1785 and threaded to match with GI pipes as per IS : 1239 (part-I). with all necessary accessories, specials viz. socket, bend, tee, union, cross, elbo, nipple, longscrew, reducing socket,	Metre	8.000			

	reducing tee, short piece etc. fitted with holder bats clamps, including cutting pipes, making threads, fitting, fixing etc. complete in all respect including cost of all necessary fittings as required, jointing materials and two coats of painting with approved paint in any position above ground. (Payment will be made on the centre line measurements of total pipe line including all specials. No separate payment will be made for accessories, specials. Payment for painting will be made separately) a) For Exposed Work P.V.C. pipe 40 mm Dia.					
72.01	25 mm dia.	Metre	63.000			
72.02	20 mm dia.	Metre	42.000			
72.03	15 mm dia.	Metre	51.000			
73.00	Supplying, fitting and fixing white vitreous china best quality approved make wash basin with C.I. brackets on 75 mm X 75 mm wooden blocks, C.P. waste fittings of 32 mm dia., one approved quality brass C.P. pillar cock of 15 mm dia., C.P. chain with rubber plug of 30 mm dia., approved quality P.V.C. waste pipe with C.P. nut 32 mm dia., 900 mm long approved quality P.V.C. connection pipe with heavy brass C.P. nut including mending good all damages and painting the brackets with two coats of approved paint.iii) 630 mm X 450 mm size	Nos.	9.000			
74.00	Supplying, fitting and fixing pedestal of approved make for wash basin(white)	Nos.	9.000			
75.00	Supplying, fitting and fixing stainless steel sink complete with waste fittings and two coats of painting of C.I. brackets i) 630 mm X 550 mm X 180 mm	Nos.	3.000			

76.00	Supplying, fitting and fixing approved brand P.V.C. CONNECTOR white flexible, with both ends coupling with heavy brass C.P. nut, 15 mm dia (iii) 600 mm long	Nos.	8.000			
77.00	Supplying, fitting and fixing approved brand P.V.C. waste pipe, with coupling at one end fitted with C.P. over brass nut, 32 mm dia. (iii) 900 mm long	Nos.	20.000			
78.00	Supplying, fitting and fixing bib cock or stop cock. (a) (ii) Chromium plated Bib Cock long body with wall flange with aerator (Equivalent to Code Nos. 512 & Model - Tropical/Sumpting Special of ESSCO or similar brand)	Nos.	38.000			
78.01	(b) (i) Chromium plated Stop Cock (Equivalent to Code Nos. 513(A) & 513(B) & Model - Tropical / Sumthing Special of ESSCO or similar	Nos.	39.000			
79.00	Supplying, fitting and fixing gunmetal wheel valve of approved brand and make tested to 21 kg per sq. cm. (for water lines only) v) 40 mm dia.	Nos.	2.000			
79.01	(vii) 25 mm dia.	Nos.	9.000			
80.00	Supplying, fitting and fixing shower of approved brand and make. (b)Chromium plated Rose shower with revolving joint and 150 mm long shower arm (Equivalent to Code Nos. 5489 & Model - Florentine of Jaquar or similar brand).	Nos.	9.000			
80.01	(f) Hand Shower (Health Faucet) with 1mtr Flexible Tube with Wall Hook (Equivalent to Code Nos.573 & Model -ALLIED of Jaquar or similar).	Nos.	9.000			

81.00	Supplying, fitting and fixing urinal flush pipe fittings of approved brand. (b) C.P. urinal flush pipe fittings range of two	Nos.	11.000			
82.00	Supplying, fitting and fixing best quality Indian make mirror 5.5 mm thick with silvering as per I.S.I. specifications supported on fibre glass frame of any colour, frame size 550 mm X 400 mm	Nos.	9.000			
83.00	Supplying, fitting and fixing glass shelf with aluminium guard rails. (a) Ordinary type with 5.5 mm sheet glass (ii) 600 mm X 125 mm	Nos.	9.000			
84.00	Supplying, fitting and fixing liquid soap container. (a) Cromium plated.	Nos.	9.000			
85.00	Supplying, fitting and fixing soap holder. (a) PTMT (Prayag or equivalent)	Nos.	9.000			
86.00	Supplying, fitting and fixing towel rail with two brackets. (a) C.P. over brass (ii) 25 mm dia. and 600 mm long	Nos.	9.000			
87.00	Constructing Inspection pit of inside measurement 600mm X 600mm X upto 600mm (depth) with 250 mm thick 1st. class brick work in cement mortar (1:4) on all sides, bottom of the pit consisting of 100 mm thick cement concrete (1:3:6) with stone chips over a layer of jhama brick flat soling, 15 mm thick (1:4) cement plaster to inside walls and out-side walls upto G.L. and 20 mm.thick (1:4) plaster to bottom of the pit, providing necessary invert with cement concrete (1:3:6) with stone chips as per direction, neat cement finishing to entire internal surfaces, top of the pit covered with 100 mm thick R.C.C. slab (1:1.5:3) with stone chips and necessary reinforcements upto 1% and shuttering including 6 mm thick cement plaster (1:4) in all external surfaces of the slab and	Nos.	5.000			

	one 560 mm dia. R.C.C. manhole cover of approved make supplied, fitted and fixed in the slab with necessary fittings, necessary earthwork in excavation in all sorts of soil, filling sides of the pit with earth and removing spoils after work complete in all respect with all costs of labour and materials.i) With Pakur variety.					
88.00	Construction of circular soak well 2.5 metre deep in all types of sandy soils with dry brick work upto 1.6 metre from the bottom having 150 mm intermediate cement brick work (1:4) band all round and cement brick work (1:4) upto 0.90 metre from top with 20mm thick cement plastering (1:4) to inside face upto the depth of cement brick work, 15mm thick cement plaster (1:4) on outer face from top of the well upto G.L. and 6 mm thick cement plaster (1:4) on top of the R.C.C. cover slab including filling bottom 1.00 metre of inside of the well with brick metal (50 mm to 63 mm size) including R.C.C. cover slab of 100 mm thick with cement conc (1:1.5:3) with stone chips with necessary reinforcement and shuttering including one 560 mm dia. R.C.C. manhole cover (heavy type)of approved make supplied, fitted and fixed in the cover slab with necessary fittings, making necessary arrangements for pipe connections, excavation of well including shoring, dewatering and removing the excess earth from the premises as per direction complete in all respect with all costs of labour and materials. With 250 mm thick dry brick work and 250 mm thick cement brick work (1:6) and 1.00m inside dia	Nos.	1.000			
89.00	Supplying, fitting & fixing Cast iron soil pipe only conforming to I.S. 3989 / 1970 and I.S. 1729/1964 with bobbins, nails etc. including making holes in the wall, floor etc.	Metre	65.000			

	and cutting trenches etc. in any floor through masonry concrete, if necessary, and mending good damages with necessary jointing materials and painting two coats to the exposed surface with approved paint complete. (Measurement will be made along the center line of the total pipe line in fitted condition including specials, payment for specials & Painting will be paid separately). (a) With valamoid joints including sealing with sand cement mortar (4:1) upto quarter depth.					
90.00	Cast Iron fittings for soil pipe line conforming to I.S. 1729/1970 including jointing and fitting and fixing in position and painting two coats to the exposed surface complete including cost of all materials & labour. (Payment of painting will be paid separately) (b) (I) Double junction of 150 mm. dia X 100 mm. dia X 100 mm. with door	Nos	3.000			
90.01	(a) Single junction of 150 mm. X 100 mm. dia with door (ii) With lead caulked joints	Nos	3.000			
91.00	Supplying, fitting & fixing approved patent vent cowl I.C.I. conforming to I.S.S and painting two coats to the exposed surface with approved paint complete. (Payment of Painting will be paid separately). (i) 100 mm dia.	Nos	1.000			
92.00	Supplying, fitting and fixing cast iron 'P' or 'S' trap conforming to I.S. 3989/ 1970 and 1729 / 1964 including lead caulked joints and painting two coats to the exposed surface. (Painting to be paid separately). (A) 'p' Trap ii) 75 mm	Nos	9.000			
93.00	Open jointed stone ware pipe 100 mm dia. supplied, laid and fitted in position duly encircled all round by 150 mm thick layer jhama metal	Metre	9.00			

	(38 mm to 50 mm size) including excavation of earth in any soil upto required depth including refilling trench, watering and ramming complete. (Cost of Jhama Metal to be paid seperately).					
94.00	Supplying, fitting & fixing Aluminium domical grating. (iii) 100 mm	Nos	9.000			
95.00	Construction of septic tank of different capacities as per approved drawing with 1st class brick work in cement mortar (1:4) including two 560 mm dia. R.C.C. manhole cover(heavy type)of approved make supplied, fitted and fixed in the 100mm thick R.C.C (1:1.5:3) top slab with necessary fittings, 20mm thick cement plaster (4 : 1) with neat cement finish to the internal surfaces and 15 mm thick cement plaster (4 : 1) to outside wall upto 200 mm below G.L floor finished with 25 mm thick grey artificial stone over 100 mm thick R.C.C(1:1.5:3) bottom slab including supplying, fitting and fixing all necessary specials, fittings, S.W. tees, C.I. foot rest etc. including excavation earth in all sorts of soil, shoring, bailing out and pumping out water as necessary, ramming, dressing the bed and feilling the sides of the tanks with earth, removing spoils, filling up the chamber with clear water, removing foreign materials from the chamber and including constructing attached inspection pit as per approved drawing and connecting all necessary pipes, joints etc. with internal plaster work and artificial stone flooring is to be done with admixture of water proofing compound @ 0.5% by weight of cement with all costs of labour and materials. Note:- (i) Finished level of Septic Tank should be 400 mm. from Ground Level. (ii) Height of 50 mm. Ventilation pipe & Mosquito proof mesh, should be follwed as per	Each	1.000			

	IS:2470,Part- I.Payment will be made separately on the basis of actual height based on relevant I.S.Code. (iv) For 50 users A) With Pakur variety. (SAIL/TATA/RINL)					
96.00	Supplying, fitting Fixing Computer Table Actual size: Depth 600mm X Width 1200mm X Height 750mm, Load Bearing Capacity table top 35Kg, Shelf 12.5 kg., Drawer 5.6kg, Raw material (specs of lamination & thickness) 18mm Prelam Particle Board, 3mm Prelam MDF Board, Metal Parts BM Slide for Keyboard, Castor Mounting Plate, Locking Bracket, Angle clit, KD fitting, Wooden Doweland PVC Inserts, all complete including cost of delivery at office as per satisfaction of Engineer-in-Charge.	Each	2.000			
97.00	Godrej make high back chair Model: Leoma High back (9M01A)	Each	6.000			
98.00	Godrej make sofa cum bed with fabric cushion Model: Aster	Each	2.000			
99.00	Godrej make 2 seater visitor chair with cushion Model: Midas (L52)	Each	2.000			
100.00	Godrej make chair back net Model : Oxbo High back (7501R)	Each	6.000			
101.00	Godrej Interio make mid back chair Model: Earl mid back (7202R)	Each	12.000			
102.00	Supplying, fitting Fixing Table Work Table made of 25 mm prelaminated particle board with 2 mm PVC edge banding dim of 1500 W x 750 D x 740 H with same quality of Free-standing pedestal with adequate personal storage, Neat Wiring flow with cut-outs on both sides, all complete including cost of delivery at office as per satisfaction of Engineer-in-Charge.	Each	12.000			

103.00	<p>Supplying, fitting Fixing Chair The seat made from 1.2mm.thk.hot pressed plywood and back injection moulded from black Co-polymer Polypropylene are upholstered with fabric and moulded Polyurethane foam together with seat and back covers.The back foam is designed with contoured lumber support for extra comfort.Size:Seat size:-45.0cm(W)X42.0cm(D)Back size:-39.0cm(W)x38.0cm(H).The seat and back covers are injection moulded in black Co-polymer Polypropylene.The fixed type mechanism is 360' revolving type without tilt.The frame is made up of Dia.2.64cm(1)x14bg.M.S.E.RW .tube which is black powder,all complete including cost of delivery at office as per satisfaction of Engineer-in-Charge.</p>	Each	25.000			
104.00	<p>Supplying, fitting Fixing Almirah, Size-765mmx440mmx1270mm Height without leveler.Construction & Materials welded construction 0.5mm thick CRCA for shelf & 0.9mm thick CRCA for all other components.Locking 3 way locking maechanism with shooting bolt.Shelving height wise adjustable shelves 3 nos.Finish-Epoxy polyester powdercoated to the thickness of 501 micros(+/-)all complete including cost of delivery at office as per satisfaction of Engineer-in-Charge.</p>	Each	7.000			
105.00	<p>Designing of different customised curved & plain metal craft by laser cutting on different metal sheets of varying thickness for special architectural application as facade/wall panel/ceiling decoration as per design, drawing or as approved standard by the Engineer-in-charge including transportation. (Mode of measurement - linear /peripheral dimension of laser cut area)</p>	Metre	930.000			

	Mild Steel Plate, Aluminium & Stainless Steel ii) 1.5mm thick - Mild Steel Plate					
106.00	Supplying, Fitting & fixing different factory made Metal Craft Sheet (excluding cost of metal crafting) including cost of powder coating (for M.S, Aluminium plate) & finished metal sheet with all fitting accessories complete in all respect as per direction of Engineer-in-Charge. Mild Steel Plate ii) 1.5mm thick	Sqm	18.250			
107.00	Supplying & Fixing 40 mm dia 3.20 metre long Vertical Type service bracket for carrying 2 wires and an earth wire complete with Galv. clamp for stay, insulators etc., 7/14 SWG stranded Galv. (Hot Dip) wire for stay with 230x13 mm dia straining serews, 75x88 mm porcelain shackle insulators with Galv. (Hot Dip) strips etc. and painting	Set	1.000			
108.00	Supplying and fixing polythene pipe complete with fittings as necy. under ceiling/beam, bound with 22 SWG GI binding wire incl. supplying and drawing 1x18 SWG GI Wire as fish wire inside the pipes and fittings and providing 50 mm dia disc of MS sheet (20 SWG) having colour paint at one face fastened at the load point end of the polythene pipe with fish wire (synchronizing with roof/beam casting work of building construction) 19mm dia 3mm thick Polythene Pipe	RM	360.000			
108.01	4.0 sqmm 'FR' stranded Copper wire	RM	385.000			
108.02	6.0 sqmm 'FR' stranded Copper wire	RM	425.000			
108.03	10 sqmm 'FR' stranded Copper wire	RM	20.000			

109.00	Supplying and fixing Sheet steel Main Switches on flat iron frame on wall, 30/32 A Standard 240V DP with fuse on L&N	Nos	2.000			
110.00	Supplying and fixing 240/415 V MCB of Breaking capacity 10kA & C characteristics on din rail of existing DBs and necessary connection, i) 40 A, DP, Legrand	Nos	15.000			
110.01	ii) 6-32 A, SP, Legrand	Nos	20.000			
111.00	Supplying and fixing 240/415 V MCB Isolator on din rail of existing DBs and necessary connection., 40A, DP, Legrand	Nos	14.000			
112.00	Supplying and fixing double-door SPN MCB Distribution Board with IP-42/43 protection, concealed in wall after cutting the wall & mending good the damages to original finish incl. Inter connection with suitable size of copper wire and neutral link & provision for earthing attachment. Legrand, 2+16 way,	Nos	6.000			
113.00	Cutting channel of 40 mm x 40 mm size on masonry wall incl.S&F heavy gauge polythene pipe dia as stated below, by means of iron hooks and supplying and drawing 18 SWG GI Wire as fish wire incl. mending good damages to building works . 19 mm dia 3 mm thick polythene pipe without earth continuity wire.	RM	420.000			
114.00	Wiring in 1.1 KV grade single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) of following sizes in 25mm PVC casing-capping (Precision make) incl. necy. PVC clips, fittings etc.	RM	420.000			

	(i) 2 x 36/0.3 (2.5 sqmm) + 1 x 22/0.3 (1.5 sqmm)					
114.01	(ii) 2 x 56/0.3 (4 sqmm) + 1 x 22/0.3 (1.5 sqmm)	RM	445.000			
115.00	Supplying & Fixing GI Modular Switch Board of the following sizes complete with three Nos. suitable size Copper bar with holes (for Ph, N & E) fixed on bakelite/Hard Rubber insulator over the MS welded chairs incl. top cover flushed in wall for housing the board after cutting the brick wall incl. making earthing attachment, painting and mending good damages to building works 12 Module	Set	20.000			
116.00	Supplying & Fixing GI Modular Switch Board of the following sizes complete with top cover plate flushed in wall for housing the board after cutting the brick wall incl. making earthing attachment, painting and mending good damages to building works, 2 Module	Set	20.000			
117.00	Supply & Fixing 240 V 6 A Modular type switch (Brand approved by EIC) on existing GI Modular type switch board having top cover plate and making necessary connections as required	Each	18.000			
118.00	Supply & Fixing 240 V 16 A Piano key type switch (Brand approved by EIC) on GI Modular type switch board having top cover plate and making necessary connections as required	Each	75.000			
119.00	Supply & Fixing 240 V, 6A, 5 pin Modular type plug socket (Brand approved by EIC), without switch & plug top, on existing GI Modular type switch board with top cover plate and making necy.	Each	27.000			

	connections with PVC Cu wire and earth continuity wire etc.					
120.00	Supply & Fixing 240 V, 16 A, 3 pin Modular type plug socket (Brand approved by EIC), without plug top and switch, on existing GI Modular type switch board with top cover plate and making necy. connections with PVC Cu wire and earth continuity wire etc.	Each	27.000			
121.00	Distribution wiring in 1.1 KV grade 2x22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) in suitable size PVC casing-capping (Precision make) with 1x22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire for ECC, incl. necy. fittings etc. to light/fan/call bell point with Modular type switch (Brand approved by EIC) fixed on Modular GI / PVC switch board with top cover plate on wall incl. mending good damages to original finish. [PVC casingcapping and Switch board both on surface] Average run 6 mtr	Point	30.000			
121.01	Average run 8 mtr	Point	30.000			
121.02	Average run 12 mtr	Point	25.000			
122.00	Distribution Wiring in 1.1 KV grade 2x22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) in suitable size PVC casing-capping (Precision make) with 1x22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire for ECC, incl. necy. fittings etc. with S & F 6A 5 pin Modular type plug socket and switch (Brand approved by EIC) fixed on 4 Module GI / PVC	Point	16.000			

	switch board with 3/4 Module top cover plate on wall incl. necy. connection making earthing attachment, painting and mending good damages to building works [PVC casing-capping and plug box both on surface] On Board					
123.00	Supplying of approved make high speed ceiling fan (ISI marked) of following sizes having double ball bearing complete with standard down rod, canopy, hanging shackle, Aluminium blades, without regulator, A.C. 230-250 volts 900mm/ 1050mm/ 1200mm i) Ceiling fan size 1200 mm sweep	Each	18.000			
124.00	Supply & Fixing 240V, Modular Socket (2 Module) type fan regulator (Step type) (Brand approved by EIC) on existing Modular GI switch board with top cover plate incl. making necy. connections etc.	Each	14.000			
125.00	Supplying of approved make wall fan oscillating type with base, blades, guard, speed regulator etc. AC 230- 250 volts.400mm sweep	Nos	18.000			
126.00	Supply TMC501 Conventional industrial bafflen Philips LEDtube, model no : TMC 501 P 2xT-LED 22W P3242 with 2nos Mas LEDtube 1200mm 18W865 T8 I - 2100lm including necessary connection.	Nos	40.000			
127.00	Fixing only fluorescent light fitting suspended 25 cm bellow the ceiling with 2 Nos. 20 mm dia EI conduit (14 SWG) supports incl. S&F EI conduit, ball socket/socket type ceiling plate and connecting the length of PVC insulated wire and painting etc. as required by 2x24/0.20 mm (1.5sqmm) flexible copper wire of 1.10 mt. length.	Each	40.000			

128.00	Supply and fixing of greenline V2 street light (115 Waf) complete with all accessories to be fixed /projected from the wall of the building or on pole incl. making holes/providing clamping arrangement & necy. GI reducer as required. S&F 40 mm GI pipe (ISI-Medium) quality 1.5 mts. average length having suitable bend S&F necy. length of 1.5 sqmm PVC insulated single core stranded annealed copper wire and making connections as required and mending good damages to wall incl. painting etc. Make : Philips, 115 watt	Nos	4.000			
129.00	Supplying & fixing earth busbar of galvanized (Hot Dip) MS flat 25 mm x 6 mm on wall having clearance of 6 mm from wall including providing drilled holes on the busbar complete with GI bolts, nuts, washers, spacing insulators etc. as required	Metre	30.000			
130.00	Connecting the equipments to earth busbar including S & F GI (Hot Dip) wire of size as below on wall/floor with staples buried inside wall/floor as required and making connection to equipments with bolts, nuts, washers, cable lugs etc. as required and mending good damages Solid G.I Wire Nos. 6 SWG	Metre	30.000			
131.00	Earthing with 50 mm dia GI pipe 3.64 mm thick x 3.04 Mts. long and 1 x 4 SWG GI (Hot Dip) wire (4 Mts. long), 13 mm dia x 80 mm long GI bolts, double nuts, double washers incl. S & F 15 mm dia GI pipe protection (1 Mts. long) to be filled with bitumen partly under the ground level and partly above ground level driven to an average depth of 3.65 Mts. below the ground level as below: By ISI-Medium GI pipe	Set	2.000			

132.00	Excavation of soil for installation of Earth Electrode and filling & ramming. For Soft Soil	Cum	2.000			
133.00	Extra for providing masonry enclosure on the top of the earth electrode of overall size 86.36 cm x 86.36 cm x 46 cm deep (below Ground level) complete with cemented brick work(1:6) of 25 cm width duly plastered with cement mortar (inside) CI hinged inspection cover of size 36.56 cm x 35.56 cm with locking arrangement, GI reducer including drilling of 46 nos. 12 mm dia holes on the GI pipe	Item	2.000			
134.00	Extra for treatment of soil by using salt & charcoal or coke for plate electrode	Item	2.000			
135.00	Supply installation testing and commissioning of following capacity geyser 5 star rated storage water heater with advanced 3 level safety For 10L-capacity	Each	6.000			
136.00	Supplying of approved make exhaust fan heavy duty with mounting frame, blades AC 230-250. 225mm sweep RPM 900 / 1400 (9")	Each	4.000			
137.00	Supply and fixing of philips Soft Glow Office compliant fully diKused recessed mounted 2'X2' false ceiling based LED light including connection by 1.5 sq mm cu wire. Make: Philips 36 Watt	Nos	52.000			
138.00	Fixing only fluorescent light fitting suspended 25 cm bellow the ceiling with 2 Nos. 20 mm dia EI conduit (14 SWG) supports incl. S&F EI conduit, ball socket/socket type ceiling plate and connecting the length of PVC insulated wire and painting etc. as required by 2x24/0.20 mm (1.5sqmm) flexible copper wire of 1.10 mt. length.	Each	52.000			

139.00	Supplying and fixing Sheet steel Main Switches on angle iron frame on wall, 60/63 A Standard 415V TPN with fuse on L&N	Nos	12.000			
140.00	Supply and Installation of Split type room air conditioning machine of following tonnage capacity 3 star rating filled with rotary compressor and cooling capacity min. 6000 k cal/Hr., minimum discharge air flow 800Cum mtr, 800EER (Ww) 2.7-2.89. (Rates are inclusive of extra refrigerant pipe drain pipe connecting cable) up to 1.5 Ton (Make. Hitachi) 3 star non-inverter type.	Nos	10.000			
141.00	Reconstruction or mending good damages to the community structures and cultural resources properties including the development of Govt. land as plantation and beautification, etc. as per direction of the EIC.	LS Restri cted to			INR 3,10,000.00	

¹¹ The total amount is automatically calculated by the e-procurement system, from unit rates and quantities, where the e-procurement system supports such functionality

¹² The amount in words is automatically populated by the e-procurement system, where the e-procurement system supports such functionality

Section V - Eligible Countries

Eligibility for the Provision of Goods, Works and Services in Bank-Financed Procurement

In reference to ITB 4.8, and 5.1, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this Bidding process:

Under ITB 4.8 (a) and 5.1 : *None*
Under ITB 4.8 (b) and 5.1 : *None*

[Note: as and when some country/ countries become ineligible insert the list of such countries following approval by the Bank to apply the restriction]

Section VI - Fraud and Corruption **(Section VI shall not be modified)**

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, subconsultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

- a. Defines, for the purposes of this provision, the terms set forth below as follows:
 - i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
 - iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - v. "obstructive practice" is:
 - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank 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
 - (b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, subcontractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring mis procurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such

practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

- d. Pursuant to the Bank's Anti-Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;²³ (ii) to be a nominated²⁴ sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;
- e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect²⁵ all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

²³For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for prequalification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

²⁴A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

²⁵Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

PART 2 –Works’ Requirements

Section VII - Works' Requirements

Table of Contents

Preamble to the BOQ	143
Scope of Work	146
Specifications	149

Preamble to the BOQ

1.0 INTRODUCTION

The Bill of Quantities (BOQ) shall be read in conjunction with the Instructions to Bidders, General Conditions of Contract, Particular Conditions of Contract, Technical Specifications, Bid Data Sheets and Drawings. The rates quoted shall be inclusive of cost of all materials, transportation and carriage of material upto works site, labour, plant and equipment, tools and tackles, safety gadgets, incidentals etc. as may be required for that particular item in the BOQ which is to be read in conjunction in the specification.

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 on the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of Quantities. If such rates are not available in the Bill of Quantities, this will be treated as extra work and such rates and prices will be fixed by the Engineer / Project Manager as per the terms of the Contract.

Mode of measurement, if not specified elsewhere shall be followed as per available codes of practice published by the Bureau of Indian Standards (BIS).

The rates and prices tendered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the contract, include all temporary facilities, access, notices to maintain traffic prevailing in an accessible manner, as far as possible for similar flow existing and also including all construction of plant, labour, supervision, materials, erection, maintenance, insurance, overhead, profit, taxes and duties together with all general risk, liabilities and obligation set out or implied in the contract.

General directions and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. The Bidder must refer to the relevant sections of the bid documents including specifications, data sheets and drawings before quoting rates or prices against each item in the Bill of Quantities.

The Team Leader of the Project Management Consultant (PMC) – WBMIFMP will be engaged as the Project Manager. For the purpose of this contract, the Project Manager or Engineer or Engineer – In – Charge will have the same meaning and connotation.

2.0 GENERAL

2.1 General Basis for Pricing,

2.1.1 The Bidder shall be deemed to have read and examined the Bid Documents as well as inspected the project site thoroughly to conceive the work in totality to quote against each item of work as given in the BOQ.

2.1.2 The Bidder shall be deemed to be fully conversant with the site conditions and the nature and complexity of the work to be undertaken and taking into account all eventualities which can arise before, during and after project execution.

2.1.3 It is to be expressly understood that the measured work is to be taken net (not withstanding any system or practice to the contrary) according to the actual quantities finished according to the drawings or as may be ordered from time to time by the Engineer and the cost calculated for the respective prices. Necessary manpower will

have to be provided by the Contractor during measurement of works and setting out alignment of the works, for which no extra payment will be made.

2.1.4 Unless otherwise stated, all items shall be measured as executed as per drawing and specification and no allowance will be made for wastage, working space, bulking or shrinkage, and the like.

2.1.5 The quoted rates and prices shall also be inclusive of the communication system as per requirement to be established at site (tele, fax, internet facilities etc.), vehicles for movement at site etc. No extra cost against such items will be paid.

3.0 Miscellaneous

3.1 Temporary power connections, telephones, construction and drinking water shall be arranged by the Contractor at his own cost and shall be deemed to be included in their quoted rates. Alternative power arrangement shall be made by Contractor without any extra charge.

3.2 All underground and overground utility items shall have to be suitably supported during the construction phase by the Contractor so that the existing utility services are not damaged. No extra payment will be made on this account.

3.3 The Contractor shall keep plumbers, technicians and electricians ready for repair/ shifting of existing underground/ over ground utilities and for crisis management.

3.4 During the progress of work, convenient access to adjacent premises shall be made by the Contractor. No extra payment will be made on this account.

3.5 For speedy progress of work in case of exigency, while working along busy road etc., Contractor may have to do work round the clock at the instance of the Engineer/Project Manager. Arrangement for lighting and other safety requirements shall have to be made for night working. No extra payment shall be made to the Contractor except the items provided in the BOQ.

3.6 The construction and maintenance of temporary access road for haulage of construction materials and machineries at different locations will be the sole responsibility of the contractor for which the bidder should acquaint themselves with through survey of the proposed site and include the cost of the same in their rates. No extra payment/ claims for so ever on this ground will be entertainment.

The contractor will be required to make good all damages at his own cost, that would occur in the local village roads for plying of trucks carrying construction materials, plant and machinery, during the entire construction period or till such roads are restored permanently by the local authorities.

3.8 The item rates quoted by the Contractor shall, unless otherwise specified, also include compliance of/ supply of the following:

i) General works such as setting out, clearance of site before setting out and clearance of works after completion.

ii) A detailed programme for the construction and completion of the work.

- iii) Samples of various materials proposed to be used on the work for conducting tests thereon as required as per the provisions of the Contract and approved Quality Assurance Plan (QAP).
- iv) Any other item of work which is not specially provided in the Bill of Quantities (BOQ) but which is necessary for complying with the provisions of the Contract.
- v) All temporary works, formwork and false work.
- vi) Arrangement of a laboratory with facilities for testing and testing of various items of works as specified in relevant clauses.
- vii) Cost of in-built provisions for Quality Assurance.
- viii) Cost of labour hutment, site office.

3.9 Extra items of work – If during the progress of work any extra items need to be carried out, which in the opinion of the Engineer/ Project Manager is essentially required to be executed, then the extra item shall be analyzed as follows:

- i) Derived from rates of similar items of works stated in the tendered offer
- ii) In the event an extra item of work that cannot be derived from (i) above, then the following shall be applicable.
- iii) The actual cost of materials based on documentation including labour, transportation, overhead and profit as per State USoR(I&WD), SOR (Building Works) (PWD), SOR (Road & Bridge Works) (PWD), SOR (S & P Works) (PWD).
- iv) If not specifically indicated in the items themselves, the rates appearing in this schedule are inclusive of cost of all supply, carriage, handling, fitting, fixing, toll charges, ferry charges etc. and all other incidental works involved in any floor, at any level including all necessary jointing materials, scaffolding to any height, hire charges of tools and plants, and all helping materials.

4.0 Scope of Work

The Government of India has received for financing from the World Bank toward the cost of the West Bengal Major Irrigation and Flood Management Project (WBMIFMP) Project and intends to apply part of the proceeds toward eligible payments under the contract for construction of works as detailed below.

NAME OF WORK

Contract Title: - “Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.”

4.1 Project Background:

The Damodar River originates from the Chhotonagpur Plateau at Latehar district in Jharkhand and flows through the districts of Latehar, Hazaribagh in Jharkhand and enters Purulia District in West Bengal which is the lowermost riparian State in Damodar Basin. Five reservoirs have been built on the Damodar and its tributaries in Jharkhand to moderate floods in the lower basin area in West Bengal and for irrigation. These are operated by Damodar Valley Corporation (DVC). The Damodar River bifurcates into two main branches, i.e, Mundeswari and Lower Damodar (Amta channel) near the border of Burdwan and Hooghly districts, and both the channels traverse through the districts of Hooghly and Howrah, and ultimately meet River Hooghly, which debouches into Bay of Bengal.

The irrigation network downstream of the Durgapur Barrage (West Bengal) was developed more than 6 decades ago and is now degraded. Dilapidated hydraulic infrastructure, loss of irrigation water due to seepage and silted distribution networks have reduced the system’s efficiency and led to water scarcity, particularly at the tail reaches. As a result, the gap between irrigation potential created vis-à-vis utilized is increasing, despite adequate water availability (around 1,40,000 hectare-meter (ha-m) for 3,32,000 hectare (ha) of command area under Kharif irrigation on an average). This is only 20% of the total water availability at the barrage during monsoon. Tail end farmers are compelled to abstract groundwater, which increases the costs of cultivation. This trend increases when rainfall is erratic or insufficient.

4.2 Project Area

The overall Project area considering both irrigation and flood management aspects is as follows:

Irrigation

Northern Boundary: River Ajoy at Purulia, Block Katwa-I, District Burdwan (Latitude 233851 N)

Southern Boundary: Outfall of Nabinbabur Khal at Block Amta-I, District Howrah (Latitude 223547 N)

Western Boundary: Durgapur Barrage on river Damodar at Block Barjora, District Bankura (Longitude 871831 E)

Eastern Boundary: Howrah Burdwan Main Line of Eastern Railway at Nityanandapur, Block Balagarh, District Hooghly (Longitude 882517 E)

Flood Management

Northern Boundary: Bifurcation point of river Damodar into Mundeswari River and Amta channel at Beguahan, Block Jamalpur, District Burdwan (Latitude 23088.34 N)

Southern Boundary: Outfall of Amta channel in river Hooghly, Block Shyampur-I, District Howrah (Latitude 222059.76 N)

Western Boundary: Ichhapur at Block Khanakul-I, District Hooghly (Longitude 87450.43 E)

Eastern Boundary: River Saraswati at Eklakhi, Block Chanditala - II, District Hooghly (Longitude 881663.89 E)

The schematic drawing, brief project outlay, location and other particulars are available on the website www.wbiwd.gov.in in the link “WBMIFMP”

4.3 Project Objectives

WBMIFMP is a World Bank (WB) assisted Major Irrigation & Flood Management Project in association with Irrigation & Waterways Department (IWD), Government of West Bengal and Asia Infrastructure Investment Bank (AIIB) with an initiative to rejuvenate six decades old Damodar Valley Project (DVC) Canal System and moderate flooding through the Rivers Mundeswari and Damodar (Amta channel) in the districts of Paschim Bardhaman, Purba Bardhaman, Bankura, Hooghly and Howrah.

WBMIFMP aims to improve the existing irrigation network in the Damodar Valley Command Area (DVCA) within the State of West Bengal, to optimize conjunctive and sustainable use of ground and surface water across the DVCA in different irrigation seasons, and to reduce flooding in the Lower Damodar Sub-Basin (LDSB) in West Bengal.

4.4 Key Activities under the Contract

“Construction of two storied irrigation field hostel and meeting room at Amta irrigation campus in block Amta-1, under Howrah District under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.”

Location:- The present site for construction of proposed office building is located at Amta Irrigation campus in the district of Howrah. Latitude-22.57196 Longitude-88.001235.

Present problem:- Officers & Field’s staff going to site work for different work purpose cover a lot of distance from working site under WBMIFMP from head quarter at Amta. Recently, World Bank Project for improvement of Lower Damodar area is executed in full swing. For effective implementation of this project, a fully fledged infrastructure of Sub Division office is urgently required at Amta Campus and it is felt prudent to locate this office at Amta Irrigation campus near site for better hauling purpose.

Necessity & purpose of scheme:- To keep close liaison with various work under WBMIFMP, it is necessary to possess a two storied irrigation Field hostel and meeting room in nearby Amta campus. It is required for administrative meeting and also staying at head quarter during flood period. For the purpose of better management and execution of work at site it is felt prudent to construct two storied irrigation Field hostel and meeting room at Amta with all required facilities.

Following are the Various Components of the proposed work.

I. This proposed building will be constructed by R.C.C. column structure with all necessary items.

II. The different items have been provided such as 250mm thick & 125mm thick brick work, plastering, floor tiles, wooden doors & windows, M.S. grill, interior and exterior painting and also electrical and plumbing items etc.

Status of Land:- Possession of land has already been obtained under Irrigation & waterway's Department.

Duration of contract: 365 days including rainy and all other seasons

Specifications (I & WD)

The Works shall be executed in accordance with these Specifications which comprises the following Sections:

- I. **Section A -** General Specifications
- II. **Section B -** Technical Specifications

I. SECTION A-GENERAL SPECIFICATIONS

A-1 General Specifications

A-1.1: Mobilisation of Contractor

In the first One month from the date of signing of agreement, the contractor shall complete the following actions in a phased manner on priority basis as directed by Engineer.

1. Establish his office in complete manner including installing Telephone and Fax.
2. The contractor shall furnish, in advance, a detailed Work programme containing all activities upto the completion of Works. Supporting resources schedule shall also be submitted.
3. Complete construction, installation and commissioning of “Field Laboratory” including all the tests and test apparatus provided in para 5.
4. Mobilize all required Key Staff, Technicians, Labourers.
5. Complete the identification of Quarries and quality of available material.

A-1.2: Quality Control

The Contractor shall ensure that all the actions are taken to build in Quality Assurance (QA) in the planning, management and execution of works. The QA shall cover all stages of work such as setting out of works, selection of material, selection of method of works, selection of plant and equipment, deployment of staffs, quality control testing. The QA program shall cover as per standard documents such as relevant Indian Standard Codes including its Special Publications, IRC Codes including Special Publications and MORTH (Specifications for Road and Bridge Works). These shall broadly cover the QA aspects of all services rendered all items to be supplied and all activities to be performed including the temporary structures and equipment which will influence the quality of the completed works or the progress of the work.

As a minimum it will cover the following:

- i) Document and data control
- ii) Process control
- iii) Work, inspection, testing and documentation procedure
- iv) Control and documentation of purchasing and handling of materials

- v) Maintenances of records for non-conformity and timely corrective actions.
- vi) Internal Quality Audit
- vii) Training of staffs
- viii) Contractor's ESHS-MSIP

QA Plan should be submitted to the Engineer for approval, not later than 14 days from the date of delivery of Letter of Acceptance. The work of building of quality control shall be deemed to be covered under the scope of work. This QA Plan may be updated / modified if required and that updated / modified Plan should be a part of Contract Agreement.

A-1.3: Drawings:

The drawings provided in the Tender Documents shall be used for reference only. The Contractor shall study the nature of the work and ensure that the rates and prices quoted in the Bill of Quantities have due consideration of sites including its accessibility and storage space of storing materials, lower progress of work during monsoon and/or running irrigation and complexities of the actual execution/construction.

The contractor based on his surveys and investigation shall submit the working drawings (in soft and hard copies) for each activity at least 28 days in advance of the scheduled start date of the activity as per the approved work programme. The working drawing should clearly show the modifications, if any, with reference to the corresponding tender drawing. The Engineer shall review the working drawings including the proposed modification, if any, revise the drawing, if required, approve and issue the drawings to the Contractor in two copies of Good for Construction (GFC) drawings at least 14 days in advance of the scheduled start date of the activity.

Examination and/or approval by the Engineer of any drawings or documents submitted the Contractor shall not relieve the contractor of his responsibilities or liabilities under the Contract.

The tender rates/prices for the work shall be deemed to include the cost of preparation, supply and delivery of all the necessary working drawings, prints, soft copies which the Contractor is required to provide as per the requirement of the Contract.

A-1.4: Site Information

The information about the site of work and site condition provided in the tender document is given in good faith for guidance only but it shall be responsibility of the Contractor to satisfy himself regarding all aspects of the entire site conditions.

The locations of the works and the general site particulars are as shown in the index plan enclosed with the Tender Documents.

Whereas the right of way of the work sites shall be provided to the Contractor by the Employer the Contractor has to make his own arrangement for the land required by him for and areas for

temporary stockpiling of materials, setting up his office, field laboratory, site for plants and equipment, maintenance and repair workshops, construction worker's camp, stores etc. The location of quarries and other sources from which naturally occurring materials are available, for guidance of the Contractor. It is assumed that the Contractor has inspected the quarries; borrow areas etc., in the vicinity of the working area before quoting his rates for the work to assess the availability of construction materials in required quantity and quality.

A-1.5: Setting out:

The Contractor shall establish working benchmarks tied with the reference bench marks within a fortnight after taking possession of the site. The reference benchmarks for the area shall be as indicated in the Contract Document or directed by the Engineer and the values of the same shall be obtained by the Contractor from the Engineer. Numbers of the working benchmarks shall be at one km. interval on both sides of the canal and also nearby important structures. Checks must be made on the benchmarks on every month and adjustment if any approved from the Engineer and recorded. An up-to-date list of all benchmarks including adjustments shall be maintained by the Contractor and a copy of the same mentioning location description, latitude – longitude, levels with actual photographs of the established benchmarks shall be submitted to the Engineers for their record.

The lines and levels of formation (foundation level of the Structure, Top level and toe levels of the protection works side slopes shall be carefully set out and frequently checked, care being taken to ensure correct cross section and gradient obtained everywhere.

The Contractor will be sole responsible for safe guarding all survey monuments, bench marks, marking pegs etc. The engineer will provide the Contractor all necessary data for setting out centerline, toe line. All dimensions and levels shown on the drawings or mentioned in the document forming part of or issued under the contract shall be verified by the Contractor on the site and he shall immediately inform the Engineer in case of apparent error or discrepancies in levels or dimensions.

The work of setting out shall be deemed to be a part of general works preparatory action for the execution of work and no separate payment shall be made for the same.

II. SECTION B-TECHNICAL SPECIFICATIONS

1. Earth Work

1.1. Setting Out

Before start of work centre line of the canal / embankment shall be marked by suitable and firm pegs each at about 30m interval in straight reaches. In the curved reaches of the canal the curve shall be laid out and top and bottom edges of excavation and toe of embankment shall be suitably peg marked. The centre line in such reaches shall be marked by pegs at an interval of 5 m to ensure smooth curve profile during excavation/filling. Distance pegs shall be constructed at 200 m interval at canal boundary for proper alignment.

All levels of canal profiles shall be referred to a specified and established firm benchmark not subject to subsidence/interference or disturbance. Temporary benchmark pillars shall be constructed at suitable locations for reference of levels during construction. Proper layout of the embankment / flood walls shall be marked with pucca reference pillars.

1.2. Clearing of Land

Before beginning the construction / repair of embankment, the land over which excavations/filling is to be done shall be cleared of all trees, bushes, vegetation, rubbish, roots, ant hills and any other objectionable material before excavation/filling. The cleared material shall be the property of the Government and its disposal shall be done in a manner as approved by the Engineer-in-Charge. The land so cleared shall be maintained free from any growth and vegetation during the period of construction.

In filling reaches, all holes and hollows whether originally existing or produced by digging up roots shall be filled with suitable earth well rammed and leveled off. The depth to which topsoil is removed shall be adequate to remove all perishable material and any soil which may become unstable on saturation or may interfere with the development of proper bond between the existing surface and new embankment. As per IS 4701, the depth of stripping as a guide for containing light grass cover shall be 5 to 7.5cm. It shall be 20cm for soil containing thick vegetation/agricultural land.

1.3. Excavation

Before commencement of the excavation in any reach the contractor shall inform and obtain the necessary instructions in writing from the Engineer-in-Charge.

The contractor shall excavate whatever material may be encountered up to the depth of excavation shown on the Cross-section of the channels. All material, thus excavated, shall be the property of the Government.

Excavation to be carried out shall strictly conform to the plans and levels shown on the profile of excavation in the Cross-sections. The bed of the canal will have a longitudinal gradient as given in L-section and will be kept level transversely. The side slopes shall also conform to those given in the drawings and shall be neatly finished. Any excavation below the prescribed bed level shall not be paid.

Excavation of internal section in branch canal/distributary shall be carried out by suitable earthmoving equipments/tractors. Excavation of internal section in minors may be done manually.

1.4. Dewatering and Bailing out water by Pump

Normally, open foundations shall be laid dry. Where water is met with in excavation due to stream flow, seepage, springs, rain or other reasons, the Contractor shall take adequate measures such as bailing, pumping, constructing diversion channels, drainage channels, bunds, depression of water level by well-point system, cofferdams and other necessary works to keep the foundation trenches dry when so required and to protect the green concrete/masonry against damage by erosion or sudden rising of water level. The bailing out water is to be carried out as per direction of the Engineer-in-charge. Approval of the Engineer shall, however, not relieve the Contractor of the responsibility for the adequacy of dewatering and protection arrangements and for the quality and safety of the works.

Where cofferdams are required, these shall be carried to adequate depths and heights, be safely designed and constructed and be made as watertight as is necessary for facilitating construction to be carried out inside them. The interior dimensions of the cofferdams shall be such as to give sufficient clearance for the construction and inspection and to permit installation of pumping equipments, etc., inside the enclosed area.

If it is determined beforehand that the foundations cannot be laid dry or the situation is found that the percolation is too heavy for keeping the foundation dry, the foundation concrete shall be laid under water by tremie pipe only. In case of flowing water or artesian springs, the flow shall be stopped or reduced as far as possible at the time of placing the concrete.

Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of the movement of water through any fresh concrete. No pumping shall be permitted during the placing of concrete or for any period of at least 24 hours thereafter, unless it is done from a suitable sump separated from the concrete work by a watertight wall or other similar means. The pump installation capacity number (HP, Discharge and Head) must be approved by Engineer-in-charge in writing in a separate register to be issued by the department for such item.

At the discretion of the Contractor, cement grouting or other approved methods may be used to prevent or reduce seepage and to protect the excavation area.

The Contractor shall take all precautions in diverting channels and in discharging the drained water as not to cause damage to the works, crops or any other property.

The Payment will be made on the quantity of water calculated on the basis of initial and final water level measured before starting and completion of each day's work which necessitates a bailing/ pumping of water from the trench. The final level of water to be measured, will depend on the level at which the day's work will be taken up. The rate includes any seepage water that may percolate in the trench during pumping.

1.5. Embankment

For the embankment construction /rehabilitation, the toe of the slope on each sides of the bank shall be Dag-Belled and marked by pegs firmly driven in the ground at interval of 20m. Profiles made by bamboos, earth and strings shall be setup for the guidance of workmen at 50m interval over straight reaches and about 25m. apart for curved reaches. A suitable allowance for settlement shall be made in setting up the profile for embankment.

Surface Preparation: The base of the extension portion of embankment shall be stripped and roots & other vegetation's shall be removed. The stripping operation is to be done up to the bottom of root zone of vegetation so that all roots are removed out of the surface. The stripping depth may vary at places depending upon type of vegetation growing on the area/slopes. The cost of all such stripping up to bottom of roots shall be deemed to be included in the unit rates of the excavations.

The slope of existing banks shall be benched. Benching of slopes shall be done with a little slope towards the inside of benches so as to give a good grip/bond to the embankment soil with the sub-grade. Unless otherwise specified, the benches shall be 0.3x0.6m on the front and rear slope of the embankment. Before benching, canal slopes shall be cleared of all roots, vegetation, rubbish etc. No separate payment shall be made for these and the rates quoted for raising the embankment is inclusive of these operations. The areas shall be pre-wet by sprinkling water before the construction of embankment commences. Unless otherwise specified, the water applied for pre-wetting the areas shall not be paid being considered included in the unit price per cubic meter bid in the bill of quantities for compacting the embankment.

Before laying soil on existing embankment, the slopes shall be properly cut and benched in steps not steeper than 1.5: 1.

1.6. Construction/Rehabilitation of Embankments and Disposal of Excavated Earth

Embankment shall be built in layers not exceeding 20cm to 25cm loose. Each layer will be laid horizontally in 30cm more than full width of the section and the banks and berms shall then be dressed after compaction in full width and to the required slope. The top of embankment shall be leveled and finished so as to be suitable for roadway. Where provided, a cross slope of 1 in 80, outward to drain away rain waters may be given.

All material of excavation shall be disposed outside the embankment at designated disposal sites on either side of canal.

Contractor shall be responsible that no unwanted disposal is being made in the work area. Any such disposal shall be removed at his own cost to the satisfaction of Engineer-in-Charge. Similarly, the contractor shall ensure that there is no blockage of drains or damage to the canal and to the existing outlets of canal due to disposal of material. If anything found contrary, the contractor shall arrange to rectify at his own cost within the prevalent environmental regulations.

All surplus earth lying on embankments above designed bank level shall be removed by the contractor within a maximum period of 5 days.

1.7. Compaction Requirement

All surplus earth lying on embankments above designed bank level shall be removed by the contractor. Embankments shall be compacted, as shown on the drawings, to achieve the requirements laid down as under: -

Laying of earth on embankment:

The fill material shall be deposited in horizontal layers. The thickness of each horizontal layer before compaction shall normally be not more than 25 centimetres (loose layer), or as determined by the Engineer-in-charge and the layer shall be laid to full width of embankment. The thickness of layer shall be governed by the type of compaction equipment to be deployed based on the space available for compaction. The excavating and placing operation shall be such that the material when compacted will be blended sufficiently to secure minimum DBD of 90%. If the surface or any compacted layer of earth fill is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be moistened and/or sacrificed in an approved manner to provide a satisfactory bonding surface before the next succeeding layer is placed.

- 1.8.** Earthwork in Excavation of foundation: (Ref. PWD, Building works, Para: point B under General Specification) All works shall be carried out in proper manner. Items of works not covered by the following shall be carried out as per best practice according to directions of the Engineer-in-Charge and to his satisfaction. Unless otherwise specified in this section or in the description of item, the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Schedule. Foundation when excavated to the level shown in the drawing will be shown to the Engineer-in- Charge and if on account of bad ground or for any reason whatsoever he decides to go deeper with the foundation, the contractor shall excavate further to the depths required by the Engineer-in-Charge. In no case shall the foundation soling or concrete be laid prior to receiving orders to that effect from the Engineer-in-Charge or his authorised representative.

Excavating shall include throwing the excavated earth at least one meter or half the depth of excavation, whichever is more, clear of the edge. The excavated areas around the foundation of structures are to be filled up properly to the required levels with earth obtained from excavation or other materials as directed, well rammed with water and consolidated in layers not exceeding 150 mm. at a time. The quantity for this item of work will be measured on the basis of quantity of excavation paid for less the volume occupied by the structure in foundation.

Specifications (Building Works)

The Works shall be executed in accordance with these Specifications which comprises the following Sections:

- I. **Section C** - General Specifications
- II. **Section D** - Technical Specifications

SECTION C - GENERAL SPECIFICATIONS

(INCLUDING MODES OF MEASUREMENT)

(A) MATERIALS

GENERAL:

All materials to be used in works shall conform to Indian Standards Specification as published by B.I.S from time to time (and in the absence thereof as approved by the Engineer-in-Charge). Unless specifically mentioned otherwise the following modes of measurements shall be adopted. In general, the mode of measurement of the civil engineering works shall be guided by I.S.I. Code Nos.: 1200-1964 (Revised) for Indian Standard Method of measurement of Building work.

A-1: Bricks

All bricks shall be of approved quality of standard specifications, made of good brick earth, uniform deep red, cherry or copper colour, thoroughly burnt in kiln (machine made) without being vitrified, regular in shape and size, sound, hard, homogeneous in texture, true to shape and of standard dimension and shall be free from cracks, chips, flaws, stones or humps of any kind and shall not show appreciable signs of efflorescence either dry or subsequent to soaking in water. The size of bricks shall be $9\frac{3}{4} \parallel \times 4\frac{3}{4} \parallel \times 2\frac{3}{4} \parallel$ (conventional). 190 x 90 x 90 mm (modular). The Bricks shall emit a clear ringing sound on being struck and have minimum crushing strength of 105 kg/sq.cm. All the bricks which absorb water more than 20% of their own dry weight after 24 hours immersion in cold water shall be rejected.

A-2 Coarse Aggregates for Cement Concrete Works:

Stone chips or stone ballast for cement concrete (plain or reinforced) shall be hard, of uniform and fine texture. free from faults or planes of weakness and free from weathered faces. The ballast or chips must be free from loam, clay or any surface coating, free from organic matter or other impurities and screened, free of dust. Stone of black and hard variety as is generally available from quarries in Pakur areas will be normally used. Stone aggregates from other sources may also be used provided the same is found suitable in the opinion of the Engineer-in-Charge. The opinion of Engineer-in-Charge must be recorded in writing. The ballast or chips shall be obtained by breaking from large blocks and must be more or less cubicle in shape.

Size of Coarse Aggregates: For any of the following nominal sizes of graded coarse aggregates, grading shall be in conformity with the requirements laid down in the Indian Standards Specification IS: 383-1963 as shown below in Table 1.

TABLE – 1

IS. Sieve Designation	Percentage passing for graded aggregate of nominal size			
	40m	20mm	16mm	12.5mm
1	2	3	4	5
80 mm	100			
63 mm				
40 mm	95-100	100		
20 mm	30-70	95-100	100	100
16 mm			90-100	
12.5 mm.				90-100
10 mm.	10-35	25-55	30-70	40-85
4.75 mm.	0-5	0-10	0-10	0-10
2.36 mm.				

When coarse aggregates brought to the site is ungraded, single size coarse aggregates of different nominal sizes, conforming to the requirements vide **Table II** given below, shall be mixed at site with the other ingredients of concrete either directly in the mixture or on the platform in the proportion indicated in **Table III** below:

TABLE –II

IS. Sieve Designation	Percentage passing for single sized aggregate of nominal size					
	63mm	40mm	20mm	16mm	12.5mm	10 mm
1	2	3	4	5	6	7
80 mm	100					
63 mm	85-100	100				
40 mm	0-30	85- 100	100			
20 mm	0-5	0-20	85-100	100		
16 mm				85- 100	100	
12.5 mm.					85-100	100
10 mm.	0-5	0-5	0-20	0-30	0-45	85-100
4.75 mm.			0-5	0-5	0-10	0-20
2.36 mm.						0-5

TABLE – III

SI. No s.	Cement concrete mix	Nominal size of aggregate	Parts of aggregate of size 50	Parts of aggregate of size 40	Parts of aggregate of size 20	Parts of aggregate of size 12.5	Parts of aggregate of size 10
1	2	3	4	5	6	7	8
1.	C.C.1:6:12	63mm	9		3		
2.	C.C.1:6:12	40mm		9	3		
3.	C.C.1:5:10	63mm	7½		2½		
4.	C.C. 1:5:10	40mm		7½	2½		
5.	C.C.1:4:8	63mm		6	2		
6.	C.C.I:4:8	40mm		6	2		
7.	CC. 1:3:6	63mm	4½		1½		
8.	CC. 1: 3 : 6	40mm		4½	1½		
9.	CC. 1:3:6	20mm			4½		1½
10.	C.C.1:2:4	40mm		2½	1		1½
11.	C.C.1:2:4	20 mm			3		1
12.	C.C.1:2:4	12.5mm				3	1
13.	C.C. 1:½:3	20 mm			2		1

Notes: The Proportions indicated in **Table III** above are by volume. These proportions may be varied somewhat by Engineer-in-Charge after making sieve analysis of the aggregates brought to the site, when considered necessary for obtaining better density and strength of concrete, void ratio in the tune 0-25

All-in-aggregates: If combined aggregates are available, they need not be separated into fine and coarse. But necessary adjustment may be made in the grading by the addition of single sized aggregates. The grading of the all-in-aggregate when analysed as described in IS: 2386 (Part I) shall be in accordance with **Table IV**.

TABLE - IV

I.S.Sieve Designation	Percentage passing for all-in-aggregate	
	40mm Nominal size	20mm Nominal size
1	2	3
80 mm	100	
40 mm	95-100	100
20 mm	45-75	95-100
4.75 mm	25-45	30-50
600 micron	8-30	10-35
150 micron	0-6	0-6

- i) Gravel, for use as coarse aggregates in cement concrete work must be hard, absolutely free from surface coating and on being broken, the fractured surface must indicate a uniform and fine texture free from laminations or planes or weakness. It shall be thoroughly washed and free from any foreign elements.

- (iii) Jhama chips for cement concrete work shall be obtained by breaking good quality Jhama bats, must not be spongy or with any coating of foreign materials and should be homogeneous in texture. The chips shall be more or less cubicle in shape.

All coarse aggregates for concrete works must be well graded. These shall be screened for removal of dust and if so necessary in the opinion of the Engineer-in-Charge, shall be washed at the cost and expenses of the contractor.

A—3 Sand

All sand shall be clean sharp and free from clay, loam, organic or any other foreign matter, shall be obtained from approved source. The contractor shall get the sample of sand to be used in different kinds of works approved by the Engineer-in-Charge before using the same in work. Sand which in the opinion of the Engineer- in-Charge or his representative is dirty, must be washed to his satisfaction at the cost and expenses of the contractor.

- (i) Sand for all cement concrete work must be coarse. The sand shall pass through a mesh, 4.75 mm. square measured in the clear. Sand shall not be used for concrete works if it contains more than 10% of fine grains passing through a 76 mesh sieve as used for cement test, nor should the fineness modulus be less than 2.00 unless specific permission is obtained from the Engineer-in-Charge.
- (ii) Medium sand may be used for cement mortar, for masonry, plaster etc. fineness modulus shall be between 2 and 1.8.
- (iii) Sand filling in plinth or foundation where specified may be done with fine sand or Silver sand.

A—4 Cement:

No cement except those supplied by the department or approved by Engineer-in-Charge shall be used in work or brought to site by contractor. Cement bags must be stored in a water-tight shed having wooden floor or platforms raised at least 50 mm. from ground as approved by the Engineer-in-Charge. Cement which is partially set or which is lumpy or caked is to be treated as damaged and shall be removed from the site immediately.

For list of relevant IS Code for Cement to be used in work Page-B-64-65 of Volume-I & Clause 2.1.4 (Page-9) of Volume-III of Combined PWD Schedule and mandatory tests before use of Cement material into works are given in clause 3.0 (Page188,189 & 190) Volume-III of Combined PWD Schedule, may be seen.

A—5 Steel:

All steel shall be clean and free from loose mill scales, dust, loose rust and coats of paints, oil or other coatings. Any scale or loose rust shall be removed before use, even though the same may have been supplied by the Department without any claim for extra charge for the same. No steel excepting those supplied by the Department or approved by the Engineer-in-Charge shall be used in work or brought to site by the contractor.

For list of relevant IS Code for reinforcement in concrete page-B-66 of Volume-I & for structural steel clause 2.1.7.5 (Page-12) of Volume-III may be seen. Mandatory tests before use of steel materials into works are given in clause 2.0 Steel/ Iron (Page-185,186 & 187) Volume-III of Combined PWD Schedule, may be seen.

A-6 Timber:

All timber shall be of best quality well-seasoned and/or well-treated for preservation and protection against decay etc. It shall be uniform in substance, straight in fibre, free from large or dead knots, sap, flaws, sun- cracks, shakes or blemishes of any kind. Any insect damage or splits across the grain shall not be permissible. The colour of the timber shall be uniform throughout, firm and shining with a silky luster when planed and shall not emit dull sound when struck.

A-7 Glass:

All glasses shall be of the specified type, colour visibility and sound and shall be free from cracks, flaws, spick bubbles and blemishes and shall not weigh less than 7.4 kg/sqm unless otherwise specified.

A-8 Timber Doors, Windows etc. and their Fittings:

- (i) Door and window work shall be carried out as per detailed drawings or as directed by the Engineer- in-Charge, Specified timber shall be used, and it shall be sawn in the direction of the grains and be straight and square.
- (ii) Fittings shall be of iron, brass, and aluminium or as specified. These shall be well made, reasonably smooth and free from sharp edges, corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. Iron fittings shall be finished bright or black enameled or copper oxidised. Brass fitting shall be finished bright or (brass) oxidised chromium plated (etc treated) & aluminium fittings shall be finished bright or anodised or as specified. Fittings shall be got approved by the Engineer-in-Charge before fixing. In case of renewal works, the new fitting shall, as far as possible, match with the existing ones. Screws shall **be driven home with screw driver and not hammered** in.

A-9 Fibre Reinforced Polymer (FRP) door shutter/frame:

The Polymer shall be either thermoplastic or thermo set resin, such as polyester, Isopolyester, Vinyl ester, epoxy or Phenolic base. The fibre moulded skins may be of glass or other synthetic (Carbon or aramid) or natural (jute or Coir) or other reinforcing materials.

The sandwich core to impart monolithic composite structures approved by Department of Science & Technology or similar competent Authority.

Testing: As per IS 4020 door testing performance criteria.

Frame without Core: Frames shall have intermittent stiffness for rigidity and will have provision for hinge fixing, including anchors.

Frame with Core: Such Composite frames will be filled with inner Core in addition to all the features mentioned for frame without Core.

A-10 Paint etc.:

All paints shall be delivered in strong containers, marked with the colour of the paint, brand, volume of paint content in litres and of the best quality of approved make and brand as approved by the Engineer-in-Charge. Under no circumstances shall the paint be diluted with Linseed oil or otherwise. Any paint or enamel although of approved brand, which so hardens in the container that it cannot be readily broken up with a stirrer to a smooth uniform painting consistency, shall be rejected. Any paint or enamel too thick for proper brush application shall be rejected.

SECTION D - TECHNICAL SPECIFICATIONS

(B) EXECUTION

GENERAL: All works shall be carried out in proper manner. Items of works not covered by the following shall be carried out as per best practice according to directions of the Engineer-in-Charge and to his satisfaction. Unless otherwise specified in this section or in the description of item, the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Schedule.

B—1 (a) Excavations of Foundation and Filling up Trenches:

(i) Foundation when excavated to the level shown in the drawing will be shown to the Engineer-in-Charge and if on account of bad ground or for any reason whatsoever he decides to go deeper with the foundation, the contractor shall excavate further to the depths required by the Engineer-in-Charge. In no case shall the foundation soling or concrete be laid prior to receiving orders to that effect from the Engineer-in-Charge or his authorised representative.

(ii) Excavating shall include throwing the excavated earth at least one metre or half the depth of excavation, whichever is more, clear of the edge.

(iii) The excavated areas around the foundation of structures are to be filled up properly to the required levels with earth obtained from excavation or other materials as directed, well rammed with water and consolidated in layers not exceeding 150 mm. at a time. The quantity for this item of work will be measured on the basis of quantity of excavation paid for less the volume occupied by the structure in foundation.

(b) Shoring:

(i) For loose earth and when the depth of excavation exceeds 3 metres, poling boards (vertical members) of 50 to 75 mm. in thickness and 175 to 225 mm. in width preferably of Sal-wood to be placed close together and to be driven about 300 mm. in ground below the bottom of the trench with intermediate sal-bullah piling of diameter not less than 100 mm. at the rate of 900 to 1000 mm. center to center to be placed in between the vertical surface of trench and the poling boards and double struts of sal-bullah of not less than 100 mm. in diameter between two wallings (horizontal member) of 250 mm. in width and 75 mm. in thickness held horizontally between them.

(ii) For medium clay and when the depth of excavation exceeds 2 metres but not exceeds 3 metres single struts will be provided and sal-bullah piling may not be placed. Other requirements are to be satisfied as (i) above.

(iii) For stiff clay or dry clay and when the excavation is within 2 metres, vertical poling boards will be placed at the rate of 600 to 1000 mm. apart with or without walling pieces; but single or double strutting will be provided. Other requirements are to be satisfied as per (i) above.

B-2 Cement concrete Works (Plain or Reinforced):

- (i) **Shuttering and Staging:** Wherever necessary, shuttering and staging must be provided. Unless otherwise stated no payment will be made for such shuttering or staging and the cost thereof will be deemed to have been covered by the rate for relevant finished item of work. Where payment for shuttering has been specified, the rate shall be deemed to cover the cost of the necessary staging as well. Payment, if any, for shuttering will be on the basis of surface area of shuttering in actual contact with concrete.

Shuttering may be of approved dressed timber true to line, not less than 25 mm. thick. Surface to be in contact with concrete are to be planed smooth except where otherwise stated. As an alternative, sufficiently rigid steel shuttering may be used. In every case, joints of the shuttering are to be such as to prevent the loss of liquid from concrete. In timber shuttering the joints must be perfectly closed and the entire shuttering surface shall be covered with polythene sheets of approved quality. In case of steel shuttering also the joints are to be similarly lined.

All shuttering and framing must adequately be stayed and braced to the satisfaction of the Engineer- in-Charge for properly supporting the concrete during the period of hardening. It shall be so constructed that it may be removed without shock or vibration to the concrete.

Before the concrete is placed, the shuttering shall, if considered necessary be coated with an approved preparation for preventing the adhesion of the concrete to the moulds, and it is to be of such a nature and so applied that the surface of the finished concrete is not stained. Care shall also be taken that such approved preparation shall be kept out of contact with the reinforcement.

In no circumstances shall forms be struck until the concrete reaches strength of at least twice the stress of which the concrete may be subjected at the time of striking.

Interior of all moulds and boxes must be thoroughly washed out with a hosepipe or otherwise so as to be perfectly clean and free from all extraneous matter prior to the deposition of concrete.

All form works shall be removed without shock or vibration. Before the form work is stripped, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has hardened sufficiently. In normal weather and with ordinary cement, vertical or side shuttering may be removed after three days and the bottom shuttering of horizontal members after fourteen days in case of slabs and twenty-one days in case of beams and cantilevers etc. from the date of placing the last portion of the concrete in the structure. The above are the minimum and may be extended if found necessary. Before stripping the shuttering of structural members, the contractor shall take prior permission of the Engineer-in-Charge or his representative.

No plugs, bolts, ties, hold fasts or any other appliances whatsoever for the purpose of supporting the shuttering are to be fixed in the structure or placed in such a way that damage might result to the work in removing the same when the shuttering is struck.

- (ii) **Scaffolding:** The scaffolding must be strong and rigid stiffened with necessary cross bracers and always decked and boarded on the sills with close boarded veiling and swings to prevent any injury to persons or materials. The contractor shall have to allow other traders to make reasonable use of his scaffolding as and when directed by the Engineer-in-Charge.

If for the interest of the work contractors have to erect scaffolding in other's properties including local bodies or corporation, the arrangement for the same including the cost of licensing fees etc. shall have to be borne by the contractor and the department should be kept free from any liability on this account.

- (iii) **Mixing, Placing and Compacting:** The proportion specified is by volume in dry rodded condition of the different constituents.

Boxes of suitable sizes shall be used for measuring sand and aggregate. The unit of measurement for cement shall be bag of cement weighing 50 Kg. and this shall be taken as 0.035 cubic metre while measuring the aggregate, shaking, ramming or hammering shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand allowances for bulking be made. **The aggregate in each batch of concrete are to be proportioned as to contain full bags of cement.**

Normally all structural concrete shall be mixed in mixture machine in appropriate proportion, shall have to be vibrated with suitable vibrator. Mixing shall be continued until there is uniform distribution of the materials and the mass is uniform in colour and consistency, but in no case mixing shall be done for less than two minutes. The rates appearing in the Schedule of Rates against such items are inclusive of hire and operational charges of such appliances. For a particular job the Engineer-in- Charge may allow hand mixing and or hand tapping of concrete In case of hand mixing concrete, extra cement up to 10% over the standard requirement of cement for machine mix of particular mix shall have to be provided by the contractor at his own cost.

As the bulking of sand may vary from day to day and at different parts of the day on account of varying moisture content, frequent tests for bulking shall be carried out with the sand to be used and amount of bulking allowed for in the field mix so as to keep the actual proportion constant through- out.

Only such quantities as are required for immediate use are to be mixed at any one time. Sufficient water is to be added to obtain proper workability so that the mixture may flow readily round the reinforcement and into every part of the moulds. The workability shall be measured by the amount of slump.

The quantity of water to be used for each mix of 50 kg cement to give the required consistency shall not be more than 34 litres for 1:3:6 mix, 32 litres for 1:2:4 mix, 30 litres for 1:1 1/2:3 mix and 27 litres for 1:1:2 mix. In the case of vibrated concrete, the limit specified may be suitably reduced to avoid segregation.

Nominal Mix Concrete may be used for concrete of M20 or lower. The proportions of materials for nominal mix concrete shall be in accordance with the following table.

Proportions for Nominal Mix Concrete

Grade of Concrete	Total Quantity of Dry Aggregates by Mass per 50 Kg of Cement, to be Taken as the Sum of the Individual Masses of fine and Coarse Aggregates. Kg. Max	Proportion of Fine Aggregate to Coarse Aggregate (by Mass)	Quantity of Water per 50 Kg of Cement, Kg., Max
M 5	800	Generally, 1:2 but subject to an upper limit of 1: 1 1/2 and lower limit of 1:2 1/2	60
M 7.5	625		45
M 10	480		34
M 15	330		32
M 20	250		30

Note: The proportion of the aggregates should be adjusted from upper limit to lower limit progressively as the grading of the aggregates becomes finer and the maximum size of coarse aggregate become larger. Graded coarse aggregate shall be used.

Example: For an average of fine aggregate (that is, Zone II). The proportions shall be 1: ½, 1:2 and 1:2½ for maximum size of aggregates 10 mm, 20 mm and 40 mm respectively.

The total water content in each batch of concrete shall always be kept constant as the amount previously determined by experiments. The quantity of water to be actually added may, therefore, vary depending on moisture content in the aggregates. In actual job, if the quantities of the ingredients remain constant, the amount of slump may be taken as a good guide indicating the total water content in the mixture. The consistency and consequently the water content of the concrete shall therefore be kept constant and checked from time to time as work proceeds, by means of standard slump test. The slump tests shall be carried out with concrete immediately after it has been mixed and before any initial set has commenced, the sample being taken preferably at the point where the concrete is being delivered for placing in the moulds.

The mould shall then be removed by rising vertically immediately after filling. The moulded concrete shall then be allowed to subside and the height of the specimen measured after coming to rest

The consistency shall be recorded in terms of millimeters of the subsidence of the specimen during the test, which is known as slump.

The following slumps shall be adopted for different works.

Sl. No	Type of Work	SLUMPS	
		When vibrator are used	When vibrators are not used
1.	Mass concrete in foundation footings, retaining walls and pavements	10 to 25 mm.	50 to 75 mm.

2	Mass concrete in RCC foundation, footing and retaining walls.	10 to 25 mm.	80 mm.
3.	Beams, slabs and columns simply reinforced	25 to 40 mm.	100 to 125 mm.
4.	Thin RCC section or section with congested steel	40 to 50 mm.	125 to 150 mm

I. S.: 456-2000 allows use of nominal mix of concrete upto grade M20 and may be allowed in works at the discretion of Engineer-in-Charge and will be guided by the provision of IS 456-2000. For grade of concrete above M20, design mix has to be adopted. For determination of mix proportion for design mix concrete, the target strength should be higher than the specified characteristic strength to ensure that characteristic strength is attained at 28 days at site. According to Explanatory Hand Book on IS 456-1978 (S.P. 24—1983):

Target Strength = Characteristic strength + 1.65 x standard deviation.

Standard deviation for different grades of concrete in absence of any test may be taken as per IS: 456 — 2000 as follows:

Grade of Concrete	Assumed Standard Deviation N/mm ²
M 10	3.5
M 15	3.5
M 20	4.0
M 25	4.0
M 30	5.0

Once the target strength of cube moulds with specific mix design is obtained in the laboratory, it may be inferred that the corresponding characteristic strength of concrete, prepared with the materials used in the test mould(s) cured under identical condition as that of the test specimen, shall be obtained at site at 28 days.

The Explanatory Hand Book on IS: 456—1978 (S.P.-24-1983) provides an approximate formula for expressing the strength of concrete at age 't' (in days), (Clause 5.2.1, Page-20)

$$f_t = [t/(a+b_t)] \times f_{28}$$

where f_{28} is the strength at 28 days. f_t = strength of concrete at any age

a & b are imperial constant

$$a = 4.7 \text{ and } b = 0.833$$

t = time in days

ACCEPTANCE CRITERIA:

The concrete shall be deemed to comply with the strength requirements when both the following conditions are met:

- (a) The mean strength determined from any group of four non overlapping consecutive test results complies with the appropriate limits, in Col. 2 of following table.
- (b) Any individual test result complies with the appropriate limits in Col. 3 of following table.

Characteristic Compressive Strength Compliance Requirement

Specified Grade	Mean of the Group of 4 Non-Overlapping Consecutive Test Results in N/mm²	Individual Test Result in N/mm²
M 15	= $f_{ck} + 0.825 \times$ established standard deviation (rounded off to nearest 0.5 N/mm ²) Or $f_{ck} + 3$ N/mm ² Whichever is greater	= $f_{ck} - 3$ N/mm ²
M 20 or above	= $f_{ck} + 0.825 \times$ established standard deviation (rounded off to nearest 0.5 N/mm ²) Or $f_{ck} + 4$ N/mm ² Whichever is greater	= $f_{ck} - 4$ N/mm ²

Note: In the absence of established value of standard deviation, the values given in relevant Table may be assumed, and attempt should be made to obtain results of 30 samples as early as possible to establish value of standard deviation.

Concrete of each grade shall be assessed separately. Concrete shall be assessed daily for compliance.

Providing a proper construction joint; (iii) the reinforcement has been displaced beyond the tolerances specified; or (iv) construction tolerances have not been met. However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the Engineer-in-Charge.

Frequency of sampling:

Sampling Procedure—a random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested; that is, the sampling should be spread over the entire period of concreting and cover all mixing units.

Frequency- The minimum frequency of sampling of concrete of each grade shall be in accordance with the following:

Quantity of concrete in the Work, Cum	Number of Samples
1-5	1
6-15	2
16-30	3
31-50	4
51 and above	4 Plus one additional sample for each additional 50m ³ or part thereof

TEST SPECIFICATION—The test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the form work, or to determine the duration of curing, or to check the testing error. Additional cubes may also be required for testing cubes cured by accelerated methods as described in IS:9013—1978. The specimen shall be tested as described in IS: 516-1959.

TEST STRENGTH OF SAMPLE—The test strength of the samples shall be the average of the strength of three specimens. The individual variation should not be more than ± 15 percent of the average.

Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent the segregation or loss of the ingredients. It shall be deposited as nearly as practicable in the final position to avoid re-handling or flowing. Unless specially permitted by the Engineer-in-Charge, concrete shall not be dropped freely from a height of more than 2 metres. Before placing the concrete, the moulds should be cleaned of shavings, pieces of wood or other rubbish.

When placing the concrete the finer materials must be carefully worked against the moulds so that the faces of concrete shall be left perfectly smooth and free from honey-combing upon withdrawal of the moulds. Any defect in this respect must be dealt with by the contractor as directed by the Engineer-in-Charge without any extra charges thereof.

Depositing concrete under water shall not be allowed without specific permission from the Engineer-in-Charge. The method of concreting to be adopted in such cases shall have to be previously approved by him.

During placing and also immediately after deposition, the concrete shall be thoroughly compacted by ramming, spearing etc. until it has been made to penetrate and fill all the spaces between and around the steel rods, around embedded fixtures, and into the corners of formwork in such a manner as to ensure a solid mass entirely free from voids. If so directed by the Engineer-in-Charge, in addition to usual ramming, spearing etc. sufficient number and suitable type of vibrators may have to be used on important jobs to enable working with homogeneity. It is imperative that the work should be done quickly as well as efficiently and adequate number of hands must therefore be employed to ensure this.

Concrete shall be placed and compacted in its final position before setting has commenced and shall not subsequently be disturbed.

Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be predetermined by the Engineer-in-Charge or his representative. Any rest, pauses, such as for meal, shall also be subject to his approval. All concreting work should be so programmed as not to necessitate work at night. If for any reason this becomes imperative, the contractor shall obtain previous permission of the Engineer-in-Charge or representative and make proper lighting arrangements, at own cost, to his satisfaction.

(iv) Protection and Curing: The contractor shall adequately protect freshly laid concrete, about 1 to 2 hours after its laying from too rapid drying due to sunshine, drying winds etc. and also from rains or surface water and shocks. About 24 hours after laying of concrete, the surface shall be cured by flooding with water of minimum 25 mm. depth or by covering with wet absorbent materials. The curing shall be done for a minimum period of 7 days. Over the foundation concrete the masonry work may be started after 48 hours of its laying, but the curing of cement concrete shall be continued along with masonry work for a minimum period of 7 days.

In case of cement concrete used as sub-grade for flooring, the flooring may be commenced with 48 hours of the laying of sub-grade. In case it is not possible to do so due to exigencies of work. the subgrade shall be roughened with steel wire brush without disturbing the concrete, wetted with neat cement slurry at the rate of 1.75 kg of cement per square metre applied to the base before laying floor, and full rate of artificial stone flooring/mosaic will be paid with the specific orders of the Engineer-in-Charge. The curing to be continued along with top layer of flooring for a minimum period of 7 days.

(v) Construction Joints: All joints in slabs and other horizontal members are to be formed by inserting vertical boards against which the concrete deposited can be properly rammed. The position where such joints may be made will be indicated by the Engineer-in-Charge or his representative.

In the case of horizontal joint any excess mortar or laitance shall be moved from the surface after the concrete is deposited and before it has set.

When the work has to be commenced on a surface which has hardened, such surface shall be well roughened and all laitance removed; the surface shall then be swept clean, thoroughly wetted and covered with a thin layer of mortar composed of equal volumes of cement and sand. Such works shall be deemed to be covered by the rates for concrete.

(vi) Minimum Crushing Strength: For major RCC work, (where concrete is specified by strength) the mix should not be leaner than 1:11/ :3 so as to give ultimate crushing strength not less than 25 N/Sq. mm. at 28 days cured under field condition. The mix for the concrete is to be so adopted and the slump is to be so allowed as to give specified strength and proper workability at the existing site conditions. Contractor shall remain fully responsible for producing concrete of specified strength in the actual job and therefore cast at his own cost test specimens of 15 cm. Cube as already specified during work and cure the same in similar way as for laid concrete being tested for strength. Each set of test specimen shall be

taken to cover the quantity of concrete laid on the job during the period from the time of taking the previous set of specimens and the quantity will be estimated by the Engineer-in-Charge from records maintained by him.

The interior surface of the mould and base plate shall be lightly oiled before the concrete is placed in the mould.

(a) Compacting—The test specimens shall be made as soon as practicable after mixing and in such a way as to produce full compaction of the concrete with neither segregation nor excessive laitance. The concrete shall be filled into the mould in layers approximately 5 cm deep. In placing each scoopful of concrete, the scoop shall be moved around the top edge of the mould as the concrete slides from it, in order to ensure a symmetrical distribution of the concrete within the mould. Each layer shall be compacted either by hand or by vibration. After the top layer has been compacted, the surface of the concrete shall be finished level with the top of the mould, using a trowel, and covered with a glass or metal plate to prevent evaporation.

Compacting by Hand - When compacting by hand, the standard tamping bar shall be used and the strokes of the bar shall be distributed in a uniform manner over the cross-section of the mould. The number of strokes per layer required to produce specified conditions will vary according to the type of concrete. For cubical specimens, in no case shall the concrete be subjected to less than 35 strokes per layer for 15 cm cubes or 25 strokes per layer for 10 cm cubes. For cylindrical specimens, the number of strokes shall not be less than 30 per layer. The strokes shall penetrate into the underlying layer and the bottom layer shall be rodded throughout its depth. Where voids are left by the tamping bar, the sides of the mould shall be tapped close the voids.

(b) Compacting by Vibrator - When the job concrete is placed by vibration and consistency of the concrete is such that the test specimens cannot be properly moulded by hand rodding as described under (a) above, the specimens shall be vibrated to give a compaction corresponding to that of the job concrete. The fresh concrete shall be placed in the mould in two layers, each approximately half the volume of mould. In placing each scoopful of concrete, the scoop shall be moved around the top edge of the mould as the concrete there slides from it, in order to ensure a symmetrical distribution of concrete within the mould. Either internal or external vibrator may be used. The vibration of each layer shall not be continued longer than what is necessary to secure the required density. Internal vibrators shall be of appropriate size and shall penetrate only the layer to be compacted. In compacting the first layer, the vibrators shall not be allowed to rest on the bottom of the mould. In placing the concrete for the top layer, the mould shall be filled to the extent that there will be no mortar loss during vibration. After vibrating the second layer, enough concrete shall be added to bring the level above the top of the mould. The surface of the concrete shall then be struck off with a trowel and covered with a glass or steel plate as specified under (a) above. The whole process of moulding shall be carried out in such a manner as to preclude the alternation of water cement ratio of the concrete by loss of water either by leakage from the bottom or overflow from the top of the mould.

Curing - The test specimens shall be stored on the site at a place free from vibration, under damp matting, sacks or other similar material for 24 hours \pm ½ hour from the time of adding the water to the other ingredients. The temperature of the place of storage shall be within the range of 220 to 320C. After the period of 24 hours, they shall be marked for later identification removed from

the moulds and unless required for testing within 24 hours, stored in clean water at a temperature of 24°C to 30°C until they are transported to the testing laboratory. They shall be sent to the testing laboratory well packed in damp sand, damp sacks, or other suitable material so as to arrive there in a damp condition not less than 24 hours before the time of test. On arrival at the testing laboratory, the specimens shall be stored in water at a temperature of 27 ± 2 °C until the time of test, records of the daily maximum and minimum temperature shall be kept during the period of the specimens remain on the site and in the laboratory.

After curing, the specimen suitably marked and properly wrapped shall be made over to the Engineer-in-Charge or his representative who will arrange to have them tested at 28 days from the date of casting. If there be any delay for any reason whatsoever the result of the test shall nevertheless be valid and will be applicable as per rules in each case for all test specimens whatsoever. The contractor shall be responsible for proper packing of the specimens at his own cost, for safe and convenient transport of the same from the site to the testing laboratory. The cost of testing the test moulds and other charges including cost of carriage of the test moulds from the work site to the particular laboratory (both ways) and other incidental charges in this connection will have to be borne by contractor.

In case of concrete showing, on the result of the cube tests, strength less than that specified in (a) and (b) of the Acceptance Criteria but has a strength greater than (c) & (d) of the said Acceptance Criteria concrete may, at the discretion of the Engineer-in-Charge, be accepted as being structurally adequate without further testing.

If the concrete is deemed not to comply pursuant to (c) & (d) of the Acceptance Criteria, the Structural adequacy of the parts affected may be investigated as per provision of I.S. 456-latest revision i.e. core test and/ or load test, as the case may be before rejection on the application of the Contractor with the undertaking to bear the cost of such tests. If the strength of concrete is such that it satisfies provisions made in relevant of 16.3.3 and/or sub-clause 16.5.3 of I.S. 456-1978, concrete in the member represented by such tests shall be considered acceptable but the Engineer-in-Charge shall have the full power to fix the rate of deduction @ Rs.200/- per cubic Metre

In case the test results do not satisfy the relevant requirement of the preceding paragraph, the volume of concrete so deficient shall be deemed to be un-acceptable and shall be removed from the structure and replaced by fresh concrete to specified strength and the contractor shall, in that case, have to carry out the instruction of the Engineer-in-Charge irrespective of the amount of loss, inconvenience and difficulties involved.

The contractor shall remain liable to act/to carry out instructions under the provision of this clause, notwithstanding issuing of any certificate or the passing of any bills or accounts by the Engineer-in-Charge.

(vii) Rehabilitation of Concrete For rehabilitation of Concrete Structures the following essential steps are to be followed

(a) To remove the loose concrete/plaster until hard and sound surface is exposed. (b)

To remove all rusts by wire brush or sand blasting.

- (c) To apply two coats of cement based Polymer modified anti corrosive protective coating to exposed reinforcement (manufacturer's specification is to be strictly followed).
- (d) If diameter of bar is reduced by more than 25%, additional bar equivalent to 50% area of existing bar is to be added by lapping/welding as deemed fit by Design wing.
- (e) (i) The exposed hard concrete surface is to be saturated with clean water and a bond coat of Cement slurry duly admixed with water resistant bonding agent.
Or
(ii) For concrete beam /column if found necessary by Engineer-in-Charge the surface may be treated by epoxy based reactive agent for jointing fresh concrete with old surface.
- Note:** In both cases manufacturer's specification is to be strictly followed. It is desirable that representative of the manufacturer supervises the special job and certify that the work is done as per specification.
- (f) (i) For Slab / Chhaja / Weatherboard: To fill up the removed part of Concrete / fresh Concrete / Plaster admixed with the water resistant bonding agent as per Manufacturer's specification within the time the bond coat remains fresh or tacky. The admixed material shall have to be applied within 30 minutes of preparation or as specified in literature.
- (ii) For Beams / Columns: To fill up the removed part of concrete with fresh concrete with water proofing plasticising admixture as per manufacturer's specification.
- (g) To cure the concrete surface for 3 days.

B-3 1st Class Brickwork:

Cement mortar shall be prepared by mixing sand and cement in specified proportion. Sand shall be measured on the basis of its dry volume. In case of damp sand, its quantity shall be increased suitably to allow for bulking.

Brick shall be laid in English bond. The brick shall be laid by layering method. A layer of mortar shall be spread on full width for suitable length of the lower courses. Each brick shall first be laid so as to project over the one below. Both at the end and at the side, then pressed into the mortar and shoved into final position so as to embed the brick and to fill its inside face fully with mortar. Cut bricks shall not be used except where necessary.

The walls shall be taken up true to plumb with plumb bob. The thickness of brick courses shall be kept uniform and for this purpose, wooden straight edge with graduations giving thickness of each brick course including joint shall be used. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in alternate course shall come directly one over the other. A set of tools comprising wooden straight edge, mason's spirit level, square, half metre rule, line and pins, string and plumb shall

be kept for every 3 masons for frequent checking during progress of work. Faces of walls found not in plumb shall be dismantled.

Both the faces of walls of thickness greater than 25 cm. shall be kept in proper plane. All the connected brickwork shall be carried out nearly at one level and no portion of the work shall be left more than 1 metre below the rest of the work. Where this is not possible, the work shall be racked according to bond (and not left toothed) at an angle not steeper than 45°

Bricks shall be so laid that all joints are quite full of mortar. The thickness of joints shall not exceed 10 mm. Bricks shall be laid with frogs upward except in the top course where frog shall be placed downward. The face joints shall be racked to a minimum depth of 15 mm. by racking tools daily during the progress of work when the mortar is still green, so as to provide key for plaster or pointing to be done. Where plastering or pointing is not required to be done, the joints shall be struck flush and finished at the time of laying.

The face of brickwork shall be cleaned the very day that brickwork is laid daily and all mortar droppings removed.

Green work shall be protected from rain by suitable covering. The brickwork shall be kept wet for a period of at least 7 days. The top of masonry work shall be left flooded at the close of the day.

Scaffolding shall be sound and strong and holes left in masonry work for supporting the scaffolding shall be filled and made good, before plastering.

B—4 Damp Proof Courses:

This shall be laid to specified thickness over walls for the full thickness of the super structure walls. The surface shall be leveled and prepared before laying the cement concrete. Edges of damp proof course shall be straight, even and vertical. Side shuttering shall consist of wooden form and shall be strong and properly fixed so that it does not get disturbed during compaction and the mortar does not leak through. The concrete mix shall be of workable consistency and shall be tamped thoroughly to make a dense mass. When the sides are removed, the surface should come out smooth without any honey-combing. The damp proof course shall be laid continuous and the surface shall be double chequered. Damp proof course shall be cured for at least seven days, after which it shall be allowed to dry. Water proofing materials of approved quality shall be added to concrete mixture in accordance with the manufacturer's specifications stating the quantity for water proofing materials in litres or kg. per 50 kg. of cement and will be paid for separately. Similarly, polymer based paint used under damp proof course as per manufacturer's specification shall also be paid separately.

B-5 Cement plaster:

The proportion of mortar of exterior or interior plaster shall be as specified in the items of work.

The plaster shall be of thickness as specified and the surface shall be similarly cured as for cement concrete. The moulding shall be carried out as shown in the drawing and shall be separately measured in overall length unless otherwise specified in the items. Interior corners and edges of openings if so directed by the Engineer-in-Charge shall be rounded off or chamfered with the same mortar for which no extra payment will be allowed. All cement concrete surface should be chipped off properly before taking up the plastering work.

B-6 Artificial Stone Floorings:

The artificial stone flooring shall be laid **in panels of shape and size as directed**. The casting of the panels will be so programmed as to prevent bonding of the freshly laid panel with adjacent panels.

Unless otherwise specified, the underlay shall be with graded stone chips 12 mm. down, the thickness of topping shall be of 3mm. thick and colouring pigment as may be required shall only be added with the topping. The topping and the underlay shall not be laid in one operation. After laying the 'Underlay' the surface shall be left out to dry. The topping shall be laid only after the underlay has sufficiently dried and initially set and after thoroughly brushing with hand wire brush and sweeping clean and after application of slurry. The topping shall be finished with an English trowel and a piece of clean dry linen. During all the stages, the required level shall be carefully observed and maintained. Suitable grading, where required, shall be provided in the flooring for water drainage as directed by the Engineer- in-Charge.

The corner between floor and wall shall be rounded off if so directed by the Engineer-in-Charge for which no separate payment shall be made. All cement concrete surface should be chipped off properly before taking up the flooring work.

B-7 Rain Water Pipes:

The rain water pipes shall be of the materials and of the sizes as specified. All rainwater pipes shall have suitable grating as directed at the inlet opening at roof and shall be fitted and fixed in proper position with necessary offsets, clamps, shoe, Y-junctions and other accessories as required and as directed by the Engineer-in- Charge. The pipes are to be fixed to walls in cement mortar (1: 4 with necessary clamps and nails, suitable teak wood blocks being fixed on the walls to receive the nails. Y- Junction shall be used at the top of the pipe and the vertical leg thereof shall be provided with a cowl. All joints are to be properly packed. In case the hole is made much larger than the size of the pipe, cement concrete (1:2:4) shall be used to fill the annular space. The pipes with fittings etc. are to be painted with 2 coats of paints as approved by the Engineer-in-Charge.

B-8 White Washing, Colour Washing:

Preparation of surface: All surfaces for white washing, colour washing, painting shall be thoroughly brushed free from mortar droppings and foreign matter and prepared to the satisfaction of Engineer- in-Charge, before application of the treatment

Before white washing all the nails etc. have to be removed from the walls and all nail or other holes, small depressions or damages in plaster of wall surface shall be filled or repaired to original condition with lime paste.

Old surfaces spoiled by smoke and greasy shoots shall be sprinkled with surki and water and rubbed with brickbats or steel wire brushes or steel scrapers. The surface shall then be broomed to remove all dust and shall be washed with clean water.

Preparation of white wash: The white washing is to be done with 5 parts of stone lime and one part of shell lime with necessary gum (2 Kg. per Cum of lime) using indigo as necessary and to be mixed as per standard practice.

Preparation of colour wash: Colour washing shall have a primer of white wash and shall be of shade as approved by the Engineer-in-Charge, sufficient quantity of colour wash enough for complete job shall be prepared in one operation to avoid any difference in shade.

Procedure and preparation of the surface shall be same as in white washing.

Application of white wash and colour wash : The operation for each coat shall consist of four consecutive strokes of the brush, one horizontally from right to left and the next from left to right and the third stroke bottom to upward and the fourth from top to down ward before the previous stroke dries. Each coat shall be allowed to dry before the next coat applied. No portion of the surface shall be left out initially to be patched up later on. The brush shall be dipped in white wash or colour wash, pressed lightly against the wall of the container and then applied by lightly pressing against the surface with full swing of hand.

The white wash on ceiling should be done prior to that on walls.

Protective Measures : Surfaces of doors, windows, floors, articles of furniture, beams, burghas etc. and such other parts of the building not to be white or colour washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white or colour wash splashes, if any

B -9 Dry Distempering:

Dry distemper of approved brand and manufacture shall be used. The shade shall be got approved from the Engineer-in-Charge before application of the distemper. The dry distemper shall be stirred slowly in clean water using 6 deciliters of water per kg. of distemper or as specified by the manufacturer. Warm water shall preferably be used. It shall be allowed to stand for at least 30 minutes (or if practicable over night) before use. The mixture shall be well stirred before and during use to maintain an even consistency. Distemper shall not be mixed in larger quantity than is actually required for one day's work.

Before new work is distempered, the surface shall be thoroughly brushed free from mortar droppings and other foreign matter and sand papered smooth. New plaster surface shall

be allowed to dry for at least two months, before applying distemper. In the case of old work, all loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease, dirt etc. Pitting in plaster shall be made good with plaster of paris mixed with dry distemper of the colour to be used. The surface shall then be rubbed down again with a fine grade Sand paper and made smooth. A coat of the distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is applied. The priming coat of whiting shall be applied and no white washing coat shall be used as a priming coat for distemper.

Whiting (ground white chalk) shall be dissolved in sufficient quantity of warm water and thoroughly stirred to form thin slurry which shall then be screened through a clean coarse cloth, Two kg. of gum and 0.4 kg. of copper sulphate dissolved separately in hot water be added for every Cum of the slurry which shall then be diluted with water to the consistency of milk so as to make as wash ready for use. The treated surface shall be allowed to dry before distemper coat is given. In the case of new work, the treatment shall consist of a priming coat of whiting followed by the application of two or more coats of distemper till the surface shows an even colour. For old work the surface is to be prepared as described above and one or more coats of distemper shall be applied till the surface attains an even colour. The application of each coat shall be as follows: The entire surface shall be coated with the mixture uniformly, with proper distemper brushes (ordinary white wash brushes shall not be allowed) in horizontal strokes followed immediately by vertical ones which together shall constitute one coat. The subsequent coats shall be applied only after the previous coat has dried. The finished surface shall be even and uniform and shall show no brush marks. Enough distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room, which cannot be completed the same day. After each day's work, the brushes shall be washed in hot water and hung down to dry. Old brushes which are dirty or caked with distemper shall not be used.

B-10 Painting:

All surfaces for painting shall be properly sand papered and cleaned and where necessary good quality putty shall be used to hide all holes, cracks, open joints etc. The rate for painting includes such work. Paint shall be applied with approved brushes and surfaces shall be sand papered after every coat. All work when completed shall present a smooth, clean solid and uniform surface, to the satisfaction of the Engineer-in-Charge.

- (a) **Primer:** All surfaces for painting, if they are new, should have a coat of priming before application of the paint. Old surfaces where existing paints have been completely worn out owing to long use should also receive a coat of priming before application of fresh painting.
- (i) **Wood primer:** Wood primer of approved brand and manufacture is to be applied on the wooden surface, which would be free from moisture and loose particles.
- (ii) **Steel Primer:** For steel surface red oxide primer, zinc chromate primer of approved brand and manufacture and as per direction of the Engineer-in-Charge is to be applied on the surface. The surface should be made free of grease, rust, moisture and loose particles.
- (iii) **Acrylic Primer Coat (solvent based Primer) :** Acrylic primer coat is to be used as base coat on wall finish of cement, lime or lime cement plaster surface before application of any wall coating e.g. distemper, oil based paints, synthetic enamel, acrylic emulsion etc. on them. Priming coat shall be preferably applied by brushing and not by spraying. Hurried

priming shall be avoided particularly on absorbent surface. New plaster patches in old work before applying distemper paints etc. should also be treated with acrylic primer. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of plaster of paris mixed with water on the entire surface including filling up the undulation and then Sand papering the same after it is dry. The cement primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first, vertical strokes shall be applied immediately afterwards. The entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

- (b) **Synthetic Enamel Paint:** Synthetic enamel paint of approved brand and manufacture and of the required shade shall be used for the top coat and an undercoat of shade to match the coat as recommended by the manufacturer shall be used. Undercoat of the specified paints 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 fine grade of wet abrasive paper to ensure a smooth and even surface free from brush marks and all loose particles dusted off. Top coats of specified paint of the 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.
- (c) **Aluminium Paint:** Aluminium paint of approved brand and manufacture shall be used. The paint comes in compact dual containers with the paste and the medium separately. The two shall be mixed together to proper consistency before use. Each coat shall be allowed to dry for 24 hours and lightly rubbed down with fine grade sand paper and dusted before the next coat is applied. The finished surface shall present an even and uniform appearance. As aluminium paint is likely to settle in the container, care shall be taken to frequently stir the paint during use. The paint shall be applied and laid off quickly, as surface is otherwise not easily finished.
- (d) **Interior Acrylic Emulsion Paint:** Acrylic emulsion paint are not suitable for application on external surface and surface which are liable to heavy condensation and are be used generally on internal surface. For plastered surfaces a cement priming coat is required before application of acrylic emulsion. Acrylic emulsion paint of approved brand and manufacture and of the required shade shall be used. The paint will be applied in the usual manner with brush 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 for 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 undercoat, which is applied on the absorbent surface. The quantity of thinner 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 present a uniform appearance.

- Precautions:**
- (i) 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.
- (ii) In the preparation of walls for Acrylic emulsion painting, an oil base putty shall be used in filling cracks, holes etc.

(iii) Splashes in floor etc. shall be cleaned out without delay as they will be difficult remove after hardening.

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

(e) Varnishing: Varnish for the undercoat shall be a flattening varnish of the same manufacture as the top coats. New wood work to be varnished shall be finished smooth with a carpenter's plane. Knots shall be cut to a slight depth. Cracks and holes shall be cleaned of dust. The knots, cracks etc. shall then be filled in with wood putty. The varnish shall be applied liberally with a full brush and spread evenly with short light strokes to avoid frothing. If the work is vertical the varnish shall be crossed and re-crossed and then laid off, the later being finished on the upstroke so that varnish, as it sets, flows down and eliminates brush marks. The above process will constitute one coat. If the surface is horizontal, varnish shall be worked in every direction with light quick strokes and finished in one definite direction so that it will set without showing brush marks. Rubbing down and fattening the surface shall be done after each coat except the final coat with fine sand paper. The work shall be allowed to dry away from draughts and damp air. The finished surface shall then present a uniform appearance and fine glossy surface free from streaks, blisters etc. Any varnish left over in the small container shall not be poured back into the stock tin, as it will render the latter unfit for use. Special fine haired varnishing brush shall be used and not ordinary paint brushes. Brushes shall be well worn and perfectly clean.

(f) Oiling with Raw Linseed Oil: Raw linseed oil shall be lightly viscous but clear and of a yellowish colour with light brown tinge. Its specific gravity at a temperature of 300 C shall be between 0.293 and 0.298. 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 be of approved brand and manufacture. The wood work shall be cleaned of all smoke and water and completely dried. The oil shall be applied freely with brushes (not rags) and spread evenly and smooth until no more oil is absorbed. Each subsequent coat shall be applied after the previous coat is thoroughly dried and in any case not before 24 hours of application of the first coat. Work after completion shall not be patchy and sticky to the touch and shall present a uniform appearance.

(g) Wax Polishing: Wax polishing shall be done with material of approved brand and manufacture. Preparation of surface will be same as for varnishing. The polish shall be applied evenly with a clean soft pad of cotton cloth in such a way that the surface is completely and fully covered. The surface is then rubbed continuously for half an hour. When the surface is quite dry, a second coat shall be applied in the same manner and rubbed continuously for one hour or until the surface is dry. The final coat shall then be applied and rubbed for two hours (more if necessary) until the surface has assumed a uniform gloss and is dry, showing no sign of stickiness. The final polish depends largely on the amount of rubbing which should be continuous and with uniform pressure with frequently changes in the direction.

(h) French Polishing: Pure shellac varying from pale orange to lemon yellow colour, free from resin or dirt shall be dissolved in methylated spirit at the rate of 150 gm. of shellac to a litre of spirit. Suitable pigment shall be added to get required shade. The surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots if visible shall be covered with a preparation of red lead and glue size laid on while hot. Holes and indentations on the surface shall be stopped with glazier's putty. The surface shall then be given a coat of wood filler made by mixing whiting (ground chalk) in methylated spirit at the rate of 1.4 kg. of whiting per litre of spirit. The surface shall again be rubbed down perfectly smooth with glass paper and wiped clean. A pad of woolen cloth covered by a fine cloth shall be used to apply the polish. The pad shall be moistened with the polish and rubbed hard on the wood in a series of overlapping circles applying the mixture sparingly but uniformly over the entire area of an even level surface. A trace of linseed oil on the face of the pad facilitates this operation. The surface shall be allowed to dry and the remaining coats applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean fine cotton cloth, slightly dampened with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall have a uniform texture and high gloss.

B-11 Terrazzo Flooring: (Cast in situ): I.S. 2114-1962

- (a) (i) The aggregates used in terrazzo topping shall be marble aggregates of required colour. Marble powder used in terrazzo shall pass through I.S. Sieve 30.
- (ii) Aggregates for terrazzo under layer as well as the base concrete shall conform to the requirements of ordinary cement concrete.
- (b) Cement used for floor finish work shall be ordinary cement or white cement of approved quality.
- (c) Pigments incorporated in terrazzo shall be of approved make & brand and of permanent colour
- (d) The dividing strips may be copper, brass, aluminium, plastic, glass or similar materials. Metallic dividing strips shall have a protective coating of bitumen. The thickness of strip shall not be less than 1.5 mm. and width not less than 20 mm.
- (e) (i) The base concrete shall be lean concrete of mix 1:5:10 of lime concrete and thickness shall be not less than 100 mm.
- (ii) The cushioning layer shall preferably be lime concrete and thickness shall be no less than 75 mm.
- (iii) (iii) The under layer shall be of cement concrete of 1: 2: 4, size of coarse aggregates not exceeding 12 mm. The thickness of terrazzo topping shall be not less than the following, depending upon the grades and size of chips used.

Grade Nos.	Size of chips	Minimum thickness of
0	1 to 2 mm.	6 mm.
0	2 to 4 mm.	
1	4 to 7 mm	9 mm
2	7 to 10 mm	12

- (f) The mix for terrazzo topping shall consist of cement with or without pigments, marble powder, marble aggregates and water. The proportion of cement and marble powder shall be 3 parts of cement and one part of powder by WEIGHT. For every part of cement marble powder

mix, the proportion of aggregates by VOLUME shall be as follows depending upon the size and grade of marble aggregates.

Size of aggregates	Proportion of aggregates to binder
For grades 00,0 and 1	13/4 parts
2	11/3 parts

- (g) The Proportion of cement shall be inclusive of any pigments added to cement. The proportions pigments die mixed with ordinary cement or white cement to obtain different colour to the binder, shall be as specified in the following Table:

Colour	Pigment to be used	Proportion of pigment	Proportion of Ordinary Portland cement	Proportion of white cement
Red	Red oxide of iron	1	15 to 20	NIL
Black	Carbons black	1	25 to 40	NIL
Pink	Red oxide	1	NIL	100 to 400
Cream	Yellow oxide of iron	I	NIL	100 to 400
Yellow	Yellow oxide of iron	1	NIL	25 to 75
Light Green	Green Chromium	1	NIL	50 to 150
French Grey		NIL	1 to 2	1

- (h) (i) Terrazzo topping shall be laid while the under layer is still plastic, but is hardened sufficiently, normally between 18 and 24 hrs. After the laying of the under layer, terrazzo topping may be laid. A cement slurry, preferably of the same colour as the topping shall be brushed on the surface immediately before laying is commenced. The terrazzo topping shall be compacted thoroughly by tamping or rolling and trowelled smooth. Excessive trowelling or rolling in early stages shall be avoided. The compaction shall ensure that air is cleared from the mix.

(ii) The surface shall be left dry for air curing for duration of 12 to 18 hrs. and then be cured by allowing water to stand in pools over it for a period of not less than 4 days.

(iii) Grinding and polishing may be done either by hand or by machine. The first and second grinding shall be done with carborundum stone of Grit size 60 and 80 respectively. After each grinding, the surface shall be washed clean and grouted with neat cement grout of the same colour (without marble powder) of cream like consistency and then shall be allowed to dry for

24 hours and wet cured for 4 days. The third grinding shall be done with carborundum stone of Grit size 120 to 150 and the surface shall then be washed clean and allowed to dry for 11 hours and wet cured for 4 days. The fourth grinding shall be done with carborundum stone of Grit size 320 to 400 and the surface shall

then be washed clean and rubbed hard with felt and slightly moistened oxalic acid powder (5 gm of oxalic acid powder per Sqm of floor area shall be adequate) and finally the surface shall be washed clean with dilute oxalic acid solution and dried.

B-12 Door, Window Frames and Shutters: (a)

Wooden Section:

All doors, window frames must have plaster rabbit 12 mm x 12 mm. and rabbit for receiving shutter at least 15 mm deep. Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-Charge. All portion of timber abutting against or embedded in masonry or concrete shall be painted with boiling coal-tar, before being placed in position. In place of coal-tar, use of approved wood primer shall be permitted. In case of door frames without sills, the vertical members shall be buried in floor 40 mm. deep. Where sills are provided, these sills shall be sunk in the floor to 40 mm. depth and shall rest on damp-proof course. Sills shall be provided, where so directed. The door frames without sills while being placed in position shall be provided with temporary wooden bracing or dry bricks well wedged between the styles at the sill level. These shall be retained to keep the frames from warping during construction. The frames shall also be protected from damages during construction. The shutters shall be so fixed that while closing, the left hand leaf of the shutter is closed first and the right hand leaf of shutter overlaps on the left hand leaf. The overlapping shall be minimum 20 mm. Solid wood panels shall be made out of one or more pieces of timber of not less than 125 mm. in width. In order to avoid warping, splitting and cracking, normally piece not exceeding 200 mm. in width should be used. When made from more than one piece, the pieces shall be joined with continuous tongued and grooved joints glued together and reinforced with metal dowels. The grains of the solid panel shall run along the longer dimension of the panel. The corners and edges of panels shall be finished as shown in drawings and these shall be feather tongued into styles and rails. Sash bars shall have mitered joints with styles. In measuring the width and thickness of styles and rails, a tolerance can be allowed up to 1 mm. Styles and rails shall be properly and accurately mortised and tenoned. Rails which are more than 180 mm. in width shall have two tenons. Styles and end rails of shutters shall be made out of one piece only. Lock and intermediate rails exceeding 200 mm. in width may be made out of one or more pieces of timber, but the width of each piece shall not be less than 75 mm. Where more than one piece of timber are used, they shall be joined with a continuous tongued and grooved joint glued together and reinforced with metal dowels at regular intervals not exceeding 200 mm. or pinned with not less than three 40 mm. rust proof pins of the lost heads type. Jointed pieces of timber shall belong to the same pieces. The tenons shall pass clear through styles. When assembling a leaf, styles shall be left projecting as a horn. The styles and rails shall have 12 mm. grooves in paneled portion for the panel to fit in. The joinery work shall be assembled and passed the Engineer-in-Charge and then the joints shall be pressed and secured by bamboo pins of about 6 mm. diameter. The horns of styles shall be sawn off.

Glass panes shall be fixed by wooden beading having mitered joints. A thin layer of putty shall be applied between glass panes and sash bars and also between glass

panes and the beading. Fixing of glass panes with simple putty⁴ and beads shall not be permitted. Putty shall be prepared by mixing one part white lead with three parts of finely powdered chalk and then adding boiled linseed oil to the mixture to form a stiff paste.

(A) Aluminium Sections.

Specifications for different component will be as follows. Any approved/ISI marked Aluminium extruded sections.)

(A) Sliding Window:

(i) 2 Track Sliding

Frame :

Bottom Member	4095	151.15
Top & Side Member	4096	151.15 ¹

Shutter :

Bottom & Top. Member	4148	151.16
Style Side	9777	151.15
Inter Lock	9778	151.15 ²

(ii) 3-Track Sliding

Frame :

Bottom Member	4097	151.15
Top & Side Member	4098	151.15 ¹

Shutter :

Bottom & Top. Member	4148	151.16
Style Side	9777	151.15
Inter lock	9778	151.15 ²

(iii) 4 Track Sliding

Frame :

Bottom Member	4121	151.6
Top & Side Member	4120	151.6

Shutter
:

Bottom & Top. Member	4148	151.161
Style Side	9777	151.152

Accessories: EPDM Gasket, Adhesive, Screw, Cleat Angle
Glass: clear bubble free float glass

(B) Casement Window:

**(i) 40 series (40 mm depth).
Outer Frame**

	Peripheral members	4133	151.1
	Mullion	9149	151.79
	Shutter :		
	Frame members	9148	151.81
	Glazing Clip	4135	151.96
	Cleat Angle. (Non-Anodized)	2081	151.167
(ii)	34 series (34 mm depth).		
	Outer Frame		
	Peripheral Member	2082	151.164
	Mullion	9139	151.163
	Shutter :		
	Peripheral Member	2082	151.164
	Mullion	9139	151.163
	Shutter :		
	Frame members	4124	151.165
	Glazing Clip	4125	151.166
	Cleat Angle. (Non-Anodized)	2081	151.167
	Accessories: Stainless steel / Aluminium Functional, Hinge, EPDM Gasket-T & U Type, Adhesive, Screw, Glass		

(C) Louvered Window: Outer

Frame

	Top, Bottom & Side Member	9835	303.01
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Louver

	Light – 18G	1702	
	Medium – 16G	1702	
	Heavy – 14G	1702	

(D) Fixed glazing on all tracks with member of all fixed glazing flushed on one side only

Frame

	Top, Bottom & Side	9210	151.53
	Mullion	9207	151.52
	Glazing Clip	4660	151.17

Accessories: EPDM Gasket, Glass

(E) Fixed Partition -for height of clear opening more than 1.0 Metre

(i) Unsupported length (Vertical member) up to 1.5 m height

	Members:		
	Side, Top & Bottom	9210	151.5
	Intermediates	9207	151.5
	Glazing Clip	4660	151.1
			-
(ii)	Unsupported length (Vertical Member) above 1.5 m height		
	Members:	9221	151.18
	Intermediates	9220	151.19
	Glazing Clip	4660	151.17
(iii)	Both ends restrained (with horizontal members or masonry walls / concrete members where the horizontal members can be screwed) for panels		
	Members:		
	Side, Top & Bottom	9210	151.53
	Intermediates	9207	151.52
	Glazing Clip	4660	151.17
(iv)	Both ends restrained (with horizontal members or masonry walls / concrete members where the horizontal members can be screwed) for panels		
	Members:		
	Side, Top & Bottom	9221	151.18
	Intermediates	9220	151.19
	Glazing Clip	4660	151.17
	Accessories: EPDM Gasket, Glass / Board		
F)	Movable door shutters fully glazed, partly glazed Partly pre-laminated and rimless doors.		
(i)	Movable door Door Frame, (Required only when there is masonry wall/concrete member).		
	Top Side member	9210	
	151.183		
	Shutter:		
	Top Rail	9201	151.26
	Bottom Rail	9200	151.23
	Lock Rail	9240	151.21
	Door Vertical	9241	151.23
	Glazing Clip	4660	151.17
	Handle	5140	157.13

(ii) Rimless Door

Top & Bottom Rail
151.51

9206

Accessories:

1. Heavy duty floor spring & top pin assembly make:
Garnish/Nita/Hardwyn or any approved make conforming to IS : 6315
2. EPDM Gasket
3. Wool Pile
4. Lock
5. Handle-Standard/Decorative/Acrylic.
6. Sundries: Adhesive, screw, Cleat Angle

B-13 Door, Window Clamps or holdfasts:

- (a) Unless otherwise specified the clamps shall be fixed to outer side of the frame with screws. For the purpose of receiving clamps a recess of at least 12 mm. deep of suitable size shall be cut into the frame. After fixing the frame true to plumb with the clamps, the exposed face of the clamps shall be covered by a thin wooden covering fixed with screws.
- (b) The side of the door, window frames which remains in contact with masonry shall invariably be painted with a protective coat of paint.

B-14 Schedule of Fittings:

- (i) Fittings shall be of iron, aluminium or as specified. These shall be well made, reasonably smooth and free from edges, corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. All hinge pins shall be of steel and their riveted heads shall be well formed.

Iron fitting shall be finished bright or copper oxidised. Brass fittings shall be finished bright (brass), oxidised or chromium—plated (electro-plated) and aluminium fittings shall be finished bright or anodised or as specified. Fittings shall be got approved by the Engineer- in charge before fixing.

- (ii) Screws used for fittings shall be of the same metal and finish as the fittings; however anodised brass screws or chromium brass screws shall be used for fixing aluminium fittings.
- (iii) Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screwdriver and not hammered in. Recesses shall be cut to exact size and depth for the counter -sinking of hinge.

B-15 Stone Masonry Block Walling:

- (i) Considering ease in handling and other requirements, the nominal length and height of the block is kept 300 mm. and 150 mm. respectively with the widths as 200, 150 and 100 mm. respectively. The actual block dimensions are short by 10 mm. to accommodate mortar joint thickness. These blocks weigh from 9 to 18 kg each. The stone masonry blocks are made from large size stone pieces bound together with lean cement concrete mix 1:5:8 (cement, sand, stone aggregate 10 mm down). The stone piece sizes vary from 50 to 260 mm. To impart good workability and bond, the sand should be well graded and should have tiny particles (15 to 20%) passing I.S. sieve Nos. 300 micron and 5 to 15% passing I.S. sieve no 150 micron in area. Where fly ash is available, this may be used as substitute for the fine particles of sand, provided good workability and plasticity in such lean concrete is achieved to the desired extent and in such case of using of fly ash, lesser cost of production of masonry stone block may be achieved.
- (ii) Stone masonry blocks are prepared in the following stages (a) Stone pieces are arranged in mould (b) concrete (1:5:8) is filled around stone pieces in first layer (c) Second layer of stone pieces is laid then (d) Concrete (1.5:8) is filled up to top.

Demoulding of such blocks follows soon after 3 to 7 minutes of its casting. The moulded blocks are cured by frequent sprinkling of water over the stacks for 2 weeks and are cured for another 2 weeks before laying them in wall.

For quality control, testing of two blocks out of every 500 blocks for compressive strength after providing proper capping as per test procedure laid down in I.S.-2185 of 1967, from (1:5:8) lean concrete stone masonry block (290 mm x 190 mm.) and thickness 140 mm is desired. Average ultimate crushing load for such block in tons is to be 38 and its average compressive strength thus stands at 69 kg/sq. cm.

- (iii) The blocks are used both for load bearing and non-load bearing walls. Permissible stresses in the masonry are taken from the I.S. Code 1969 of 69 –Structural safety of building - masonry walls.

As cutting of the these blocks is not recommended all length of walls, openings, spaces between openings etc. shall be in multiple of 100 mm. and all height shall be multiple of course height

Wall thickness is decided based on the strength of the blocks and the load coming over it. The blocks should be dry at the time of laying in the masonry. If the climate is not dry, the blocks may be wetted on the surface only in order to reduce the suctioning of water from the mortar. For breaking of vertical joints in alternate course, smaller length blocks (depending upon the wall length) are used. The external surface is finished with designable pointing; the internal face may or may not be plastered.

B-16 PRECAUTION AND SEQUENCE OF OPERATION DURING DEMOLITION / DISMANTLING OF STRUCTURE

PROCEDURE FOR DEMOLITION:

Before beginning the actual demolition work, a careful study shall be made of the structure which is to be pulled down and also of all its surroundings to ascertain how far the stage by stage demolition will affect the safety of the adjoining structure. A definite plan of procedure for the demolition work, depending upon the manner in which the loads off the various structural parts are supported, shall be prepared and approved by the Engineer-in-Charge and this shall be followed as closely as possible, in actual execution of the demolition work.

It should be ensured that the demolition operations do not, at any stage, endanger the safety of the adjoining buildings. Moreover, the nuisance effect of the demolishing work on the use of the adjacent buildings should be kept to the minimum.

No structure or part of the structure or any floor or temporary support or scaffold, side wall or any device or equipment shall be loaded in excess of the safe carrying capacity, in its then existing condition.

PRECAUTIONS PRIOR TO DEMOLITION:

1. On every demolition job, danger signs shall be posted all around the structure and all doors and openings giving access to the structure shall be kept barricaded or manned except during the actual passage of workmen or equipment. However, provisions shall be made for at least two independent exits for escape of workmen during any emergency.

During nights, red lights shall be placed on or about all the barricades.

- 2 All the necessary safety appliances shall be issued to the workers and their use explained. It shall be ensured that the workers are using all the safety appliances while at work.
3. The power on all electrical service lines shall be shut off and all such lines cut or disconnected at or outside the property line, before the demolition work is started. Prior to cutting of such lines, the necessary approval shall be obtained from the electrical authorities concerned. The only exception will be any power lines required for demolition work itself.
4. Water stream and other service lines shall be shut off and capped or otherwise controlled at or outside the building line, before demolition work is started.

SPECIAL MEASURES FOR PUBLIC:

1. Safety distances to ensure safety of public shall be clearly marked and prominently sign posted.

Every sidewalk or road adjacent to the work shall be closed or protected. All main roads, which are open to all, shall be kept open to the public clear and unobstructed at all times. Diversions for pedestrians shall be constructed, where necessary for safety.

2. If the structure to be demolished is more than two storied or 7.5 m high, measured from the side walk or street which cannot be closed or safely diverted, and the horizontal distance from the inside of the sidewalk to the structure is 4.5 m or less, a substantial sidewalk shed shall be constructed over the entire length of the sidewalk adjacent to the structure, of sufficient width with a view to accommodate the pedestrian traffic without causing congestion. The side walk shed shall be lighted sufficiently to ensure safety at all times.

The roof of sidewalk sheds shall be capable of sustaining a load of 73 N/mm^2 . Only in exceptional cases, say due to lack of other space, the storing of material on a sidewalk shed may be permitted in which case the shed shall be designed for a load of 146 N/mm^2 . Roof of sidewalk shed shall be designed taking into account the impact of the falling debris. By frequent removal of loads it shall be ensured that the maximum load, at any time, on the roof of work shed is not more than 6000 N/mm^2 . The height of sidewalk shed shall be such as to give a minimum clearance of 2.4 m.

Sidewalk shed opening for loading purposes, shall be kept closed at all time except during actual loading operations.

The deck flooring of the sidewalk shed shall consist of plank of not less than 50 mm in thickness closely laid and deck made watertight. All members of the shed shall be adequately braced and connected to resist displacement of members or distortion of framework.

When the horizontal distance from the inside of the sidewalk to the structure is more than 4.5 m and less than 7.5 m, a sidewalk shed or fence with substantial railing shall be constructed on the inside of the sidewalk or roadway along the entire length of the demolition side of the property with movable bars as may be necessary for the proper execution of the work.

SPECIAL PRECAUTIONS DURING DEMOLITON:

- Prior to commencement of work, all material of fragile nature like glass shall be removed.
- All openings shall be boarded up.
- Dust shall be controlled by suitable means to prevent harm to workmen.

SEQUENCE OF DEMOLITION OPERATIONS:

1. The demolition work shall be proceeded with in such a way that
 - (a) it causes the least damage and nuisance to the adjoining building and the members of the public, and
 - (b) it satisfies all safety requirements to avoid any accidents.

2. All existing fixtures required during demolition operation shall be well protected with substantial covering to the entire satisfaction of the rules and regulations of the undertakings or they shall be temporarily relocated.
3. Before demolition work is started, glazed sash, glazed doors and windows etc. shall be removed. All fragile and loose fixtures shall be removed. The lath and all loose plaster shall be stripped off throughout the entire building. This is advantageous because it reduces glass breakage and also eliminates a large amount of dust producing material before more substantial parts of the buildings are removed.
4. The demolition shall always proceed systematically storey by storey, in the descending order. All work in the upper floor shall be completed and approved by the Engineer-in-Charge prior to disturbance to any supporting member on the lower floor. Demolition of the structure in sections may be permitted in exceptional cases if proper precautions are ensured to prevent injuries to persons and damage to property.

DEMOLITION OF WALLS:

1. While walls of sections of masonry are being demolished, it shall be ensured that they are not allowed to fall as single mass upon the floors of the building that are being demolished so as to exceed the safe carrying capacity of the floors. Overloading of floors shall be prevented by removing the accumulating debris through chutes or by other means immediately. The floor shall be inspected by the Engineer-in-Charge before undertaking demolition work and if the same is found to be incapable to carry the load of the debris, necessary additional precautions shall be taken so as to prevent any possible unexpected collapse of the floor.
2. Walls shall be removed part by part. Stages shall be provided for the men to work on if the walls are less than one and a half brick thick and dangerous to work by standing over them.

DEMOLITION OF FLOOR:

1. Prior to removal of masonry or concrete floor adequate support centering shall be provided.
2. When floors are being removed, no workmen shall be allowed to work in the area, directly underneath and such area shall be barricaded to prevent access to it.

DEMOLITION OF CERTAIN SPECIAL TYPES AND ELEMENTS OF STRUCTURES:

1. ROOF TRUSSES:

- a) If a building has a pitched roof, the structure should be removed to wall plate level by hand methods. Sufficient purlins and bracing should be retained to ensure stability of the remaining roof trusses while each individual truss is removed progressively.

- (b) On no account should the bottom tie of roof trusses be cut until the principal rafters are prevented from making out ward movement.

2. HEAVY FLOOR BEAMS:

Heavy baulks of timber and steel beams should be supported before cutting at the extremities and should then be lowered gently to a safe working place.

3. BRICK ARCHES:

Expert advice should be obtained and, at all stages of the demolition, the closest supervision should be given by persons fully experienced and conversant in this type of work to ensure that the structure is stable at all times.

However, the following points may be kept in view.

- (a) On no account should the restraining influence of the abutments be removed before the dead load of the spandrel fill and the arch rings are removed.
- (b) A single span arch can be demolished by hand by cutting narrow segments progressively from each springing parallel to the span of the earth, until the width of the arch has been reduced to a minimum which can then be collapsed.
- (c) Where deliberate collapse is feasible, the crown may be broken by the demolition ball method working progressively from edges to the centre.
- (d) In multi-span arches, before individual arches are removed, lateral restraint should be provided at the springing level. Demolition may then proceed as for single span; where explosives are used it is preferable to ensure the collapse of the whole structure in one operation to avoid the chance of leaving unstable portion standing.

4. CANTILEVER (NOT PART OF A FRAMED STRUCTURE):

Canopies, cornices, staircases and balconies should be demolished or supported before tailing down load is removed.

5. IN-SITU REINFORCED CONCRETE:

Before commencing demolition, the nature and condition of the concrete, the condition and position of reinforcement and the possibility of lack of continuity of reinforcement should be ascertained.

Demolition should be commenced by removing partition and external non-load bearing cladding.

(a) REINFORCED CONCRETE BEAMS:

A supporting rope should be attached to the beam. Then the concrete should be removed from both ends by pneumatic drill and the reinforcement exposed. The reinforcement should then be cut in such a way as to allow the beam to be lowered under control to the floor.

(b) REINFORCED CONCRETE COLUMNS:

The reinforcement should be exposed at the base after restraining wire guy ropes have been placed round the member at the top. The reinforcement should then be cut in such a way as to allow it to be pulled down to the floor under control.

(c) REINFORCED CONCRETE WALLS:

These should be cut into strips and demolished as for columns.

(d) SUSPENDED FLOORS AND ROOFS:

The slab should be cut into strips parallel to the main reinforcement and demolished strip by strip. Where ribbed construction has been used, the principle of design and method of construction should be determined before demolition is commenced. Care should be taken not to cut the ribs inadvertently.

LOWERING, REMOVAL AND DISPOSAL OF MATERIALS:

Dismantled materials may be thrown to the ground only after taking adequate precautions. The material shall preferably be dumped inside the building. Normally such materials shall be lowered to the ground or to the top of the sidewalk shed, where provided, by means of ropes of suitable tackles.

MODES OF MEASUREMENTS

GENERAL: Unless specifically mentioned otherwise, the following modes of measurement shall be adopted.

C-1 Brick Walls:

(a) With Modular Bricks (190 mm x 90 mm x 90 mm) :

The thickness of brick wall made of Modular Bricks with one brick laid flat (with long side parallel to the length of the wall) shall be measured as 100 mm. One brick thick walls (with the length of the brick parallel to the thickness of the wall) shall be measured as 200 mm., one and half brick as 300 mm, two brick walls measured as 400 mm and so on.

(b) With Conventional Bricks ($9\frac{3}{4}$ x $4\frac{3}{4}$ x $2\frac{3}{4}$) or (248 mm x 120 mm x 70 mm):

The thickness of brick wall made with one brick laid on edge (with the long side parallel to the length of the wall) shall be measured as 75 mm. Similarly, a wall made with one brick laid flat (with the long side parallel to the length of wall) shall be

measured as 125 mm. 1 brick thick walls (with the length of brick parallel to the thickness of the wall) shall be measured as 250 mm, one and half brick walls (i.e. one brick along the length and one brick along the width) shall be measured as 375 mm., two brick thick walls measured as 500 mm. and so on.

- (c) The width of lintels etc. covering the entire thickness of brick wall shall also be measured as equal to corresponding wall thickness.
- (d) Net measurement of all walls will be taken after deduction of all opening etc. This applies to 125/100 mm. thick and 75 mm. thick walls also. Parapets (upto 1060 mm. height) will be measured along with the brick work of the floor just below the roof and will be paid for at the same rate.
- (e) No extra payment will be made for curved or chamfered work even though it may necessitate cutting of bricks. For small curves or chamfers the Engineer-in-Charge may, at his discretion allow measurement on the square (i.e. without deduction for the quantity removed for forming the small curve or chamfer).

C-2 Concrete Plain or Reinforced:

Finished net measurement will be taken after deduction of large holes, rebates etc. but without deduction for the volume of reinforcement, if any, in the concrete.

C-3 Reinforcement:

The measurement will be on the basis of calculated weight of reinforcement only (i.e. without considering the weight of tying wires) actually consumed in the finished work as per drawing and design or as per direction of the Engineer-in-Charge. If the length of any rod be more than that shown in the drawing but has been allowed to be used, the length will be taken as the length shown in the drawing. Hooks and laps as per standard practice will be measured and paid for.

C-4 Plaster, Lime punning, Plaster of Paris rendering:

For measurements of plaster (exterior or interior) deduction is to be made for door, window or opening of similar dimension and allowance is to be made for jambs, sills and soffits. Payment will be made on the basis of surface measurement of wall deducting one-third the measurement of such opening and without any separate measurement of jambs, sills and soffits. In case of large openings, exceeding three Sqm however, as in the case of verandahs with columns, payment will be on actual measurements.

C-5 White Washing and Colour Washing:

- (i) Payment will be made on the basis of surface measurement without any deduction for door, window or opening or similar dimension and without any separate measurement for jambs, sills and soffits of such openings.

- (ii) For cement paint and oil painting to walls or concrete jellies or similar other works, method of measurements shall be the same as in plaster.

C-6 Painting:

- (a) Measurement for painting work in doors and windows, grills, gratings, collapsible gates, corrugated roofing etc. shall be on the following basis. In all such cases the —Area shall be measured flat (and not girthed). For door and windows, no separate payment shall be made for the frames (chowkats), the —Area in such cases represents the area of the wall opening covered by the frames (including exposed surface of the frames). For grills, gratings etc. the area represents the area of the opening covered by outer frames.
- (b) The area measured as above shall be multiplied by the factor given below and the works of painting shall be paid on the quantities thus arrived at:

Name of surface painted	Multiplying factor for painting one side only	Multiplying factor for painting both side
(i) Timber doors, windows etc.	0.80	1.60
Fully glazed (or with glass	1.30	2.60
substitute) Fully paneled or flush	1.80	3.60
or battened Fully venetian or	1.14	2.28
fixed or louvered	1.00	2.00
Two third paneled one third	1.20	2.40
glazed half paneled half	0.75	1.50
glazed		
Flushing joiner	1.33	2.66
One third paneled two third glazed	1.55	3.10
One third paneled two third venetian	0.25	0.50
(or fixed	0.63	1.25
louvered)	1.25	2.50
Half paneled half venetian (or fixed-louvered)	1.05	2.10
Netted (without painting to the net with z-	1.14	2.28
battens) Netted (with Painting to the net as	1.20	2.40
well with Z-battens)	1.10	2.20
Corrugated (i.e. with leaves of GI.		
sheets) (ii) (a) Corrugated iron sheet roof		1.50
(b) Corrugated iron sheet wall including supporting frame		1.50
(iii) Corrugated asbestos sheet roof or wall	0.50	1.00
(iv) Trafford Asbestos sheet roof or wall	1.13	2.25
(v) Heavy type grating or grated doors (as in jails etc.)	1.47	2.94
for painting all over	1.13	2.25
(vi) Collapsible gate (all		
over) (vii) Steel windows	1.20	2.25
(full glassed)		
(viii) Ledges & battened or ledged, battened and braced one		0.80
third glazed two third venetian (or fixed-		
louvered) two third glazed one third venetian		
(or fixed-louvered)		2.00
(ix) Weather boarding (Supporting frame shall not be		
Measured separately)		
(x) Title & slate battening (over all measured		1.00
without deduction the open surface)		
(xi) Trellis (or jaffri) work one way or two way (over all		
members without deduction the open space &	1.10	2.20
including the supporting members for painting all	2.00	4.00
over)		
(xii) Grills, gratings & railings (cast iron or wooden)		
guards bars, balustrades, expanded metals (supporting	0.80	1.00
frame work shall not be measured separately for painting all		
over) (xiii) Steel rolling shutters including top casing	1.10	2.20
(jambgurdes, bottom rail and locking arrangement etc. shall	1.10	2.20
be deemed to be included in the item.)	1.05	2.10
(xiv) Curved or enriched work.		
(xv) Gates and open palisade fencing including standards,		
braces, rails, stays etc. (for painting all over)		
(xvi) Partly paneled and partly glazed or glazed		
steel door. (xvii) Plain sheet steel doors & windows		
(xviii) Wood shingle roofing		
(xix) Boarding with cover fillets and match boarding		

Note as per IS: 1200 (Part XV)-1976/P-8

- Note 1.** The Height shall be taken from bottom of lowest rail, if palisades do not go below it or from lower end of palisades, if they project below lowest rail, upto top of palisades, but not upto top of standards, if they are higher than palisades.
- Note 2.** Where doors, windows etc. are of composite types other than those included in this table, different portions shall be measured separately with their appropriate coefficients, center of common rail being taken as the dividing line between the two portions.
- Note 3.** Measurement of painting of doors, windows, collapsible gates, rolling shutters etc as given in this table shall be deemed to include painting, if required of all iron fittings in the same shade.
- Note 4** When two faces of a door, window etc. are to be treated with different specified finishes, measurable under separate items, edges of frames and shutters shall be treated with the or the other type of finish and measurement thereof shall be deemed to be included in the measurement of the face treated with that finish.
- Note 5.** In case shutters are fixed on both faces of a frame, measurement for the door frame and shutter on one face shall be taken on the manner already described, while the shutter on the other face shall be measured exclusive of the frame.
- Note 6.** Where shutter is provided with clearance exceeding 15 cm. at top and/or at bottom, such openings shall be deducted from the overall measurement and relevant coefficients applied.

C-7 Metal, Chips, Boulders, Bats, Sand, Lime, Coal, Carried Earth etc. :

- (a) Unless specifically mentioned otherwise in the description of the item itself, measurements for supply and / or carriage shall be taken in stacks and that as soon after the stacks are made as possible. The height and the shape and size of the stacks shall be as per direction of the Engineer- in-charge but in no case shall the height of the stacks be less than the minimum as indicated hereinafter.

Allowance for shrinkage and / or shrinkage shall be made as indicated hereinafter. The net quantity shall be arrived at after deducting these allowances from the measurement of fresh stacks and payment for supply or carriage shall be made on the net quantity thus derived. Quantity of any material shall always indicate such net quantity, unless specifically mentioned otherwise.

- (b) If for any special reasons, as per provisions in any particular contract, final measurements have to be taken in wagons (before unloading at destination) no deduction for shrinkage and / or shrinkage shall be made.

For carried earth supplied by the contractor, the earth is to be first stacked at site for measurement and the earth utilised in the work after such stacks have been measured. The items of earthwork with such carried earth include the cost of such operation. The net quantity, for the purpose of payment, shall be derived after deducting allowances for shrinkage and/or shrinkage as specified below. In special circumstances, the Engineer-in-Charge may, at his sole discretion, take borrow- pit measurements for such carried earth, in which case no allowance for shrinkage and/or shrinkage is to be deducted.

Where earth is to be carried from any excavation, the measurement for carriage for excavated earth will be taken on the basis of earth excavated.

(c) For conversion of brick materials from one form to another 314 Nos. of bricks (conventional size) will be taken to produce 1 cum of bats and 1.1 cum of bats to produce 1 cum of khoa or metal.

Unless specifically mentioned otherwise in any particular contract, 1025 kg. of steam coal shall be taken as equivalent to 1 cum (When measured in very old and settled stacks or in wagons at destination or after deducting sinkage and/or shrinkage allowance when measured in fresh stacks). Similarly 1107 Kg. of slack coal shall be taken as equivalent to 1 cum

(d) For consolidation of stone or jhama metal and similar works involving utilisation of materials already measured in stacks, the quantity of materials actually consumed in such works will be taken to be same as the recorded quantities (after due allowance for sinkage and/or shrinkage, where applicable) of the stack or stacks actually utilised in such works.

(e) Schedule showing minimum height of stacks and allowance to be deducted for sinkage and/or shrinkage when measured in fresh stacks.

Sl. Nos.	MATERIALS	Minimum height of stacks	Allowance to be deducted for sinkage and/or shrinkage
(a)	Stone metal, ballast, chips, shingles or	32.5 cm	1/13
(b)	Stone boulders 15 cm. or above sizes	35 cm	1/7
(c)	Stone boulders below 15 cm. size	45 cm	1/9
(d)	Jhama bats or bricks bats	53 cm	1/7
(e)	Jhama metal, khoa or chips	34 cm	1/9
(f)	Sand	61 cm	1/8
(g)	Surki	61 cm	1/4
(h)	Lime	61 cm	1/4
(i)	Moorum	33.5 cm	1/13
(j)	Carried earth	34 cm	1/9
(k)	Rubbish (building or kiln)	34 cm	1/9
(l)	Steam coal or slack coal	61 cm	1/8
(m)	Cinder	61 cm	1/9

C-8 Carriage:

All items involving carriage, loading, unloading & stacking shall be in accordance with the provisions of the Schedule of Rates of Public Works (Roads) Department applicable at the material time within the jurisdiction of the circle.

C-9 Glazing:

All glazing shall be measured in square metres. Each pane of glass shall be measured to the nearest 0.5 cm. both width and height. Irregular or circular panes shall be measured as the

smallest rectangular area from which the irregular or circular pane can be cut. Irregular panes shall be measured separately, and described as irregular shapes measured square.

CHART FOR CONSUMPTION OF MATERIALS

Consumption of different materials of construction in the corresponding contract items of work shall be computed on the basis of the quantities shown in this table subject to a variation of plus/minus 5 (Five) per cent. For steel reinforcement, the variation may be permitted upto $\pm 10\%$

N.B. : The statement is based on the following assumptions :

- (i) That dry sand with necessary allowance for bulking is used and (ii) that the size of bricks used shall be $248 \times 120 \times 70$ mm or $9\frac{3}{4} \times 4\frac{3}{4} \times 2\frac{3}{4}$ " for conventional bricks and $(190 \times 90 \times 90)$ mm for modular bricks

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required
1.	10 mm. cement plaster 1:2	% Sqm	1. Cement 2. Sand	0.54 1.08 Cum Cu.m
2.	-Do- 1:3	% Sqm	1. Cement 2. Sand	0.40 1.20 Cum Cu.m
3.	-Do- 1:4	% Sqm	1. Cement 2. Sand	0.30 1.20 Cum Cum
4.	-Do- 1:6	% Sqm	1. Cement 2. Sand	0.20 1.20 Cum Cu.m
5.	15 mm cement plaster 1:2	% Sqm	1. Cement 2. Sand	0.80 1.60 Cum Cu.m
6.	-Do- 1:3	% Sqm	1. Cement 2. Sand	0.60 1.80 Cum Cu.m
7.	-Do- 1:4	% Sqm	1. Cement 2. Sand	0.46 1.84 Cum Cu.m
8.	-Do- 1:6	% Sqm	1. Cement 2. Sand	0.30 1.80 Cum Cu.m
9.	20 mm. cement plaster 1:3	% Sqm	1. Cement 2. Sand	0.80 2.40 Cum Cu.m
10.	-Do- 1:4	% Sqm	1. Cement 2. Sand	0.60 2.40 Cum Cu.m
11.	-Do- 1:6	% Sqm	1. Cement 2. Sand	0.40 2.40 Cum Cu.m
12.	25 mm. cement plaster 1:3	% Sqm	1. Cement 2. Sand	0.884 2.65 Cum Cu.m
13.	-Do- 1:4	% Sqm	1. Cement 2. Sand	0.71 2.84 Cum Cu.m
14.	25 mm. cement plaster 1:6	% Sqm	1. Cement 2. Sand	0.472 2.84 cum cu.m
15.	Cement flush / rule/ tuck 1:3	% Sqm	1. Cement 2. Sand	0.119 0.357 cum cu.m

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required	
16.	-Do-	1:4	% Sqm	1. Cement 2. Sand	0.091 cum 0.366 cu.m
17	Brick work in Cement mortar	1:2	cum	1. Brick 2. Cement 3. Sand	389 Nos. 0.15 cum 0.30 cum
18	-Do-	1:3	cum	1. Brick 2. Cement 3. Sand	389 Nos. 0.107 cum 0.33 cum
19	-Do-	1:4	cum	1. Brick 2. Cement 3. Sand	389 Nos. 0.083 cum 0.33 cum
20	-Do-	1:5	cum	1. Brick 2. Cement 3. Sand	389 Nos. 0.066 cum 0.33 cum
21	-Do-	1:6	cum	1. Brick 2. Cement 3. Sand	389 Nos. 0.055 cum 0.33 cum
22	Brick work in composite mortar	1:1:6	cum	1. Brick 2. Cement 3. Lime 4. Sand	389 Nos. 0.0535 cum 0.0535 cum 0.33 cum
23	Brick work in composite mortar	1:2:9	cum	1. Brick 2. Cement 3. Lime 4. Sand	389 Nos. 0.035 cum 0.071 cum 0.33 cum
24	Brick work in cement mortar with modular/ fly ash	1:4	cum	1. Brick 2. Cement 3. Sand	500 Nos. 0.0805 cum 0.322 cum
25	- Do -	1:6	cum	1. Brick 2. Cement 3. Sand	500 nos. 0.0537 cum 0.322 cum
26	12.5 cm. thick Brick work	1:3	% Sqm	1. Brick 2. Cement 3. Sand	4951 nos. 1.22 cum 3.66 cum
27	12.5 cm. thick Brick work	1:4	% Sqm	1. Brick 2. Cement 3. Sand	4951 nos. 0.914 cum 3.66 cum
28	100 mm. thick brick work with modular / fly ash brick	1:4	% Sqm	1. Brick 2. Cement 3. Sand	5065 nos. 0.73 cum 2.90 cum

Sl. Nos.	Description of Items		Unit	Name of Materials required	Quantity of Materials required	
29.	75 mm thick brick work	1:3	% Sqm	1. Brick 2. Cement 3. Sand	3014 0.762 2.286	nos. cum cum
30.	75 mm thick brick work	1:4	% Sqm	1. Brick 2. Cement 3. Sand	3014 0.572 2.286	nos. cum cum
31.	Cement concrete with jhama chips	1:2:4	cum	1. Jhama Chips (6 to 19 mm) 2. Sand 3. Cement	0.90 0.45 0.225	cum cum cum
32.	Cement concrete with jhama chips	1:2½:5	cum	1. Jhama Chips (6 to 19 mm) 2. Sand 3. Cement	0.93 0.465 0.186	cum cum cum
33.	Cement concrete with jhama chips	1:3:6	cum	1. Jhama Chips (6 to 19 mm) 2. Sand 3. Cement	0.93 0.48 0.16	cum cum cum
34.	- Do -	1:4:8	cum	1. Jhama Chips (6 to 19 mm) 2. Sand 3. Cement	0.98 0.49 0.122	cum cum cum
35.	Cement concrete with stone chips	1:2:4	cum	1. Stone chips (6 to 20 mm.) 2. Sand 3. Cement	0.88 0.44 0.22	cum cum cum
36.	- Do -	1:1½:3	cum	1. Stone chips (6 to 20 m.) 2. Sand 3. Cement	0.86 0.43 0.286	cum cum cum
37.	- Do -	1: 2 ½ : 3	cum	1. Stone chips (6 to 20 mm.) 2. Sand 3. Cement	0.92 0.46 0.18	cum cum cum
38.	- Do -	1:3:6	cum	1. Stone chips (6 to 20 mm.) 2. Sand 3. Cement	0.94 0.47 0.156	cum cum cum
39.	- Do -	1:4:8	cum	1. Stone chips (6 to 20 mm.) 2. Sand 3. Cement	0.96 0.48 0.12	cum cum cum

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required		
40	25 mm artificial stone floor with jhama chips(which includes 3mm thick neat cement finish)(cement in the consumption chart is exclusive of cement required for slurry purpose)	1:2:4	% Sqm	1.Jhama chips (5 to 12 mm.) 2.Sand 3.Cement	2.268 1.140 0.872	cum cum cum
41	20 mm artificial stone floor with jhama chips(which includes 3mm thick neat cement finish)(cement in the consumption chart is exclusive of cement required for slurry purpose)	1:2:4	% Sqm	1.Jhama chips (5 to 12 mm.) 2.Sand 3.Cement	1.716 0.858 0.73	cum cum cum
42	25 mm artificial stone floor with stone chips(which includes 3mm thick neat cement finish)(cement in the consumption chart is exclusive of cement required for slurry purpose)	1:2:4	% Sqm	1.Stone chips (5 to 12 mm.) 2.Sand 3.Cement	2.23 1.12 0.855	cum cum cum
43	20 mm artificial stone floor with stone chips(which includes 3mm thick neat cement finish) (cement in the consumption chart is exclusive of cement	1:2:4	% Sqm	1.Stone chips (5 to 12mm.) 2.Sand 3.Cement	1.676 0.838 0.70	cum cum cum

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required
44	35 mm artificial stone floor with stone chips (which includes 3mm thick neat cement finish) (cement in the consumption chart is exclusive of cement)	1:2:4 % Sqm	1.Stone chips (5 to 12mm.) 2.Sand 3.Cement	3.11 cum 1.56 cum 1.075 cum
45	35 mm artificial stone floor with jhama chips (which includes 3mm thick neat cement finish) (cement in the consumption chart is exclusive of cement)	1:2:4 % Sqm	1.Jhama chips (5 to 12 mm.) 2.Sand 3.Cement	3.43 cum 1.72 cu.m 1.17 cum
46	7.5 cm lime terracing in roof with brick khoa, surki, lime (7:2:2) Including finishing	Sqm	1.Brick Khoa 2.Surki 3.Lime	0.075 cum 0.021 cu.m 0.021 cu.m
47	10 cm lime terracing in roof with brick khoa, surki, lime (7:2:2) Including finishing	Sqm	1.Brick Khoa 2.Surki 3.Lime	0.10 cum 0.029 cum 0.029 cum
48	12.5 cm lime terracing in roof with brick khoa, surki, lime(7:2:2) Including finishing	Sqm	1. Brick Khoa 2.Surki 3.Lime	0.125 cum 0.036 cum 0.036 cum
49	15 cm lime terracing in roof with brick khoa, surki, lime(7:2:2) Including finishing	Sqm	1. Brick Khoa 2.Surki 3.Lime	0.150 cum 0.043 cum 0.043 cum
50	5 cm thick R. C. Slab with stone chips and with 0.8% reinforcement	1:2:4 % Sqm	1. Stone chips (6to 2 mm.) 2.Sand 3.Cement 4.Steel 5.Shuttering	4.47 cum 2.23 cum 1.12 cum 322.60 kg 100 Sqm

Sl. Nos.	Description of Items		Unit	Name of Materials required	Quantity of Materials required	
51	7.5 cm thick R. C. Slab with stone chips and with 0.8% reinforcement	1:2:4	% Sqm	1. Stone chips (6to 20 mm.) 2.Sand 3.Cement 4.Steel 5.Shuttering	6.70 3.35 1.675 482.62 100	cum cum cum kg Sqm
52	10 cm thick R. C. Slab with stone chips and with 0.8% reinforcement	1:2:4	% Sqm	1. Stone chips (6to 20mm.) 2.Sand 3.Cement 4.Steel 5.Shuttering	8.93 4.47 2.23 683.54 100	cum cum cum kg Sqm
53	12.5 cm thick R. C. Slab with stone chips and with 0.8% reinforcement	1:2:4	% Sqm	1. Stone chips(6to20mm.) 2.Sand 3.Cement 4.Steel 5.Shuttering	11.18 5.59 2.80 787.44 100	cum cum cum kg Sqm
54	15cm thick R. C. Slab with stone chips and with 0.8% reinforcement	1:2:4	% Sqm	1. Stone chips(6to20mm.) 2. Sand 3. Cement 4. Steel 5. Shuttering	13.4 6.7 3.35 955.08 100	cum cum cum kg Sqm
55	Single Brick flat soling(conventional size)		Sqm	1.Brick	32	Nos
56	Brick on edge soling(conventional size)		Sqm	1.Brick	54	Nos
57	7.5 cm wide Brick-on edge edging (250 mm depth)		% .m	1.Brick	820	Nos
58	7.5 cm wide Brick-on edge edging (125 mm depth)		% m	1.Brick	410	Nos

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required	
59	35 mm thick (finished) terrazzo work, cast in situ(using c.c. 1:2:4 backing with stone chips 12mm down)floor 9mm thick terrazzo topping, laying and finished to 6mm thick after final grinding in ordinary grey colour(cement in consumption chart is exclusive of cement required for slurry@1.75 kg/Sqm)	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4.Marble Chips 5.Marble Powder	1.05 1.30 2.60 1420 0.126	cum cum cum kg cum
60	-DO- In black or red colour	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4.Marble Chips 5.Marble Powder 6.pigment	1.05 1.30 2.60 1420 0.126 40	cum cum cum kg cum kg
61	-DO- In Silver Grey	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4.White Cement 5.Marble Chips 6. Marble Powder	0.85 1.30 2.60 0.20 1420 0.126	cum cum cum kg cum
62	-DO- In Pink, Green, Yellow, Light Green colour	% Sqm	1.Grey Cement 2.Coarse Sand 3.Stone Chips 4. White Cement 5.Marble Chips 6. Marble Powder 7.Pigment	0.65 1.30 2.60 0.40 1420 0.126 40	cum cum cum cu.m kg. cum kg
63	35 mm thick (finished) terrazzo work, cast in situ (using c.c.1:2:4 backing with stone chips 12mm down)floor 12mm thick terrazzo topping, laying and finished to 9mm thick after final grinding in ordinary grey colour(cement in consumption chart is exclusive of cement required for slurry@1.75 kg/Sqm)	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4.Marble Chips 5.Marble Powder	1.146 1.16 2.32 1734 0.170	cum cum cum kg cu.m

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required	
64	-DO- In black or red colour	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4.Marble Chips 5.Marble Powder 6.pigment	1.146 1.16 2.32 1734 0.170 57	cum cum cum Kg Cu.m Kg
65	-DO- In Silver colour	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4. White Cement 5.Marble Chips 6. Marble Powder	0.863 1.16 2.32 0.283 1734 0.170	cum cum cum cu.m kg cum
66	-DO- In Pink, Green, Yellow, Light Green	% Sqm	1.Grey cement 2.Coarse Sand 3.Stone Chips 4. White Cement 5.Marble Chips 6. Marble Powder	0.58 1.16 2.32 0.566 1734 0.170	cum cum cum cu.m kg. cum Kg
67	20 mm thick (finished) terrazzo work in floor with precast tiles set on 20 mm av. th. of lime / cement mortar 1:3 and sides with admixtures of pigment as and when necessary and white cement / grey cement in ordinary grey colour (cement in consumption chart is exclusive of cement required for slurry @ 1.75 Kg./m ²)				
	(a) When sand cement mortar is used in bed	% Sqm	1.Grey cement 2.Coarse sand 3.Pigment	1.422 2.4 31	cum cum kg
	(b) When lime mortar is used in bed	% Sqm	1.Unslaked Lime 2.Surki 3.Grey Cement 4.Pigment	5.65 2.67 0.616 31	Quinta ls cum cum kg
68	-Do- In black and red colour				
	(a) when sand cement mortar is used in bed	% Sqm	1.Grey cement 2.Coarse sand 3.Pigment	1.422 2.4 31	cum cum kg

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required	
	(b) when lime mortar is used in bed	% Sqm	1.Unslaked Lime 2.Surki 3.Grey Cement 4.Pigment	5.65 2.67 0.616 31	Quintals cum cum kg
69	-Do- In Silver colour				
	(a)when sand cement mortar is used in bed	% Sqm	1.Grey cement 2.White cement 3.Coarse sand	1.268 0.154 2.4	cum cum cum
	b) when lime mortar is used in bed	% Sqm	1.Unslaked Lime 2.Surki 3.Grey Cement 4. White cement	5.65 2.67 0.462 0.154	Quintals cum cum cum
70	20 mm thick (finished) terrazzo work, in floor with precast tiles set on 20mm avg. thick of lime/cement mortar 1:3 and sides with admixtures of pigment as and when necessary and white cement /grey cement in Pink, Green, Yellow, Light Green colour				
	(a) when sand cement mortar is used in bed	% Sqm	1.Grey Cement 2.White Cement 3.Coarse sand 4.Pigment	1.114 0.308 2.4 31	cum cum cum kg
	(b) when lime mortar is used in bed	% Sqm	1.Unslaked Lime 2.Surki 3.Grey Cement 4. White cement 5 Pigment	5.65 2.67 0.308 0.308 31	Quintals cum cum cum kg
71(A)	Plaster with composite Mortar of cement, lime and sand with (1:2:9)				
	(a)35 mm thick	% Sqm	Cement	0.455	cum
	(b)25 mm thick	% Sqm	Cement	0.325	cum
	(c)20 mm thick	% Sqm	Cement	0.260	cum
	(d)15 mm thick	% Sqm	Cement	0.200	cum
71(B)	Plaster with composite Mortar of cement, lime and sand with				
	(a)20 mm thick	% Sqm	Cement	0.390	cum
	(b)15 mm thick	% Sqm	Cement	0.300	cum
	(c)10 mm thick	% Sqm	Cement	0.198	cum
72	Rubble Masonry in cement Mortar				

Sl. Nos.	Description of Items	Unit	Name of Materials required	Quantity of Materials required	
	(a) 1:6	cum	1.Stone 2.Cement 3.Sand	1.25 0.065 0.385	cum cum cum
	(b) 1:4	cum	1.Stone 2.Cement 3.Sand	1.25 0.09 0.36	cum cum cum

Sl. No s.	Description of Items	Unit	Name of materials	Quantity of materials required	
73	250 mm th. Masonary work with Autoclave aerated concrete blocks of size 625 mm x 250 mm x 125 mm in Cement Mortar (1:6)	cum	1.Cement 2.Sand 3. Autoclave aerated concrete blocks	0.020 0.120 1.05	cum cum cum
74	125 mm thick Autoclave aerated concrete blocks work with its size 625 mm x 250 mm x 125 mm in Cement Mortar (1:4).	% Sqm	1.Cement 2.Sand 3. Autoclave aerated concrete	0.25 1.00 12.80	cum cum cum
75	100 mm thick Autoclave aerated concrete blocks work with its size 625 mm x 250 mm x 125 mm in Cement Mortar (1:4).	% Sqm	1.Cement 2.Sand 3. Autoclave aerated concrete	0.19 0.78 9.86	cum cum cum
76	Ordinary Cement concrete (mix 1:2:4) with graded stone chips (6mm nominal size)	cum	1. Stone chips 2.Cement 3.Sand	0.88 0.44 0.22	cum cum cum
77	Masonry work with precast Hollow Concrete Block of size 300mm X 200mm X 150mm with cement mortar (6:1)	cum	1.Cement 2.Sand 3. precast Hollow Concrete Block		cum cum cum

78	100mm thick Masonry work with precast Hollow Concrete Block of size 400mm X 100mm X 150mm	% Sqm	1.Cement 2.Sand 3. precast Hollow Concrete Block		Cu.m Cu.m Cu.m
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<p style="text-align: center;">INDIAN STANDARDS FOR BUILDING WORKS BUILDING CONSTRUCTION PRACTICE</p>		
Sl. No	Specification for	Indian Standard No
1	Design of structural Timber (Fourth revision)	883 : 1994
2	Structural use of un-reinforced masonry (Third Revision)	1905 : 1987
3	Brick Work (First revision)	2212 : 1991
4	Construction of floor roof with joists and filler blocks: Part-I with hollow concrete filler block	6061 (Part 1) :1971
5	Construction of floor & roof with joists & filler block: Part 2 with hollow clay blocks joints and hollow clay filler block	6061 (Part 2) :1981
6	Construction of floor and roof with joists & filler blocks: Part 3 precast hollow clay block joints and hollow clay filler block	6061 (Part 3): 1981
7	Construction of floor roof with joists & filler blocks: Part 4 with hollow clay block slab panels	6061 (Part 4): 1981
8	Anti-termite measures in buildings part I constructional measures (First Revision)	6313 (Part 1): 1981
9	Anti-termite measures in buildings : Part 2 pre constructional chemical treatment measures (First Revision) (Amendment Nos.5)	6313 (Part 2) :1981
10	Antitermite measures in buildings Part 3 Existing buildings (First Revision) (Amendment Nos. 4)	6313 (Part 3): 1981
11	Installation of Joints in concrete pavements (First revision)	6509 : 1985

12	Construction of reinforced brick and R.B.C floor and roofs	10440 :1983
13	Setting out of buildings	11134 :1984
14	No fines cast in situ cement concrete	12727 :1989
15	Sand for masonry mortars (first revision)	2116 :1980
16	Polysulphide base joints sealants : Part 1 General requirements	11433 (Part 1) :
17	Polysulphide base joints sealants : Part 2 General requirements Methods of test	11433 (Part 2) : 1986
18	Polysulphide based sealants: Part 1. General requirement	12118 (Part 1) :
19	Polysulphide based sealants : Part 2 methods of test	12118 (Part 2) : 1987

BUILDING LIMES AND LIME PRODUCT

Sl. No	Specification for	Indian Standard No
20	Field slaking of building lime & preparation of putty (2 nd revision)	1653 : 1992
21	Preparation of use of lime puzzolona mixture concrete in Building & Roads (1 st revision)	5817 : 1992
22	Method of field testing of building lime (1 st revision)	1624 : 1986

CEMENT & CONCRETE

23	Plain & reinforced concrete (Fourth revision)	456 : 2000
24	Prestressed Concrete (first revision) (Amendment No 1)	1343 : 1980
25	Concrete structures for the storage of liquids: Part I general requirements (Amendment No 1)	3370 (Part 1) : 1965
26	Concrete structures for the storage of liquids: Part 2 Reinforced concrete structures (Amendment No-2)	3370 (Part 2) : 1967
27	Concrete structure for the storage of liquids: Part 3 Prestressed concrete structures (Amendment No I)	3370 (Part 3) : 1967
28	Concrete structures for the storage of liquids Part 4: Design table (Amendment Nos. 2)	3370 (Part 4) : 1967
29	Use of immersion vibrators for consolidating concrete (first revision)	3558 : 1983
30	Extreme Weather concreting: Recommended practice for hot weather concreting. (Amendment Nos. 1)	7861 (Part 1) 1975

31	Extreme Weather concreting: Recommended practice for hot weather concreting. (Amendment Nos. 1)	7861 (Part 2): 1981
32	Methods of non-destructive testing of concrete : Part 1 Ultrasonic pulse velocity	13311 (Part 1) : 1997
33	Methods of non-destructive testing of concrete: Part 2: Rebound hammer	13311 (Part 2) : 1997
34	Methods of Sampling & analysis of concrete	1199 : 1959
35	Recommended guidelines for concrete mix design	10262 : 1982
36	Concrete slump test apparatus	7320 : 1974
37	Ready mixed concrete (2nd revision)	4926 : 2003.
38	Artificial lightweight aggregates for concrete masonry units	9142 : 1979

CEMENT MATRIX PRODUCT		
Sl. No	Specification for	Indian Standard No
39	Construction of lightweight concrete block masonry	6042 : 1969
40	Concrete masonry units Part I Hollow and Solid concrete blocks (Second Revision) (Amendment No 1)	2185 :(Part 1) : 1979
41	Concrete masonry units Part 2 Hollow and Solid lightweight concrete blocks (first revision)	2185 : (Part 2) : 1983
42	Reinforced concrete fence posts (First Revision)	4996 : 1984
43	Precast concrete coping blocks (First Revision)	5751 : 1984
44	Precast concrete kerbs (first revision)	5758 : 1984
45	Precast reinforced concrete door & window frames (first revision)	6523 : 1983
46	Precast reinforced concrete plant guards	9375 :1979
47	Precast concrete septic tanks	9872 :1981
48	Precast concrete blocks for lintels and sills (Amendment No-I)	9893 :1981
49	Precast concrete manhole covers and frames: Part 1 Covers (Amendment No 3)	12592 (Part 1) : 1988

50	Precast concrete manhole covers and frames : Part 2 frames	12592 (Part 2) : 1991
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CLAY PRODUCTS FOR BUILDING		
Sl. No	Specification for	Indian Standard No
51	Common burnt clay building bricks (Fifth Revision)	1077 : 1992
52	Heavy duty burnt clay building bricks (Third Revision)	2180 : 1988
53	Burnt clay flat terracing tiles : Part 1 Machine made (Second	2690 (Part 1) :
54	Rev.) Burnt clay flat terracing tiles : Part 2 Hand Made (Second Rev.)	1993 2691 (Part II) :
55	Revision) Burnt clay facing bricks (Second	1992
56	Revision) Burnt clay paving bricks (Second Revision	2691 : 1988 3583 : 1988

CONCRETE REINFORCEMENT		
Sl. No	Specification for	Indian Standard
57	Mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement Part 1 Mild Steel and medium tensile Steel bars	432 (Part I) : 1982
58	(Third Revision)	
59	Mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement Part 2 Hard Drawn Steel wire (Third Revision)	432 (Part II) : 1982 1786 : 1985

CONSTRUCTION MANAGEMENT		
Sl. No	Specification for	Indian Standard No
60	Unified nomenclature of workmen for civil engineering	10302 : 1982

DOOR, WINDOWS AND SHUTTERS		
Sl. No	Specification for	Indian Standard No
61	Aluminium doors, windows and ventilators.	1948 : 1961
62	Aluminium windows for industrial building (Amendment	1949 : 1961
63	Wooden flush doors shutters (Cellular and hollow core type) : Part 2 Particle board and hard board face panels (Third revision)	2191 : (Part 2) : 1983
64	Wooden flush doors shutters (Solid core type) Part-1 Ply wood face	2202 (Part 1) : 1999
65	Wooden flush doors shutters (Solid core type) Part-2 particle board face panels and hard board (Third Revision)	2202 (Part 2) : 1983
66	Steel doors frames (Second Revision) (Amendment Nos.2)	4351 : 2003
67	Wooden side sliding doors	4962 : 1968
68	Collapsible gate	10521 : 1983

EARTHQUAKE ENGINEERING		
Sl. Nos.	Specification for	Indian Standard Nos.
69	Earthquake resistant design & construction of buildings (Second Revision) (Amendment Nos. 1)	4326 : 1993
70	Criteria for earthquake resistant design of structures (Fourth Revision) (Amendment Nos. 1)	1893 : 2002
71(a)	Improving earthquake resistant low strength masonry buildings – Guidelines (Amendment Nos. 1)	13828 : 1993
71(b)	Ductile detailing of reinforced concrete structure subjected to seismic forces	13920 : 1993

FIRE FIGHTING		
Sl. No	Specification for	Indian Standard
72	Selection, installation and maintenance of automatic fire detection and alarm system (Second Revision)	2189 : 1988
73	Selection installation and maintenance of portable first aid fire extinguishers (Third Revision)	2190 : 1992
74	Installation and maintenance of internal fire hydrants and hose reels on premises (First Revision)	3844 : 1989
75	Selection, Operation and maintenance of special fire fighting appliances: Part:1 combined foam and crash tender	5896 (Part 1) : 1970

FIRE SAFETY		
Sl. No	Specification for	Indian Standard
76	Fire Safety of building (General) : General Principles of fire grading & classification (First Revision)	1641 : 1988
77	Fire Safety of buildings (General): Details of construction (First Revision)	1642 : 1989
78	Fire safety of buildings (General) : Exposure hazard construction (First Revision)	1643 : 1988

FLOORING, WALL FINISHING & ROOFING		
Sl. No	Specification for	Indian Standard
79	Chequered Cement concrete tiles specification	13801 : 1993
80	Magnesium oxychloride composition floors (Second Revision)	658 : 1982

81	Laying Bitumen mastic flooring (Second Revision)	1196 : 1978
82	Laying of rubber floors (First Revision)	1197 : 1970
83	Laying, fixing and maintenance of linoleum floor (First Revision)	1198 : 1982
84	Application of cement and cement lime plaster finishes (First Revision)	1661 : 1972
85	Laying in situ terrazzo floor finish (First Revision)	2114 : 1984
86	Application of lime plaster finish (First Revision)	2394 :1984
87	External rendered finishes	2402 :1963
88	Laying in-situ cement concrete flooring (First Revision)	2571 :1970
89	Use of silicate type chemical resistant mortars (First Revision)	4441 1980
90	White washing and colour washing	6278 1971
91	Laying of bitumen mastic flooring for industries handling LPG and other light hydrocarbon products	13074 : 1991
92	Bitumen mastic for flooring (Second Revision)	1195 : 1978
93	Cement concrete flooring Tiles(First Revision)	1237:1980
94	Sand for plaster(Second Revision)	1542:1992

FUNCTIONAL REQUIREMENT IN BUILDINGS

SL. Nos.	Specification for	Indian Standard No.
95	Sound Insulation of non-industrial buildings(Amendment Nos. 1)	1950:1962
96	Acoustical design of auditoriums and conference halls (Amendment Nos. 1)	2526:1963
97	Industrial ventilation of residential buildings(First revision)	3103:1975
98	Noise reduction in industrial buildings	3483:1965
99	Acoustics in buildings	9736:1981
100	Sound Insulation of building and of building elements: part 1 Airborne sound insulation in buildings and of building elements	11050(Part1): 1984
101	Sound Insulation of building and of building elements: part 2 impact sound insulation in buildings and of building elements	11050(Part2): 1984
102	Rating of Sound Insulation of building and of building elements: part 3 Airborne sound insulation of facade elements and facades	11050(Part3): 1984

103	Buildings and facilities for the physically handicapped(first revision)	4963:1987
104	Orientation of buildings:Part1 Non-industrial buildings	7662(Part 1):1974

HILL AREA DEVELOPMENT ENGINEERING

105	Retaining wall for hill area : Part 1 Selection type of wall	14458 (Part 1) :
106	Retaining wall for hill area : Part 2 Design of retaining / breast walls	14458 (Part 2) :
107	Retaining wall for hill area : Part 3 construction of dry stone walls	14458 (Part 3) :
108	Land slide controls	14680 : 1999

HOUSING

Sl.No	Specification	Indian Standard No
109	Design and construction of floors and roofs with precast	13994:1994
110	Design and construction of floors and roofs with prefabricated brick panel	14142:1994
111	Construction of floor and roof with RC channel units	14215:1994
112	precast reinforced concrete planks and joists for flooring	13990:1994
113	prefabricated brick panel and partially precast concrete	14143:1994
114	precast reinforced concrete channel unit for construction	14201:1994
115	Precast L-panel units for roofing	14241:1994

METHODS OF MEASUREMENT OF WORKS OF CIVIL ENGINEERING

Sl.No	Specification	Indian Standard No
116	Measurements of building and civil engineering works: Part 1; Earthwork(fourth revision)	1200(part1):1992
117	Measurements of building and civil engineering works: Part 2 concrete(third revision)	1200(part2):1974
118	Measurements of building and civil engineering works: Part 3 brickwork(third revision)	1200(part3):1976
119	Measurements of building and civil engineering works: Part 4 Stone	1200(part4):1976
120	Measurements of building and civil engineering works: Part 5 form	1200(part5):1982
121	Measurements of building and civil engineering works: Part 6 Refractory work(second revision)	1200(part6):1974
122	Measurements of building and civil engineering works: Part 7 Hardware(Second revision) (Amendment no-2)	1200(part7):1972
123	Measurements of building and civil engineering works: Part 8 Steel	1200(part8):1993

124	Measurements of building and civil engineering works: Part 9 Roof	1200(part9):1973
125	Measurements of building and civil engineering works: Part 10 Ceiling & Lining(Second revision) (Amendment no-2)	1200(part10):1973
126	Measurements of building and civil engineering works: Part 11 Paving, floor finishes, dado & skirting(Third revision) (Amendment no-1)	1200(part11):1977
127	Measurements of building and civil engineering works: Part 12 Plastering & Pointing (Third revision)	1200(part12):1976
128	Measurements of building and civil engineering works: Part 13 white washing, colour Washing, distempering & painting of	1200(part13):1994
129	Measurements of building and civil engineering works: Part 14 Glazing (Third revision)	1200(part14):1984
130	Measurements of building and civil engineering works: Part 15 painting, polishing, varnishing etc. (fourth revision)	1200(part15):1987
131	Measurements of building and civil engineering works: Part 16 laying	1200(part16):1979
132	Measurements of building and civil engineering works: Part 18 demolition & dismantling(third revision)	1200(part18):1974
133	Measurements of building and civil engineering works: Part 19 Water	1200(part19):1981
134	Measurements of building and civil engineering works: Part 21 Wood	1200(part 21):1973
135	Measurements of building and civil engineering works: Part 22 Materials	1200(part22):1982
136	Measurements of building and civil engineering works: Part 23 pilling(fourth revision)	1200(part23):1988
137	Measurements of building and civil engineering works: Part 24 Well	1200(part24):1983
138	Measurements of building and civil engineering works: Part 27 Earth	1200(part27):1992
139	Measurements of building and civil engineering works: Part 28 Sound	1200(part28):1992
140	Measurements of plinth, carpet & rentable area of buildings (first revision) (Amendment no-3)	3861:1975

PAINTING, VARNISHING AND ALLIED FINISHES

SI No	Specification for	Indian Standard No
141	Painting of ferrous metals in buildings: Part 1 Pretreatment(first revision)	1477(part1):1971
142	Painting of ferrous metals in buildings: Part 2 Painting (first revision)	1477(part2):1971
143	Finishing of wood & wood based materials: Part 1 operations and workmanship	2338(part1):1967
144	Finishing of wood & wood based materials: Part 2 Schedules	2338(part2):1967
145	Painting concrete, masonry and plastered surfaces :Part 1 operations and workmanship (first revision)	2395(part 1):1994
146	Painting concrete, masonry and plastered surfaces :Part 2 Schedules (first revision)	2395(part 2):1994

PUBLIC HEALTH ENGINEERING		
Sl No	Specification	Indian Standard No
147	Basic requirement for water supply drainage and sanitation (Fourth revision)	1172:199 3
148	Building drainage (Second revision)	1742:198
149	Selection, installation and maintenance of sanitary appliances (Second revision)	2064:198 3
150	Water supply in building(Second revision)	2065:198
151	Installation of septic tanks: Part 1 design, criteria and	2470(part 1):1985
152	Installation of septic tanks: Part 2 secondary treatment	2470(part 2):1985
153	Laying of cast iron pipes (Second revision)	3114:199 4
154	Ancillary structures in sewerage system: Part 1 Manholes (First revision)	4111(Part 1):1986
155	Ancillary structures in sewerage system: Part 2 flushing	4111(Part 2):1986
156	Laying of glazed stoneware pipes (First revision)	4127:198
157	Sanitary pipe works above ground for buildings (First	5329:198 3
158	Plumbing in multistoried buildings: Part 1 Water Supply	12183(part 1):1987
159	Drainage of building's basement	12251:1987

SAFETY IN CONSTRUCTION

Sl No	Specification	Indian Standard No
160	Steel tubular scaffolding:Part2 Safety regulations for Scaffolding	4014(part 2):1967
161	Preventive measures against hazards at work places: Part 1 falling material hazards prevention	13416(part 1):1992
162	Preventive measures against hazards at work places: Part 2 fall prevention	13416(part 2):1992
163	Preventive measures against hazards at work places: Part3 disposal of debris	13416(part 3):1994
164	Preventive measures against hazards at work places: Part4 timber structures	13416(part 4):1994
165	Preventive measures against hazards at work places: Part5 timber structures	13416(part 5):1994

STONES

Sl. No	Specification	Indian Standard No
166	Marble (blocks, slabs and titles)	1130:196
167	Sandstone (slabs and titles)(First revision)	3622:197

STRUCTURAL SAFETY

Sl. No	Specification	Indian Standard No
168	Design loads (other than earthquake) for buildings and	875(part 1):1987
169	Design loads (other than earthquake) for buildings and	875(part 2):1987

STRUCTURAL SECTIONS

Sl. No	Specification	Indian Standard No
170	Aluminium bulb angles Marine application (first revision)	6449:198 7
171	Aluminium channels (first revision)	3921:198
172	Aluminium equal leg angles (first revision)	3908:198
173	Aluminium I-beam(first revision)	5384:198
174	Aluminium T-bars for Marine application(first	6475:198
175	Aluminium T sections (first revision)	6445:198
176	Aluminium unequal leg angles (first revision)	3909:198
177	Light Gauge structural steel sections (revised)	811:1987

TIMBER AND TIMBER STORES

Sl. No	Specification	Indian Standard No
178	Door and Window shutters and frames	12896:1990
179	Furniture and cabinets	13662:1993
180	Bamboos for structural purposes	9096:197

WATER PROOFING AND DAMP PROOFING

Sl. No	Specification	Indian Standard No
181	Lime concrete for a water proofed roof finish (second	3036:199 2
182	Application of bituminous mastic for water proofing of	4365:196 7
183	Water proofing of underground water reservoirs and swimming pools (first revision)	6494:198 8
184	Damp-proofing using bituminous mastic	7198:197 4
185	Bituminous mastic for use in water proofing of roofs (first revision)	3037:198 6
186	Silicon based water repellents	12027:1987

For overall guidance and reference latest edition of National Building Code of India, may be consulted.

Specifications (Sanitary & Plumbing Works)

The Works shall be executed in accordance with these Specifications which comprises the following Sections:

- | | | |
|-----|--------------------|--------------------------|
| I. | Section E - | General Specifications |
| II. | Section F - | Technical Specifications |

SECTION E - GENERAL CONDITIONS

(Including Mode of Measurement)

1. If in connection with Sanitary & Plumbing Works etc. any item or items of work relating to Building works, Road works and Carriage crop up, the contractor shall if so directed, have to execute such items. In respect of such items the Schedule of Rates for Building Works, Road Works and Carriage for the current year including general conditions, general specifications etc. operative in the area will be applicable.
2. If not specifically indicated in the items themselves, the rates appearing in this schedule are inclusive of cost of all supply, carriage, handling, fitting, fixing, toll charges, ferry charges etc. and all other incidental works involved in any floor, at any level including all necessary jointing materials, scaffolding to any height, hire charges of tools and plants, and all helping materials.
3. All cutting holes, chases, trenches etc. at any place necessary in connection with works as per items in this schedule and subsequent mending damage as per original specification and as directed are included in the rates and shall not be paid extra unless otherwise expressly specified.
4. The contractor shall be responsible for the safe custody and proper maintenance in original condition of all sanitary and plumbing works till all works are completed and formally handed over to the Department.
5. Before application of rate, quantities of all items with metric unit must be calculated with correction 2 places of decimal when the rate is up to Rs. 100.00 and 3 places of decimal when the rate is above Rs. 100.00.
6. If not mentioned otherwise in the items themselves, all materials including fitting shall conform to standard laid down by the Bureau of Indian Standards and bear I.S.I. mark where such standardization has been made. All other materials must be of best quality conforming to the standard laid down by the I.S.I. and being approved by the Engineer-in-Charge.
7. Unless otherwise specifically mentioned in the items of this Schedule, all G.I. Pipes are to be normally of TATA make, all sanitary wares and faucets should be of Parry ware, Hindware, Neycer, CERA, Jaquar, Marc (1st Quality) or should bear I.S.I. certification marks and in cases where term "approved brand/approved make/approved quality" appears shall invariably mean "ISI marked material approved by Engineer-in- Charge."

SECTION F - TECHNICAL SPECIFICATION

A. EXECUTION

General -- All works shall be carried out in proper manner. Items of works not covered by the following shall be carried out as per direction of the Engineer-in-Charge and to his satisfaction. Unless otherwise specified in this Section or in the description of item the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Schedule.

1. **G.I. Tank:**

Before acceptance of any G.I. Tank, proper scrutiny as to the thickness of the sheets should be made. Due check should also be made on each face of the tank by punching holes to be subsequently mended and hermetically sealed by the contractor without any extra charge.

2. **Flushing Cistern:**

Flushing Cistern of I.P.W.C. & E.P.W.C. will be 10 litre pull and let low down cistern types as specified. Flush pipes for urinals shall be made of G.I. Pipes of Polythene pipes with fittings or lead pipes as may be directed by the Engineer-in-Charge. Flushing cistern of urinals shall be of approved type. All flush pipes and cisterns shall have to be painted with 2 coats of paint of approved shade and brand over a coat of approved primer. The inlets of sanitary fittings and equipments to be connected with the adjacent distribution line (water supply) with requisite lengths and size of P.V.C. connection pipe is to be provided with necessary unions at both ends within the quoted rates of respective items.

3. **Fittings for G.I. Pipes:**

All G.I. Fittings will be of approved make. For installation of G.I. pipeline all fittings and specials as may be necessary shall have to be fitted and fixed to the line.

4. **Joints:**

The joints of pipes, fitting & accessories shall be made as specified and unless otherwise specified, no separate payment shall be allowed.

- (i) G.I. Pipes fitting, valves and cocks with jute and white lead paint.
- (ii) C.I. Soil pipes & fittings: The jointing shall have to be done by either of the two methods as specified:
 - (a) The half of the depth of the annular space between spigot and socket shall be packed with spun yarn and the remaining half to be filled up with molten lead well caulked with caulking tools.
 - (b) The half of the depth of the annular space between spigot and socket shall be packed with tarred gasket and the remaining half will be filled up three quarters with void and the top quarter with cement mortar (4:1) and shall be finished beveled at 45°.

- (i) Stone Ware Pipes & Fittings : The half of the depth of the annular space between socket and spigot shall be packed with tarred gasket and the remaining half shall be filled up with Cement mortar (3:1) & shall be finished beveled at 45^o.
- (ii) C.I. Water mainline: The jointing shall have to be done with Tyton joints as per manufacture's specifications.

5. **Test of pipelines valves and cocks:**

The pipelines, valves and cocks shall be tested at the contractor's expenses for which no extra payment shall be allowed. The available water supply sources may however be allowed to be utilized for testing but in absence of any such arrangement the contractor shall have to conduct the following tests.

- (i) C.I. Water main pipe line : The pipe shall have to be tested at least for designed working pressure.
- (ii) C.I. soil pipe line : Smoke test.
- (iii) S.W. Pipe line : All sections between two inspection pits shall have to be tested separately. The funnel shall be at least 1.3 meter above the soffit of the S.W. pipe at the upper inspection pit.

Any defect or defects detected during testing shall be rectified at the contractor's expenses.

6. **Septic Tank:**

Construction of septic tank shall be done as per approved design. After completion of the tank, the tank shall have to be filled up with clear water after removing any foreign materials from the inside of the tank, if any. No separate payment shall be allowed on this account.

7. **Painting:**

All pipes (G.I., C.I. water main and soil) and fittings shall have to be painted outside with two coats of paint of approved brand and shade.

B. MODE OF MEASUREMENT

1. G.I., C.I. Water main & Soil, S.W. Pipe line:

All the pipe lines shall be measured in fitted condition along the central line of the exposed surface.

2. Strainer:

The strainer as used in the Tube-Well shall be measured in fitted condition along the central line of the exposed surface.

3. Boring of Tube-Well:

Boring for tube-wells always shall have to be done by the contractor's pipe. Generally, measurement of the boring will be taken on the basis of the finished length of the tube well from the ground line. If for some special reasons, boring depth is required to be more than the finished length of the tube-well previous permission of Engineer-in-Charge is to be taken to get the payment of extra boring in excess of the finished length.

Specifications (Electrical Items)

SECTION G - Technical specification -Electrical Items.

A) Electrical Design Parameter:

i) Power supply voltage

Motors rated 200 kW and above	: 11KV, 50Hz
Motors rated > 0.2 kW and < 200 kW	: 415V, 50Hz
Motors rated less than 0.2 kW	
Panel lighting & Space Heater	: 240V, 50Hz
Control Supply for 11kV Switchgear	: 220V DC
415V Breaker Control Supply	: 220V DC
415V Power Distribution board Control Supply	: 110V, 50Hz

ii) Supply Variations: -

33kV, 11kV & 415 / 240V voltage	: +/- 10%
Frequency Variation	: + 3%, -5%
Combined Variation of Voltage & Frequency	: 10%
DC System	: +10% to -15%
Voltage dip during starting of HT Motor	: 20% at motor term.
Voltage dip during starting of LT Motor	: 15% at motor term.

iii) Insulation level: -

For 33kV System

One-minute Power Frequency withstands voltage	: 170kV (rms)
1.2/50 Micro sec, impulse withstand voltage	: 70kV (peak)

For 11kV System

One-minute Power Frequency withstand voltage	: 28kV (rms)
1.2/50 Micro sec, impulse withstand voltage	: 75kV (peak)

For 415V System

Impulse withstand Voltage	: 8kVp
One-minute Power Frequency withstand voltage	: 2.5 kV (rms)

iv) Short circuit withstand rating

33kV Switchgear	: 40 KA for 3 second
11kV Switchgear	: 40 KA for 3 second
220 V DC System	: 25 KA for 1 second

The fault level for the Switchboard shall be arrived at considering Short circuit current contribution from transformer feeding the loads plus short circuit contribution by the motors running on the bus. A margin of 10% over the S.C current thus calculated shall generally be applied and rounded off to the next higher standard ratings and this value shall be adopted for the breakers and Switchboards. The momentary current ratings shall be 2.55 times for 33 & 11kV system and 2.1 times for 415V system.

v) Neutral Grounding System

Neutral of the 33kV system shall be solidly grounded.

Neutral of the 11kV system will be connected to ground through a neutral grounding resistor to limit the earth fault current to about 300 Amps.

Neutral of the LV winding (433V) of Service Transformer shall be solidly grounded.

220V DC systems shall be ungrounded.

vi) Design Margin: -

Unless otherwise specified in the corresponding 'Mechanical Specification', maximum continuous rating of motors shall be at least 10% above the maximum load demand of the driven equipment under entire operating range including voltage & frequency variations.

For Transformer sizing applicable no-load correction factor shall be considered.

Design margin for other equipment are envisaged.

LV service Transformer :10% Margin over normal Power Demand.

Busbars & incomers of Switchgear. :10% Margin over rated current.

Batteries :10% design margin and ageing factor of at 25%.

Battery Chargers :10% Margin over normal power demand.

The above said margin shall be over and above the other design factors considered.

vii) Equipment Enclosure: -

Unless otherwise specified, Equipment enclosures shall have following degree of protection:

- · Outdoor kiosk : IP 55
- · Indoor HT Switchgear : IP 4X
- · Indoor LT Switchgear : IP 52
- · Outdoor Switchgear : IP 55
- · Local Push button stations : IP 55
- · Battery Charger : IIP 42

All Switchboards and distribution boards shall be located indoor.

B) Spot Starter cum Control Panels for Motors:

For all Gates starting option is DOL starter cum PLC panel with all provision kept for integration with future SCADA system.

Each motor will be provided with thermal overload relays, single phase preventer for protection.

The spot control panels will be located in the close vicinity of respective gates and will be designed for reversible operation of 3phase, 415V AC squirrel cage induction motor of specific rating with end stop limit switch interlock in both directions. Each spot control panel will incorporate a PLC as specified above shall be provided.

a) Power Supply System:

The DOL starter cum PLC panel from the following power supply system.

a) Rated Voltage: 3 Phase 415Vac, 50 Hz+ 5%

b) Voltage variation: +10%, -15%

c) Frequency variation: 50 Hz+6%, -6%

ii) THD:

AC input choke of suitable rating shall be provided to limit THD as per IEEE 519 & also THD at the motor terminal should be limited to 5% In case of grounded neutral system, additional filter is to be provided.

iii) Rating: Rating is based on current and shall be rounded off to the higher integer value.

iv) Duty:

DOL starter cum PLC panel system shall always be rated for continuous duty as per IEC 146 (clause II). Rating shall be based on full load motor current at rated voltage of the drive and considering following:

v) Controller logic:

Circuits shall be of latest design CPU with adjustable frequency drive specific circuitry & firmware and upgradeable features.

vi) Hot /Cold Standby Provision:

Provision of changeover & communication, data/programme transfer shall be made available in the panel as required for Hot/cold standby facility.

vii) Communication module: Shall have the facility (selectable) to act like Master or slave.

viii) Basic Features required in DOL starter cum PLC panel drive –

- DOL starter cum PLC panel shall be with microprocessor based digital regulation & control, shall be compatible to RTU/ PLC mentioned under SCADA system through standard open communication protocol.
- It shall be fully microprocessor based, in design having 3 phases uncontrolled (unless specified otherwise) and IGBT based inverter with pulse width modulation (PWM) power section, suitable for constant /variable torque application. It shall be complete with programming unit.
- The control section of the drive (controller, pulse/gate drive, power supply etc.) shall be interfaced to the power section with the help of screws, bus bars or flexible cables/wires and isolation of control & power section shall not require any desoldering / soldering of the components/ wires.
- Drive - shall have following provisions to be operated from key pads:
 - i) Forward inching
 - ii) Reverse inching
 - iii) Forward run
 - iv) Reverse run
 - v) Stop
 - vi) Speed increase
 - vii) Speed decrease
 - viii) Provision to stop the motor quickly from quick reversal of the drive shall be provided.
- Minimum Control-function modules to be provided in digital regulation system.
 - Reference speed setter.
 - Ramp generator.
 - Current feedback controller.
 - Pulse transformer trigger module.
 - Logic control and sequence module.
 - V/F control module.
 - Slip compensation control.
 - Current limiter.
 - Counter current braking.
- System shall have required digital inputs, Digital output, Relay O/P analog input & output for the integration further with future SCADA system.
- Communication - Drive shall have open standard protocol viz. Ethernet / Profibus.
- Control supply and power components shall be so arranged that they do not cause any heating to the controller and allied section of the inverter.
- Panel mounted or integrated type backlit display unit shall be desirable feature. The same unit shall be used for programming, fault messaging and running status. Display of the fault message will be in English text form.
- Acceleration and de-acceleration time with adjustable setting shall be provided which will be independently programmable.
- Adjustable Torque boost facility shall be provided.
- In order to prevent resonance between motor and coupled machines multiple point skip frequency settings shall be provided.

- Programmable automatic restart / flying re-start (start on fly) in case of momentary power failure during operation shall be provided Programmable power ride-through feature shall be provided.
- Adjustable current limit setting shall be provided.
- Over loaded capacity shall be 150% of drive rated current or 110% for 1 minute (Variable Torque) repeated every 3 minutes. These overload capacities shall such that unit is shutdown safely at the end of the envisaged overload period without causing any failure to control and power section of the inverter.
- Self-diagnostic facility shall be provided.
- Isolation arrangement for input and output along with status monitoring device and shunt trip coil (240 Vac) shall be provided.
- The device shall be protected by semiconductor fuse at ac side.
- In case of power failure, drive shall be able to store and memorize set parameters and software blocks
- It shall have electromagnetic compatibility with EMC filter as per EN-61800-3/IEC-1800-3.
- Provision of storing & down loading configuration.
- IGBT initialization testing by control section on each power up & run command.
- Suitable earthing provision to be provided.

ix) Protection

The unit shall be capable of protecting the device (itself) and the motor both in case of faults. Following minimum protections are required:

- i) Protection against input & output phase loss/phase short circuit, Under voltage and over under voltage and voltage protection, Over voltage and under voltage in dc bus, Over current in dc bus, dc Short circuit, dc earth leakage /earth fault, Wrong phase sequence, Transients and surges over voltage, Over current and short circuit at any point of the system, Under load, control power supply failure Inversion fault, di/dt. Protection, Earth fault of motor, Fan failure, stalling of motor, over speed, Display and data logging as per requirement, any other protection as per purchaser's requirement, Lightning & surge protection, Heat sink temperature protection is desirable to safeguard the drive, Microcontroller monitored thermal sensor on heat sinks for thermal protection. IGBTs shall have soft recovery freewheeling diodes to prevent IGBT failure when subjected to motor discharge spikes. This shall apply to DB circuit also.
- ii) Alarm and Annunciation – Minimum 5 alarms for faults shall be stored preferably with the time stamping.

Panel for Drives, Switchgear Components and Accessories

- Ingress protection in commensurate with Gate control system.
- Sheet steel used for fabrication of metal cabinet for control panel shall be of cold rolled type and of thickness not less than 2 mm. Non-load bearing side may be of 1.6 mm thick sheet.
- The cabinet shall be floor -mounting type and shall be provided with lockable-hinged door at front and back with handle.
- Durable gasket shall be provided for all doors and covers and for all partitions between adjacent units. The gasket shall be of sponge rubber synthetic rubber and shall be adequately secured. Barrier shall be provided/between power equipment and control equipment.
- Internal control & power wiring shall be routed separately to have better noise immunity.
- The control and power terminals shall be such that each and individual terminal shall be accessible for maintenance without effecting the wiring at any other terminal.

x) Specification for Panel mounted DC UPS

All the modules like PLC/RTU, HMI and Ethernet switch inside PLC cum DOL starter panel must be powered by UPS back-up of minimum 2 hour in order to avoid any interruption in the power line. The Panel mounted Industrial UPS must be IP 20 rated and must support the following features: -

1. In the event of supply voltage failure, battery mode must be activated without any interruption. There should be three switching outputs on the UPS module which should provide information when the UPS operates on battery mode, when there is any alarm on the UPS and when the battery of the UPS is almost flat.
2. Input Voltage Range -- 85 ... 264 V AC
3. Frequency Range-45 ... 65 Hz
4. The efficiency of the UPS operation should be more than 86%.
5. Ambient temperature Operation-- 0 °C ... +55 °C
6. The rechargeable battery of the UPS should be maintenance free based on lead AGM, VRLA technology.

I) Lighting:

Specifications

Supply of LED streetlight luminaires complete with pressure die cast/extruded aluminium housing and adhering to the following specifications and lighting design requirements will be as per the actual application:

- The driver card shall cut off at 270 V and shall resume normal working when nominal voltage is applied again. This is to ensure protection of luminaires from neutral faults and error in connection at sites.
- Efficiency of driver electronics shall be more than 90%
- The LEDs should be driven at the suitable current and within the permissible limits specified by the LED chip/lamp manufacturer.
- The fixture shall be designed so as to have lumen maintenance of at least 70% at the end of 50,000 hours,
- The luminaires should be operable with auto adjustable 100-270V supply Voltage using the same driver.
- Power Factor of the electronic driver should be at least > 0.95 with THD $< 10\%$.
- SITC of 1x 120W LED with LED Driver luminaire, CRI- >80 , IP66, lamp colour – 3000K, lumen output ≥ 100 lumen per watt etc. for street lighting with brackets inclusive of 9 Mtr GI Octagonal pole as per dimension- TOP dia -70mm, Bottom Dia – 135mm section – I (Section length -7000 mm) Thick – 3mm, Base plate -225 mm X 225 mm X 16 mm, PCD – 220mm. Incl. Foundation Accessories – M20 X 700 X 4 nos. With / without sole plate & cap etc. in CC foundation (Proportion and dimension indicated below), having 600X600X150mm thick CC(4:2:1) base block below sole plate / Pole with hardjama metal including CC (6:3:1)muffing 0.30 mts.dia and 0.30 mts above ground level including 3 mm thick neat cemented finish and GI earth bolt after making drilled holes etc. on pole & carriage of pole upto 1.6 Km from Store to work site including filling up the excavated earth pit with shifted soil and ramming properly incl provision of one 250V 15 A kit-kat fuse unit, one NL on porcelain insulator, one compression type brass cable gland for up to 3 Core X 2.5sqmm PVC/A cable and having lined with rubber gasketted with brass machine screws etc, earthing

terminal with lug, on Octagonal pole near base with 25mm GI conduit for Pole I/c cable with 3CX2.5sqmm CU. Cable. As per BSEN 10025 grade SJ355JO or equivalent. (Make: Utkarsh/ Bansal/Skipper).

- SITC of 60W LED luminaire with fixtures, weatherproof lighting fixture IP-66 with LED Driver, beam angle 36, CE certified, IK08, CRI- >80, lamp color- 3000K, lumen output - >=100 lumen per watt, lamp life- 50000 hrs and 5 year warranty etc including civil/mechanical works for machineries lighting including 3mtr 50mm G.I conduit pipe, 25mm GI conduit for pole I/c cable with 3CX2.5sqmm CU. cable.
- Supply, installation, testing and commissioning of 2X60Watt LED flood light for spot lighting with asymmetrical distribution IP-66 with ballast, CRI>70, lamp colour- -6000 K, lumen output>=100 lumen per watt, lamp life 50,000 hrs and 5 years warranty etc complete with all accessories.

Street Light Poles and Posts

1. The street light poles/pathway light poles shall be of swaged type construction conforming to IS 1239. The dimensional and other details shall be as specified in the enclosed Standard Drawings
2. The street light poles shall have M.S pipes of progressively reduced dimensions and post top lanterns poles shall be of uniform cross section. The poles shall be treated with a rigorous rust inhibition process and the outside surface of the pole shall be painted with two coats of paint conforming to IS 2339.
3. Where portion of the pole is required to be embedded in concrete and below ground, the inner circle shall be treated with two coats of bituminous paint.
4. The poles shall be complete with base plate of minimum size 300 x 300 mm and 10 mm thick, and as indicated in the standard drawing.
5. The pole below the ground level shall be grouted in 1:2:4 concrete as per standard drawing. The bottom portion of foundation shall be 800 x 800 mm.
6. Two nos. 50 dia. G.I pipes in arc with 600 mm radius shall be embedded in concrete pedestal up to marshaling box for running of incoming and outgoing cables.
7. Earthing studs shall be provided on pole.
8. Each pole shall be provided with a junction box made of 2 mm thick sheet steel mounted on supporting clamps welded to pole at +450 mm from ground level. The box shall be of weatherproof and dust tight construction with neoprene gaskets and provided with hinged front cover/door with key operated locking device. The box shall have overall dimension of 200 x 150 x 100 mm and shall be complete with the following:
Alternatively, arrangement shall be for an integral type junction box.
 - i) 8 ways 30 Amp. strip type terminals each terminal being suitable for termination of loop in and loop out of Aluminium conductor cables up to 25 Sq mm.
 - ii) 10 Amps SPN (double pole) MCB.
 - iii) Internal wiring from box to lamp holder of light fitting at top by means of 2 runs of 1000 V grade PVC copper conductor wire of size 4 Sqmm and one run of 2.5 Sqmm green earth wire.
9. The gate lights installation shall be with 600 mm long MS pipe out of which 300 mm is embedded in compound/gate wall. The junction box shall be flush mounted in wall at +450 mm from ground level and with 19 mm dia. MS conduit interconnecting pole and junction box for running wires. The light poles shall be numbered with neat letters in paint.

II) XLPE Cable:-

PILC i.e. Paper Insulated Lead cover cable is being used as Main Power supply Cable which has to be replaced with XLPE Cable of suitable size as per IS: 7098 (Part-1)

Scope of Work

This specification covers the requirements Power & Control cables for the Canal Gate Control System.

Codes and Standards

The equipment to be furnished under this specification shall be in accordance with the applicable section of the latest version of the following Indian Standards, except where modified and /or supplemented by this specification.

IS 1554:- PVC insulated (heavy duty) electric cables for working voltages up to and including 1100 volts.

IS 7098 -I :- Cross linked polyethylene insulated PVC sheathed cables for working voltages up to and including 1100 volts.

IS 7098 -II :- Cross linked polyethylene insulated PVC sheathed cables for working voltages from 3.3 kV up to and including 33 kV.

IS 10810 :- Methods of tests for cables.

Design Criteria: -

1.0 Power cables shall be sized to satisfy the following Criteria.

Short circuit withstand capacity for applicable fault current and duration.

Full load current carrying capacity under installation conditions considering Site ambient temperature & site installation (Grouping) conditions based on Manufacturer's recommendation.

Permissible voltage drop limits under steady state/transient state as applicable.

Power cables shall withstand the fault current of the circuit for the duration not less than the max time taken by the primary protective system to isolate the fault. Cables shall be sized for the following short circuit rating.

Incoming cables to 33kV Transformer : 40 KA for 0.5 sec.

Incoming cables to 11 KV Switchgear : 40 KA for 0.5 sec.

Outgoing cables to 11kV Switchboard : 40 KA for 0.16 sec.

Incoming cables to 415 V PDB (fuse operated) : Fuse cut-off current for 10 m.sec.

Feeders from PDB (fuse protected) : Fuse cut-off current for 10 m.sec.

2.0 To maintain voltage at motor terminals /equipment end within desirable limit, it is proposed to limit the voltage drop in the cables within the following limits:

Steady state Voltage drop (Continuous running condition) : 2.5%

Transient state voltage drop (During Motor Starting) : 10%

3.0 All cables shall be suitable for laying on racks, in ducts, trenches with chances of flooding by water and shall also be suitable for directly buried installation. All the cables shall be flame retardant low smoke (FRLS) type designed to withstand mechanical, electrical and thermal stresses developed under steady state and transient operating conditions.

4.0 Cables above 300 Sqmm shall be of single core type. The minimum size of LV power cable shall be of 2.5 Sqmm for Copper. Power cables shall have copper conductor for sizes up to 10 Sqmm. For higher sizes, aluminium conductor shall be provided. The minimum size of control cable shall be of 1.5 Sqmm copper. For CT/VT circuits, minimum 2.5 Sqmm copper Cable shall be provided. Conductor of Copper cables shall have plain annealed copper. All the conductors shall be multi-stranded.

5.0 Power cables shall be XLPE insulated. Control cables shall be PVC insulated. PVC insulation shall be suitable for continuous conductor temperature of 70 Degree centigrade

- C and short circuit conductor temperature of 160-degree centigrade XLPE insulation shall be suitable for continuous conductor temperature of 90-degree centigrade C and short circuit conductor temperature of 250 degree centigrade.
- 6.0 Trailing cables shall be of 1.1kV grade, heavy duty type with tinned annealed high conductivity flexible copper conductors, ethylene propylene (EPR) insulated and chloro-sulphorated polyethylene (CSP) sheathed.
 - 7.0 The cable cores shall be laid up with fillers between the cores wherever necessary. All the cables shall have distinct extruded PVC inner sheath.
 - 8.0 For single core armoured cables, armouring shall be of aluminium wire. For multi core armoured cables, armouring shall be of galvanised steel strip / wire as per applicable IS.
 - 9.0 Outer sheath shall be of PVC black in colour having following FRLS properties.
 - Oxygen index of not less than 29.
 - Acid gas emission of max. 20%
 - Smoke density of not more than 60%
 - 10.0 The cables shall meet flammability test as per IEEE-383.
 - 11.0 All the cables shall be protected against rodent and termite attack. Necessary chemicals shall be added in to the PVC compound of the outer sheath.

Technical Requirements

1.0 HT cables

Cables shall be XLPE insulated, screened, PVC inner sheathed (extruded) armoured, FRLS PVC outer sheathed, compacted aluminium conductor conforming to IS: 7098 Part-II. 33 KV and 11 KV cables shall be suitable for unearthed system. The conductor screen and insulation screen shall both be of extruded semi-conducting compound and shall be applied along with the XLPE insulation in a single operation of triple extrusion process. The metallic screen of each core shall consist of copper tape with minimum overlap of 20% copper screen which shall be capable of carrying the system earth fault current of 300A for 2 seconds. Outer sheath.

2.0 LV Power cables

LV Power cables shall be of 1.1 kV grade, XLPE insulated, PVC inner sheathed (extruded), armoured, FRLS PVC outer sheathed, compacted aluminium conductor conforming to IS: 7098 Part-I.

3.0 Control cables

Control cables shall be of 1.1 kV grade, multi core, PVC insulated, PVC inner sheathed, armoured, FRLS PVC outer sheathed stranded copper conductor conforming to IS:1554 Par-I Up to 5 cores it shall be colour coded and above 5 cores shall be numbered.

4.0 Trailing cable

Trailing cables / Flexible cables shall be rubber insulated with copper conductor as per applicable standards. The minimum size of LV power cable shall be 4 Sqmm for Copper.

5.0 Cable identification system

In addition to manufacturer's identification on cables as per IS, following marking shall also be Embossed over outer sheath. Cable size and voltage grade. Word 'FRLS' at every 5 Metre Sequential marking of length of the cable in meters at every one Metre The embossing shall be progressive, automatic, in line and marking shall be legible and indelible.

6.0 Cable drums

Cables shall be supplied in wooden or steel drums of heavy construction. The surface of the drum and the outer most cable layer shall be covered with waterproof layer. Both the

ends of the cables shall be properly sealed with heat shrinkable PVC/rubber caps, secured by 'ÁU' nails so as to eliminate ingress of water during transportation, storage and erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply with IS 10418.

Tests:-

1.0 Cables offered shall be of type tested and proven type. Type test certificates for test conducted earlier on similar rating shall be furnished. Routine tests, Acceptance tests and all special tests for FRLS properties shall be carried out for all the cables as per applicable standards. The sample shall be drawn at the rate of one per type and size for every lot offered for inspection.

2.0 Special Tests

The following tests as applicable to FRLS sheathed cables shall be conducted as type tests on each size of each lot.

- a. Oxygen index test
- b. Temperature index test
- c. Acid gas generation during fire
- d. Smoke generation test under fire
- e. Swedish chimney test for class F3 as per SS: 422014:75
- f. Under fire conditions for bunched cables as per IEEE std. 383 / 74

Specified Technical Data:-

LT Power & Control Cables			
Sl. Nos.	Item Description	LT Power Cables	Control Cables
1.0.0	CABLES		
1.1.0	Voltage grade	1100 V	1100 V
1.2.0	Earthing system	Solidly earthed	Not applicable
1.3.0	Conductor type	Stranded	Stranded
1.4.0	Conductor material	Aluminium/ Copper	Copper
1.5.0	Maximum withstand temperature		
	a. Normal condition	90°C	70°C
	b. short circuit condition	250°C	160°C
1.6.0	Insulation material	XLPE	PVC
	Inner sheath material	Extruded PVC	Plastic tape
1.7.0	Outer sheath		
1.8.0	Material	Extruded PVC	Extruded PVC

1.9.0		compound	compound
	Armour	Galvanised steel	

III) Cable Trays:-

This specification covers the design, supply, fabrication fixing, aligning, and painting of cable trays and other steel frame works at site as required for the new laid cable as well as replacement of old damaged tray.

The cable trays shall be designed and fabricated / factory made out of various sections such as GI / M.S angles, flats, channels etc. and got approved by Consultants. Before fabrication the GI/ MS sections shall be properly straightened, aligned, cleaned properly to remove rust if any. All materials used for fabrication of cable trays shall conform to IS 226 and fabrication shall be as per IS: 800. After fabrication the cable trays, and accessories shall be free from sharp edges, corners, burrs and unevenness, and a coat of cold phosphate chemical shall be applied followed by a coat of red oxide primer.

The cable trays shall be welded to the mounting supports which in turn are either welded to plate inserts or grouted to structural members. Plate inserts for cable tray mounting supports shall be provided by Civil Contractor. Cable trays shall either run in cable trenches or run overhead and supported from available structure. Minimum clearance between the top most tray tier and structural member shall be 300 mm. The type and size of tray to be used shall be as required. Each continuous length of cable tray shall be earthed at minimum two places.

All hardware such as passivated bolts, nuts, washers, and other consumable required for the fabrication and erection shall be included in the rate quoted by contractor. However, if any grip/Anchor bolts or fasteners are required, the same shall be paid extra. The cable trays, accessories; covers etc. shall be painted with two coats of red oxide primer followed by two finishing synthetic enamel paint of approved shade. Where any cuts or holes are made or welding is done on finished steel.

IV) Earthing System:-

Scope

This specification covers the requirements of supply, installation, testing and commissioning of earthing systems for new installed equipment as well as strengthening/repairing of existing one for making it effective. The work shall be carried out in accordance with relevant layout drawings, typical drawings and installation notes etc. All metal conduits cable sheathes, switchgear, distribution boards, light fixtures, fan and all other metal parts forming part of the work shall be bonded together and connected by two separate and distinct conductors to earth electrodes.

Codes and Standards

The earthing systems shall comply with all currently applicable standards, regulations and safety codes of the locality where the installation is to be carried out. Nothing in this specification shall be construed to relieve the Contractor of this responsibility.

The installation work shall conform to the latest applicable Electricity Rules, Relevant Indian Standards and Codes of Practices as follows:

IS 3043 – Code of Practice for Earthing.

IS 732 – Electrical Wiring Installation.

IS 3975 -Galvanized round steel wire.

Indian Electricity Rules 32, 61, 67 and 68 of IER 1956.

Earthing Electrodes:-

Earthing electrodes shall be designed as per the requirements of IS 3043. The resistance of earth electrodes shall be as low as possible, the maximum allowable value being one Ohm. Earth electrodes shall be as far as possible embedded below permanent moisture level. Earth pits shall be further treated with salt and charcoal to improve the soil resistant. In rocky areas where the required earth resistance cannot be attained using the standard earth electrode. Configuration then application of deep well earth pits should be examined.

Plate Electrode:-

Plate electrodes shall be made of copper plate of 3.15 mm thick and 600 x 600 mm size. The plate shall be buried vertically in ground at a depth of not less than 2.5 Mtrs. to the top of the plate, the plate being encased in powdered charcoal to a thickness of 15 Cms. Al round. Salt and river sand shall not be used. Earth leads to the electrode shall be laid in a medium grade GI pipe and connected to the plate electrode with brass bolts, nuts and washers. The GI pipe of 19 mm dia. shall be placed vertically over the plate and terminated in a funnel of 5 Cms above the ground. The funnel shall be enclosed in masonry precast chamber. The chamber shall be provided with CI frame and CI cover. The earth station shall also be provided with a suitable permanent identification label/tag.

Pipe Electrode:-

Pipe electrode shall comprise of 50 mm dia. GI pipe with wall thickness 3.65 mm and not less than 3.0 mtrs long buried vertically in a pit of 350x350 mm size and filled with alternate layers of charcoal, salt and river sand and connected at the top to a medium grade GI pipe of 19mm dia, 1 metre long with a funnel at the other end, clamped to the pipe electrode with brass bolts, nuts and washers. GI pipe electrodes shall be cut tapered at the bottom and provided with holes of 12 mm dia. drilled not less than 75mm from each other up to 2 Mtrs, length from bottom. The top end of the pipe shall be threaded and provided with G.I cap. A hole shall be provided at 100 mm from the top end to receive a 13 mm bolt with double nuts and washers. The funnel and the earth lead connections shall be enclosed in a masonry precast chamber/inspection pit. The chamber shall be provided with C.I frame and C.I cover. A proper permanent identification tag/label/earth cable marker shall be provided for each electrode.

General:-

Each installation shall have one common earth grid connected to at least two groups of earth electrodes. The earth grid shall extend throughout the installation in the form of a ring circuit with branch connections to the equipment and structures to be earthed.

Earthing Cables and Connections: -

Earth systems shall be of solid copper/galvanized flats type, of cross-section specified on the relevant design earth layout drawing. Connections between earth electrodes and main ring earth conductors shall be executed in accordance with Electrical Drawings and in such a way as to facilitate the inspection and testing the earth resistance of each individual earth electrode group without disconnection of the earth system main ring. All un-insulated parts of earth conductors shall be suitably protected against direct contact with the soil to prevent electrolytic corrosion. This may be achieved by lap wrapping bared sections with green PVC adhesive tape. All earthing terminations shall be made with compression type cable lugs. Interconnections shall be directly clamped with compression type branch connectors as detailed in Electrical Drawings. Execution of earth cable branch connection by means of exothermic welding shall require the approval of The Company Site Representative, who will take into account the suitability of the welding equipment and the previous experience of the Contractor's personnel. The resistance between each earth electrode configuration and the general mass of earth shall not exceed 5 ohms when isolated from the main earth grid. Location of earth electrodes, earth conductors' connections and earth cable routes shown on the installation earth layout drawing shall be considered as

diagrammatic only, and site inspection shall be necessary to determine earth connection onto equipment's locations and conductor routes prior to installation. Within buildings, strips of high conductivity copper/GI, sized in accordance with the layout earthing design drawing, should be utilized. Where copper tape or cable is fixed to building structure, it shall be by means of purpose made saddles. Fixings shall be made using purpose made lugs and clamps. Fixings requiring drilling of holes through stripes shall be used, considering the effective cross-section of the particular run is within relevant regulations. Where tape or cable is run in the ground or fixed externally, and is liable to corrosion, it shall be wrapped with corrosion – resistant material. Alternatively, PVC wrapped tape or cable may be used. Joints in copper tape shall be tinned before assembly, riveted with a minimum of two rivets, and sweated solid. Where holes are drilled in the earth tape for connection to items of equipment, effective cross-sectional area of connections shall be not less than required to comply with the relevant Regulations. Bolts, nuts and washers for any fixings of earth tape shall be of high--tensile grade.

Electrical Equipment: -

Metallic enclosures of all electrical equipment shall be earthed at two ends by connection to the common earth grid. Cross-sectional area of the area of equipment earth connections shall be in accordance with the earth layout design drawing.

Non-Electrical Equipment:-

All metallic equipment used for storage, processing, transportation or pumping flammable liquids, vapours or gases, and their associated supporting structure or skid, shall be electrically bonded to the installation main earth ring. Electrical bonding of associated metal work, in handrails walkways, etc., is not necessary if it is demonstrated by testing that they are electrically continuous with the structure. However, the same shall be bonded to earth at one point. Piping which is not in electrical contact with its associated tank or vessel, such as an open discharge line in to a tank, shall be bonded to the tank. In installations that do not contain electrical equipment, the resistance between each earth electrode configuration and the general mass of earth shall not exceed 5 ohms when isolated from the main earth grid.

Bonding:-

Metal sheaths and armour of all cables operating at low voltage, metal conduits, ducting, trunking, and protective conductors associated with such cables, which might otherwise come into contact with adjacent fixed metalwork, shall be effectively either segregated from, or bonded to adjacent metal work. Metallic sheaths and / or non magnetic armour of all single-core cables in the same circuit normally shall be bonded together at one and end only of their run (solid bonding) unless specified otherwise. All interior metal, water and gas piping shall be bonded together and made electrically continuous. Non conductive coatings (such as paint, lacquer and enamel) on equipment to be earthed shall be removed from threads and other contact surfaces to ensure good electrical continuity.

V) Power Distribution Box:-

The 415V AC, 3 Phase Main Power Distribution Panel will to be located in the Canal Control Room for supplying/isolating 3phase, 415V AC power to Main Control Panel and UPS in Canal Control Room and individually to all Spot Control Panel. All electrical parameter for voltage, current, will be monitored through transducers to be wired in SCADA system.

Feeder Details:

Incomer:

- 63 Amps. SFU with breaking capacity rating of 50KA and short time rating of 50KA, impulse withstand of 12KV confirming to IEC:60947/IS:13947 with all standard features (two incomer from transformer & auto changeover from DG set)- 2 Nos.

Outgoing:

- 16-20A, (25KA) SFU for gate motor - 8 Nos.

Intent of Specification

This specification covers the requirements of 415V Power Distribution board, Starters, Local Push button stations etc. complete with all accessories for system.

Codes and Standards

The equipment to be furnished under this specification shall be in accordance with the applicable section of the latest version of the following Indian Standards, except where modified and /or supplemented by this specification.

IS 3427 : Metal-enclosed switchgear and control gear.

IS 8623 : Specification for low voltage switchgear and control gear assemblies.

IS 10118 : Code of Practice for Selection, Installation, and Maintenance of switchgear & control gear.

IS 12021 : Specification for Control transformers for switchgear and control gear for voltages not exceeding 1000V AC.

IS 13703 : Low voltage fuses.

IS 13947 : Low voltage switchgear and control gear.

General Requirements

- 1.0 The Power Distribution board (PDB) and its components shall be designed for design ambient temperature of 50°C. PDB shall be designed for natural air cooling. No forced cooling is acceptable.
- 2.0 Power Distribution board shall have single incomer arrangement and cable entry shall be of from top.
- 3.0 Short circuit withstands rating of the switchgear shall be as follows:

415 V Power Distribution board	: 50 KA for 1 sec.
415V ACDB (if required)	: 50 KA for 1 sec.
220V DCDB	: 25 KA for 1 sec.
- 4.0 415V normal system shall be solidly grounded. 220V DC system shall be ungrounded.
- 5.0 Busbar, breaker and other components shall be designed for continuous operation at rated current considering temperature inside the cubicle.
- 6.0 Close & Open control of all the motors shall be provided in PLC. Local operation of circuit breakers shall be possible only in "Test" position Remote indications / alarms shall be provided in the Electrical control panel in PLC. The control / interlock schemes for various types of feeders shall be commensurate with their application. However, control philosophy of each type feeder shall be firmed up during detailed engineering stage.
- 7.0 Power Distribution board shall be of draw out type (for breaker modules -if applicable) and other modules like SFU shall be of fixed type. Power distribution board shall be of single front type.
- 8.0 110V control supply shall be derived from 415/110V control supply transformer located in each motor / feeder respective module as required. 240V AC space heater supply provision shall be provided for motors rated above 30 kW.
- 9.0 The continuous current rating of the bus bars, incomer shall be the maximum load on the bus due to all the running auxiliaries during any operating condition plus 10% margin rounded off to the next higher standard rating.

- 10.0 At least 10% of feeder modules covering the range of motors used subject to minimum of one module in each bus section shall be provided as spare. Spare modules shall be completely wired up.
- 11.0 Operating height of the handles /switches shall be limited to a maximum of 1800 mm and a minimum of 300 mm.
- 12.0 Release is acceptable for Breaker feeders in MCC only.
- 13.0 Fuse, Contactor and overload relay shall meet type-2 co-ordination as per applicable standard. For non-motor feeders' cables & switchgear sizing shall be as per the load requirement and as detailed in the technical specification.

Technical Requirements

1.0 Power Distribution Board (PDB)

- 1.1 415V PDB shall be of metal enclosed, indoor, floor-mounted, free-standing type. Switchboard frames and load bearing members shall be fabricated using CRCA sheet steel of thickness not less than 2.0 mm. Doors and covers shall also be of CRCA sheet steel of thickness not less than 1.6 mm. Thickness of gland plates shall not be less than 3.0 mm for sheet steel & 4.0mm for non-magnetic material.
- 1.2 All switchboards shall be of uniform height not exceeding 2450 mm. Switchboards shall be easily extendable on both sides by the addition of vertical sections after removing the end covers. Module size of switchboards shall not be less than 200mm.
- 1.3 Cable entry for PDB shall be from top. Switchboards shall be divided into distinct vertical sections (panels), each comprising of the following compartments:
Main busbar compartment:
Switchgear / feeder compartment
Cable alley
Auxiliary busbar compartment
- a) The feeder compartment shall be sheet steel enclosed on all sides with the withdraw able units in position or removed. The front of the compartment shall be provided with the hinged single leaf door with captive screws for positive closure.

General Technical specification of Air Circuit Breaker

1.1. Standards / Ratings:

- 1.1.1. ACB shall be air break, draw out type, modular in construction and conforming to IEC:60947 / IS: 13947 (Part-2), VDE 0660 Part 101, IEC 68 Part 2-30 (climate –proof).
- 1.1.2. The ACB shall be rated at operational voltage of 415/440V AC, 50Hz supply system, and 50DegC ambient temperature. The ACB can be also used with voltage variation of +10%.
- 1.1.3. The ACB shall have breaking capacity ($I_{cs}=I_{cu}$) rating of 65KA for rated current at 415/440V AC and short time withstand rating of 50kA or higher for 1sec.
- 1.1.4. The circuit breaker shall be suitable for isolation according to IEC 60947-2.
- 1.1.5. All ACB shall be suitable for reverse fed without compromising on the performance.
- 1.1.6. The ACB shall have impulse withstand of 12kV and insulation voltage of 1000V AC.
- 1.1.7. The ACB should have electrical life declared at specific switching frequency per hour.

1.2. Standard features:

- 1.2.1. The ACB shall provide as a standard feature for the following mechanical and electrical indicators on the front panel:
- 1.2.2. Contact position (ON / OFF)
- 1.2.3. Stored energy status or Ready for closing status
- 1.2.4. Connected / Test / Disconnected position
- 1.2.5. Trip indication on fault
- 1.2.6. The ACB shall be provided with spare minimum 2 numbers NO and 2 numbers NC auxiliary contacts, which shall be wired and available exclusively for external use. It shall be possible to add 2 nos. auxiliary contacts if required.
- 1.2.7. The manual charging handle and mechanical close / open push button shall be in the front and shall be an integral part of ACB.
- 1.2.8. Contact wear and tear / erosion indicator, either mechanical or electrical shall indicate the degree of erosion of the contacts.
- 1.2.9. Access to the accessories of the circuit breaker (like spring charging motor, shunt, under voltage etc) shall be prevented with the ACB in ON condition.
- 1.2.10. The circuit breaker shall have 3 distinct and separate positions on the draw-out frame. These are namely connected position, test position and disconnected position.
- 1.2.11. It shall be possible to padlock the draw-out ACB in the connected, test and disconnected position of the guide frame.
- 1.2.12. Withdrawal portion of the circuit breaker shall be removable from the guide frame only when it is ensured that breaker is in OFF condition.
- 1.2.13. For safety purpose it shall be possible to padlock the shutters in closed position using padlock for ACB.

1.3. Operating Mechanism:

- 1.3.1. The ACB shall be manually as well as electrically operated. Stored energy mechanism shall be provided in all cases to ensure independent closing of the breaker. Electrical operating mechanisms shall be suitable for remote operation.
- 1.3.2. ACB shall be provided with mechanical anti-pumping feature.
- 1.3.3. The ACB shall have trip free mechanism which prevents the operating mechanism from interfering with the tripping or opening action.
- 1.3.4. Castell key lock if asked for shall be provided on the ACB itself. It should be possible to remove Castell key only when breaker is in OFF condition.
- 1.3.5. All the vital accessories like Shunt, Motor and Under Voltage coils shall be accessible from the front and should not need removing of the breaker from its panel for the replacement.
- 1.3.6. Spring charging motor, closing and tripping coil of electrically operated ACB shall be suitable for both AC and DC of typical control supply like 110V or 230V etc.

1.4. Protection

- 1.4.1. The ACB shall be equipped with an integral self-powered microprocessor based current release, which works on true R.M.S values for ensuring accurate protection. The microprocessor-based release should have integral LCD display of phase and neutral currents and also the maximum loaded phase. The display should be visible with a minimum 20% loading of the phase currents.

- 1.4.2. The protection unit should meet the EMI/EMC requirement as per latest standard.
 1. The ACB should have Rogowski current sensor for accurate fault sensing.
- 1.4.3. Integral Test facility to test healthiness of release and the trip circuitry shall be provided on the overcurrent release.
- 1.4.4. Trip indicators shall be provided to display the exact nature of fault (i.e. O/L, S/C and E/F) that caused tripping of circuit breakers. The circuit breaker will have to be necessarily with mechanical re-closing lockout. The trip indication shall need no external power supply for display.
- 1.4.5. The setting range of protection release shall be as follows:
 1. Overload protection shall have adjustable setting from 40% to 100% of the circuit breaker nominal current and the variation of setting shall be in steps of 10% of the nominal current. It should have adjustable time delay setting of 2 to 30s at tripping @ $6I_r$.
 2. Short time delayed short circuit protection will have adjustable current setting from 125% to 1200% of the Nominal Current rating of the circuit breaker and adjustable time delay setting for fault discrimination from 0 to 400 ms. Short Circuit protection shall have standard phase failure protections for motor application with the delay time of 20ms.
 3. Instantaneous short circuit protection shall be settable type with a range of setting of 150% to 1200% of the Nominal Current of the circuit breaker.
 4. Earth/Ground fault protection will have minimum adjustable current setting of 300A irrespective of nominal current rating of the circuit breaker. The adjustable time delay setting for tripping on earth fault shall be within 100 to 400ms. There should also be provision to disable the Earth Fault Protection if required.
 5. Neutral Protection shall be provided for ACB. The Neutral protection shall be dependent on the phase current and typical protection range shall be either 50% or 100%. There should also be provision to disable/off the Neutral Protection if required.
 6. It shall be possible to change the release settings on-line.
 7. The release shall have thermal memory feature with ON/OFF option.

1.5.Safety Interlocks and indicators:

- 1.5.1. The ACB compartment door shall be interlocked to prevent access when in connected position. It shall however be possible to defeat the interlock in an emergency.
- 1.5.2. Interlock shall be provided to prevent plugging in or withdrawal of ACB trolley unless it is open. Any attempts to do so shall trip the circuit breaker instantly.
- 1.5.3. Interlock shall be provided to ensure closing of ACB only in 'Connected' 'Test' and Disconnected position of ACB.
- 1.5.4. Mechanical 'ON' pushbutton shall have suitable locking arrangements for carrying out maintenance of downstream load.

Make: Siemens / Schneider / Legrand or ABB

Fuse Switch Units (FSU)

- 1.0 Fuse switch units shall be of heavy duty, single throw, double break, group operated, load break type. FSUs for AC motor circuits shall be of utilisation category AC-23. Switches for other outgoing feeders shall be of utilisation category AC-22. Switches for DC circuits shall be suitable for specified application. Fuse switch units shall have required number of auxiliary contacts for control circuit wiring.
- 2.0 The FSUs shall be operable from outside the module door. The switch handle shall clearly indicate the position of switch. Switch operating handles shall be provided with padlocking facilities to lock them in 'OFF' position. However, incomer switches of switchboards shall be provided with padlocking facility in both 'ON' and 'OFF' positions. FSU rating shall not be less than fuse rating.
Interlocks shall be provided such that the cubicle door shall not open when the switch is in closed position and the switch shall close only when the door is closed. However, suitable means shall be provided to intentionally defeat these interlocks.
- 3.0 Fuses shall be HRC cartridge link type rated for at least 80 kA RMS breaking capacity for AC circuit and 25 kA breaking capacity for DC circuit. Fuses shall have visible operation indicators.

Control and Selector Switches

- 1.0 Control and selector switches shall be of rotary type, with escutcheon plates clearly marked to show the function and positions.
- 2.0 Selector switches for starter modules shall have 'Test', 'Local', 'Remote' positions as specified.
- 3.0 Ammeter and voltmeter selector switches shall have four stay put positions with adequate number of contacts for 3-phase 4-wire system. These shall have oval handles. Ammeter selector switches shall have make before break type contacts to prevent open circuiting of CT secondary.

Contactors

- 1.0 Motor starter contactors shall be of air brake, electromagnetic type rated for uninterrupted duty. Contactors shall be double-break, non-gravity type and their main contacts shall be silver faced. Direct-on-line contactors shall be of utilisation category AC3. Reversing starters shall comprise of Forward and Reverse contactors mechanically and electrically interlocked with each other. These contactors shall be of utilisation category AC4.
- 2.0 The contactor shall operate satisfactorily between 85% to 110% of the rated voltage. The contactor shall not drop out at 70% of the rated voltage but shall definitely drop out at 20% of the rated voltage.

Instrument Transformers

- 1.0 The CTs shall be mounted on the switchgear stationary parts. For metering separate core shall be provided. The CTs shall be of cast resin, bar primary type and of Class E or better insulation. CT secondary current shall be 1A. Accuracy class of the Current Transformer shall be:-
- 2.0 Class 5P20 for other relaying
- 3.0 Class 0.5 and ISF < 5 for metering
- 4.0 CTs for current rating less than 50A shall be 'Wound primary' type and above 50A shall be 'Bar primary' type.
- 5.0 Voltage Transformer shall be cast-resin, draw-out type and shall have an accuracy class of 1.0.

- 6.0 The bus VTs shall be housed in a separate compartment. All VTs shall have readily accessible fuse and MCBs on primary and secondary sides respectively.

Indicating Instruments

All indicating and integrating meters shall be flush mounted on panel front. The instruments shall be of at least 96 mm. square size with 240 degree linear scales, and shall have an accuracy class of 1.0. All instruments shall have white dials with black numerals & lettering. Black knife edge pointer shall be provided for meters. Ammeters provided for motor feeders shall have a compressed scale at the upper current region to cover the starting current up to eight (8) times the CT current. No direct reading type ammeters shall be used. All such meters shall be fed through suitable Current transformers for motors rated 10kW & above. All analog type meters shall be of Moving Coil type.

Push Buttons

- 1.0 Push-buttons shall be of spring return, push-to-actuate type. Where specified push buttons shall be stay put type. Their contacts shall be rated to make, continuously carry and break 6 A at 110 V AC and 1 A (inductive) at 110V DC. Push buttons shall have 2NO+2NC contacts.
- 2.0 All push- buttons shall have two normally open and two normally closed contact, unless specified otherwise. The contact faces shall be of silver alloy. All push-buttons shall be provided with integral escutcheon plates marked with its function. All emergency push buttons shall be stay put/latching type. To delatch, master key provision shall be provided.
- 3.0 The colour of the button shall be as follows:
Green for motor START, breaker CLOSE, valve / damper OPEN / CLOSE commands Red for motor TRIP, breaker OPEN. Black for all annunciate or functions overloads reset and miscellaneous commands.

Indicating Lamps

Indicating lamps shall be of the panel mounting, LED type .The lamps shall have escutcheon plates marked with its function, wherever necessary. All indicating lamps shall be rated for continuous operation at 85% to 110% of their rated voltage. Low Voltage Glow Prevention (LVGP) feature shall be provided for indication lamps. Lamps shall have translucent lamp-covers of the following colours, as warranted by the application:

- Red for motor ON, breaker CLOSE.
- Green for motor OFF, breaker OPEN.
- Blue for Service
- White for Test, Spring Charged, Spring Discharged, Lockout Relay Healthy
- Amber for auto trip

Control supply and space heater supply

- 1.0 The PDB shall receive two nos. 220V DC feeder for the control supply and distribute to each panel. Auto changeover arrangement shall be envisaged between two supplies. Each panel shall receive control supply through bus wires and shall be tapped off through switch & fuse provided in the respective panel. It shall be possible to isolate any panel without disturbing the power supply to other panels. Each sub circuit shall have separate fuse.
- 2.0 An under voltage relay to monitor control supply shall be provided. A contact of the relay shall be wired to the terminal for external use. A Control Supply Failed' indication shall be provided.

- 3.0 Each starter module of PDB shall derive 110V AC control supply through control supply transformers. Two nos. of Control transformers shall be provided for redundancy purpose. The control transformers shall be of insulation class 'ÁB' or better. The sizing of control transformers shall be carried out by the bidder considering the actual load of power contactors, auxiliary contactors, indicating lamps and other equipment including remote auxiliary relays and lamps in the circuit.
For space heater circuits of motor rated more than 30kW and also for panel space heater, 240V AC supply shall be provided by tapping from the in comer before the main isolating switch/breaker. Necessary switch and fuse to isolate and distribute the supply to each panel shall be provided.
- 4.0 For motor feeders, circuit for motor space heater shall be wired through NC contact of breaker/contactator and MCB.
- 5.0 Each panel of PDB shall be equipped with the following as required:
 - Thermostatically controlled space heater(s).
 - Illumination lamp with door switch 5A 3pin socket with MCB protection.

Wiring

- 1.0 All switchboards shall be supplied completely wired internally up to the terminals, ready to receive external cables. All internal wiring shall be carried out with 650V grade, HR PVC/ XLPE insulated single core, copper conductor of minimum 2.5 Sqmm for CT circuits and 1.5 Sqmm for other circuits.
- 2.0 All internal wiring terminations shall be made with solder less crimping type tinned copper lugs. Insulation sleeves shall be provided over the exposed parts of lugs. Engraved core identification plastic ferrules marked to correspond with panel wiring diagrams shall be fitted at both ends of each wire. Number 6 and 9 shall not be used for wire identification.
- 3.0 Control terminal blocks shall be of 650 Volts grade, rated for 10 Amps and in one piecemolding. It shall be complete with insulating barriers, clip-on type terminals and identification strips. Marking on terminal strip shall correspond to the terminal numbering on wiring diagrams. Terminal blocks for CT & VT secondary leads shall be provided with test links & isolating facilities. CT secondary leads shall be provided with short circuiting & earthing facilities.
- 4.0 In all the panels at least 10% spare terminals for external connections shall be provided and these spare terminals shall be uniformly distributed on all terminal blocks.

Power cable termination

Cable termination compartment and arrangement for power cables shall be suitable for heavy duty, 1.1kV grade, stranded aluminium conductor, PVC / XLPE insulated, armoured and FRLS PVC sheathed cables. All power cable terminals shall be of stud type and the power cable lugs shall be of tinned copper solder less crimping ring type conforming to IS: 8309. All lugs shall be insulated / sleeved.

Nameplates and labels

- 1.0 Power Distribution Board, local push-button stations and local motor starters shall be provided with prominent, engraved identification plates. The module identification plate shall clearly give the feeder number and feeder designation.
- 2.0 All name plates shall be of non-rusting metal or 3-ply Lamicoid, with white engraved lettering on black background. Suitable stencilled paint mark shall be provided inside the panel/module for identification of all equipment, in addition to the plastic sticker labels, if provided. These labels shall be positioned so as to be clearly visible and shall have the device number, as mentioned in the module wiring drawings.

- 3.0 Caution name plate “Caution Live Terminals” shall be provided at all points where the terminals are likely to remain live and isolation is possible only at remote end.

Busbars and Insulators

- 1.0 Each PDB shall be provided with three phase and neutral busbars. DC distribution boards shall have two busbars. All busbars and jumper connections shall be of high conductivity copper / aluminium/ aluminium alloy of adequate size. The cross-section of the busbars shall be uniform throughout the length of switchboard.
- 2.0 All busbars shall be adequately supported by non-hygroscopic, non-combustible, track-resistant and high strength sheet moulded compound or equivalent type polyester fibre glass moulded insulators. All busbar joints shall be provided with high tensile steel bolts, Belleville/ spring washers and nuts. All copper to aluminium joints shall be provided with suitable bi-metallic washers. All busbars shall have HRPVC sleeves and colour coded.
- 3.0 Contact surfaces at all joints shall be silver plated or properly cleaned and anti-oxide grease applied to ensure an efficient and trouble free connection. Suitable bimetallic connectors shall be used for dissimilar metal connections.
- 4.0 The continuous rating of the main busbars shall be same as that of the incomer MCCB and busbar shall carry this continuous current without exceeding the temperature of 90°C. For silver plated joints, temperature shall not exceed 105°C. All horizontal and vertical busbar joints shall be covered by insulating shrouds.

Earthing

- 1.0 A copper / Aluminium earthing bus of adequate size shall be provided at the bottom and shall extend throughout the length of switchgear. It shall be bolted to the framework of each panel and each breaker earthing contact bar. The earth bus shall be sized to withstand specified short circuit current.
- 2.0 The truck and breaker frame shall get earthed while the truck is being inserted in the panel and positive earthing of the truck and breaker frame shall be maintained in all positions i.e., ‘Service’, ‘Test’ and ‘Isolated’ as well as throughout the intermediate travel.
- 3.0 All non- current carrying metal work of the switchboard shall be effectively bonded to the earth bus. All hinged doors shall be earthed through flexible earthing braid. VT and CT secondary neutral point earthing shall be at one place only on the terminal block. All metallic cases of relays, instruments and other panel mounted equipment shall be effectively bonded to the earth bus by independent stranded copper wires of size not less than 2.5 Sqmm.

Local Push Button Stations

The local push buttons stations shall be with FRP enclosure, suitable for outdoor mounting on wall or steel structures. The local push button stations shall be dust and vermin proof and shall have a degree of protection of IP- 55 as per IS: 13947 Part-1. Local push button stations shall comprise Start/Stop push buttons as per drive control philosophy. Emergency stop Push-buttons shall be stay put/ latching type, requiring master key for delatching.

Modules Description

- 1.0 Incoming feeder for PDB from transformer shall be provided with the following as a minimum:
 1. TPN MCCB incomer
 2. Current transformers for metering & protection
 3. Ammeter with selector switch.

4. Fuse/MCBs for control circuits
5. Ammeter transducer
6. Voltage transformers, voltmeter with selector switch & voltage transducer
(For incomers) Numerical three phase over current and earth fault relay.

2.0 Unidirectional motor feeders rated less than 30 kW shall be provided with the following as a minimum:

1. Triple pole fuse switch unit
2. Triple pole contactor.
3. Auxiliary contactors
4. LOCAL/REMOTE selector switch
5. Bimetallic thermal overload relay with single phasing preventor.
6. Push buttons.
7. Indicating lamps with coloured lenses.
8. MCB for control circuit
9. Current transformer for metering (above 10kW)
10. Ammeter (above 10 kW)
11. MCB for 240V AC space heater circuit (above 30kW motors)
12. Current transducer (above 30kW motors)
13. Interposing relays

3.0 Bi-directional Motor feeders (If applicable) shall be provided with the following as a minimum. (Not applicable for integral Actuators)

1. Triple pole fuse switch unit
2. Triple pole mechanically interlocked, open / close contactors.
3. Auxiliary contactors
4. Local/Remote/Test switch
5. Bimetallic thermal overload relay with single phasing preventor.
6. Push buttons
7. Indicating lamps with coloured lenses
8. MCB for space heater circuit
9. MCB for control circuit
10. Interposing relays

Technical Specification of PDB room:

1. PDB room Height: 3.5 Meter Length * Width : 12*15 Feet
2. The PDB Room shall be provided with appropriate grounding system. All exposed non – current carrying metallic parts and equipments in the PDB Room shall be connected to the system. Grounding system shall be designed to ensure effective operation of the protective gears in case of earth faults. The total earth resistance at any point of the earthing system shall not be more than 1 ohm.
3. Illumination Level of PDB Room:
 - The illumination level for PDB room (s) shall be at 200 lux without sunlight contribution.
 - The illumination level for outdoor area shall be 20 lux.
 - The illumination level for passage area shall be at 150 lux without sunlight contribution.
4. Supplying and fixing 19mm dia 3mm thick polythene pipe complete with fittings as necessary. Under ceiling/beam, bound with 22 SWG GI binding with inclusive Supplying

and drawing 1x18 SWG GI wire as fish wire inside the pipes and fittings and providing 50mm dia disc of MS sheet (20 SWG) having colour paint at one face fastened at the load point end the polythene pipe with fish wire.

5. Distn. Wiring by 2X22/0.3(Ph. & N) and 1X22/0.3 as Ecc single core Stranded 'FR' pvc insulated & unsheathed single core stranded copper wire in 19mm bore, 3mm thick polythen pipe complete with all accessories embedded in wall to 240v 5 A 3 Pin Plug point incl. S&F 240 V 5A 3 pin flush type plug socket & piano key type switch.
6. Supply & Fixing 240V, 20 A, plug socket with separate 20A piano key type switch on sheet metal switch board embedded in wall.
7. S&F double door 2+6 way SPN MCB distribution Board with IP -42/43 protection.
8. Exhaust system as suitable for proper ventilation of PDB room.

VI) TRANSFORMERS:-

TECHNICAL SPECIFICATION FOR 25 KVA, 11/ 0.433 KV, 22/ 0.433 KV 3 PHASE DISTRIBUTION TRANSFORMER

1.0 SCOPE:

- 1.1 This specification covers design, manufacturing, testing and delivery of the oil immersed, Oil Natural (ON) with Completely Self Protected feature, outdoor type, three phase, 50 Hz, 11 kV, 22 kV Distribution Transformers of 25Kva.
- 1.2 The equipment offered shall be complete with all parts necessary for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
- 1.3 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements.
- 1.4 The design and constructional aspects of materials shall not withstanding any anomalies, discrepancies, omissions, in – completeness, etc. in these specifications and will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulations in t Indian Standards, IEC standards, I.E. Rules, I.E. Act and other statutory provisions.
- 1.5 The Manufacturer/supplier shall bind himself to abide by these considerations to the entire satisfaction of the employer and will be required to adjust such details at no extra cost to the employer over and above the tendered rates and prices.

1.6 TOLERANCE:

The tolerance of guaranteed performance figures shall be as specified in the (Part-I) table 7 of latest issue of IS 2026 or relevant International Standard except wherever specified otherwise in this specification.

2.0 SYSTEM PARTICULARS:

The transformers shall be suitable for outdoor installation with following system particulars and they should be suitable for service under fluctuations in supply voltage as permissible under Indian Electricity Rules

- 2.0 Nominal System Voltage: 11 kV or 22kV

- 2.1 Corresponding Highest System Voltage : 12 kV or 24kV
- 2.2 Neutral earthing : Solidlyearthed
- 2.3 Frequency: 50 Hz with ± 3 %tolerance
- 2.4 Number of Phase : 3

3.0 SERVICE CONDITIONS:

- 3.1 Equipment supplied against the specification shall be suitable for satisfactory operation under the following tropical conditions:-
 - 3.1.1 Max. Ambientair temperature : 50 Deg. C
 - 3.1.2 Max.relativehumidity : 100 %
 - 3.1.3 Max.annual rainfall : 1450 mm
 - 3.1.4 Max. Wind pressure : 150 kg./ Sqm
 - 3.1.5 Max. altitude above mean sea level : 1000 mtrs.
 - 3.1.6 Isocerauniclevel : 50
 - 3.1.7 Seismic level(Horizontal acceleration) : 0.3g.
 - 3.1.8 Climatic Condition Moderately hot and humid tropical climate conducive to rust and fungusgrowth.
 - 3.1.9 Reference Ambient Temperature for
Temperaturerise : 50Deg. C
- 3.2 The climatic conditions are prone to wide variations in ambient conditions and hencethe equipment shall be of suitable design to work satisfactorily under theseconditions.

4.0 APPLICABLE STANDARDS:

- 4.1 The design, manufacture and performance of the equipment shall comply with all currently applicable statutes, regulations and safetycodes.
- 4.2 Nothing in this specification shall be construed to relieve the manufacturer off his responsibilities.
- 4.3 The Distribution Transformers shall conform to IS: 2026 as amended up to date or other International Standards for equal or better performance. Unless otherwise modified in this specification the Distribution Transformers shall comply with the Indian Standard Specification IS 2026latest.
- 4.4 Unless otherwise specified, the equipment offered shall conform to amended up to date Indian, IEC, British or U.S.A. Standards and in particular, to the following: -
 - a) IS 2026 : Distribution Transformer
 - b) IS:1180/1989 (Part-2) : Outdoor, sealed type, Threephase disbution transformers up to and including 100 kVA, 11KV.
 - c) IS:335 : Insulating oil for transformers and switchgear.
 - d) IS:2099 : Bushing
 - e) IS:3347 : Dimensions for porcelain transformer bushing for use in normally and lightly polluted atmospheres.
 - f) IS 5 : Colours for ready mixed paints and enamels.
 - g) IS 13730 (Part-27) : Specification for particular types of winding wires.
- 4.5 In case of conflict arising out due to variations between the applicable standard and the standards specified herein the provisions of this specification should prevail.

5.0 SPECIFIC TECHNICAL REQUIREMENT:

5.1 STANDARD KVARATINGS:

The standard ratings for transformer shall be 25 KVA.

5.2 NOMINAL VOLTAGERATINNG:

- i. Primary voltage : 11 KV / 22 KV
- ii. Secondary voltage : 0.433 KV

5.2.1 WINDINGCONNECTIONS:

- i. H.V.Winding : Delta
- ii. L.V.Winding : Star (Y)

The neutral of the L.V. winding shall be brought out to a separate insulated terminal. The voltage group shall be Dyn-11.

5.3 TEMPERATURERISE:

- i) The temperature rise for top oil over an ambient temperature of 50° C should be 65°C maximum (measured by thermometer in accordance with IS 2026 or relevant International Standard).i.e. Max. Temp. of top oil shall not exceed115 °C.
- ii) Temperature rise for winding over an ambient temperature of 50° C should be 70° C maximum (measured by resistance method in accordance with IS 2026 or relevant International Standard). i.e. Max. Temp. of winding shall not exceed120 °C.

5.4 NO LOAD VOLTAGERATIO:

The no load voltage ratio shall be 11000/433 Volts or 22000/433 Volts.

- a. DESIGN & CONSTRUCTION:
- b. CORE:

- i) The core shall be stacked type or wound core type or delta core type.
- ii) **a) For Stack core :** The core shall be of high grade cold rolled grain oriented (C.R.G.O) annealed steel lamination having low loss and good grain properties, coated with hot oil proof insulation, bolted together to the frames firmly to prevent vibration or noise. All core clamping bolts shall be effectively insulated. The complete design of core must ensure permanency of the core losses with continuous working of the transformers.
- b) For Wound core :-** The core shall be 'C' type construction of high grade cold rolled grain oriented (C.R.G.O.) annealed steel lamination having low loss and good grain properties, coated hot oil proof insulation. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The core material shall not be brittle.

Core clamping for C.R.G.O. Wound core type transformers shall be as follows:

1. Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped.
2. M.S. core clamps shall be painted with oil-resistant paint.
3. Suitable provision shall be made in the bottom core clamp / bottom plate of the transformer to arrest movement of the active part.
4. Core shall be clamped by Magnus strap of 19 mmwidth.

c) **Delta Core:** The delta core has the triangular structure consisting the triangular Bottom yoke, triangular top yoke and three vertical limbs connecting the three vertices of the said Bottom and top yoke. The core shall be of high grade cold rolled grain oriented (C.R.G.O) annealed steel laminations having low loss and good grain properties, coated with hot oil proof insulation, bolted together to the frames firmly to prevent vibration or noise. All core clamping

bolts shall be effectively insulated. The complete design of core must ensure permanency of the core losses with continuous working of the transformers.

- iii. The grade of core laminations shall be M4
- iv. The transformer core shall not be saturated for any value of V/f ratio to the extent of 112.5% of the rated value of V/f ratio (i.e. 11000 / 50 or 22000/50) (due to combined effect of voltage and frequency) up to 12.5% without injurious heating at full load conditions and will not get saturated. The manufacturer shall furnish necessary design data in support of this situation.
- v. FLUX DENSITY:
- vi Flux density should not be more than 1.55 Tesla at the rated voltage and frequency. The value of the flux density allowed in the design shall be clearly stated in the offer along with graph.
- vii The No load current at rated voltage shall not exceed the percentage given in Table below. The no load current shall not exceed 2 times that at rated voltage when the applied voltage is 112.5%.

Sr. Nos.	KVA Rating	At Rated Voltage	At 112.5% Rated Voltage
1	25	2 % of the full load current in LT winding	4 % of the full load current

- viii Number of steps of core shall be minimum of

	Stack core	Wound core	Delta Core
For 25 KVA	5 standard steps	No steps	5 standard steps

c. WINDING:

i. MATERIALS:

HV winding shall be done by enamel coated copper conductors and LV winding shall be done by Double paper covered electrolytic copper conductor for both 11 and 22 kV class transformers.

ii CURRENT DENSITY:

Current density for HV and LV should not be more than 2.8 A / Sqmm. iii L.V. Neutral formation shall be at top.

d. LOSSES:

The losses at rated voltage for 25 kVA 11 /0.433 kV and 22/ 0.433 kV transformers should be as shown below and shall be calculated at 75 deg.C as per limits specified.

TABLE – 1

Type of core	Voltage Ratio in volts	KVA Rating	No load losses in watts.	Load losses in watts.
Stack core	11000/433	25	100	685
	22000/433	25	115	700
Wound core	11000/433	25	80	615
	22000/433	25	100	650
Delta core	11000/433	25	100	685
	22000/433	25	115	700

No positive tolerance will be permitted for No Load and Load Losses.

The values guaranteed in G.T.P. for flux density, no load current at rated voltage, no load current at 112.5% of rated voltage and no load loss at rated voltage shall be individually met.

e. **INSULATION MATERIAL & CLEARANCES:**

- i. Materials : Makes of Electrical grade insulating craft paper, Press Board, Perma wood/ Haldi wood insulation shall be declared in GTP by the manufacturer. The test reports for all properties as per relevant I.S. amended up to date shall be submitted during inspection.
- ii. The electrical clearance between the winding and body of the tank (between inside surface of the tank and outside edge of the windings) should be less than 30 mm.

MINIMUM EXTERNAL CLEARANCES OF BUSHING TERMINALS:

		<u>11 kV</u>	<u>22 KV</u>
HV	Ph to ph	255 mm.	330 mm.
	Ph to E	140 mm.	230 mm.
LV	Ph to ph	75 mm.	75 mm.
	Ph to E	40 mm.	40 mm.

f. **IMPEDANCE VALUE:**

The percentage impedance at 75 ° C. shall be 4.5% for 11 kV class and 5% for 22 kV class (tolerance of $\pm 10\%$)

g. **TANK:**

- i. The transformer tank shall be made up of prime quality M.S. sheets of rectangular / round / hexagonal shape. The transformer tank shall be of robust construction. All joints of tank and fittings should be oil tight and no bulging shall occur during service. The tank design shall be such that the core and windings can be lifted freely. The tank plates shall be of such strength that the complete transformer when filled with oil may be lifted bodily by means of the lifting lugs provided. Tank inside shall be painted by varnish. Top cover plate shall be slightly sloping, approximately 5 to 10 deg. towards HV bushing and edges of cover plate should be bent downwards so as to avoid entry of water through the cover plate gasket The width of bend plate shall be 25 mm min. The top cover shall have no cut at point of lifting lug. The rectangular/ hexagonal tank shall be fabricated by welding at corners.
- ii. In rectangular shape tanks, horizontal or vertical joints in tank side walls and its bottom or top cover will be not allowed. Only one vertical joint will be allowed in round shape tank and only two joints are allowed in hexagonal shape tank. In addition the cover of the main tank shall be provided with an air release plug.
Side wall thickness: 3.15 mm. (min.)
Top and bottom plate thickness: 5 mm. (min.)
- iii. Reinforced by welded angle 50X50X5 MM on all the outside walls on the edge of tank to form two equal compartments. The permanent deflection is not more than 5mm up to 750 mm length and 6mm up to 1250 mm length

when transformer tank without oil is subject to air pressure of 35KPa above atmospheric pressure for 30 min. Pressure test shall be performed carefully at the time of 1st stage inspection only to confirm the adequacy of reinforcement angle and gauge of the tank and certified by employer's representative.

- iv. All welding operations to be carried out by MIG process.
- v. LIFTING LUGS : 4 nos. welded heavy duty lifting lugs of MS plate of 8 mm thickness suitably reinforced by vertical supporting flat of same thickness as of lug welded edgewise below the lug on the side wall, up to reinforcing angle. They shall be so extended that cutting of bend plate is not required.
- vi. PULLING LUGS : 4 nos. of welded heavy duty pulling lugs of MS plate of 8 mm thickness shall be provided to pull the transformer horizontally.
- vii. TOP COVER FIXING BOLTS: GI nut bolts of 3/8" dia. with one plain washer shall be used for top cover fixing spaced at 4" apart. 6mm neoprene bonded cork oil resistance gaskets conforming to type B/C IS 4253 Part-II amended up to date will be placed between tank and cover plate.
- viii. VERTICAL CLEARANCE: The height of the tank shall be such that minimum vertical clearance up to the top cover plate of 120 mm is achieved from top yoke.
- h. HEAT DISSIPATION: The manufacturer will have to design the tank such that heat is dissipated without radiators. Transformers with radiators will not be accepted. Heat Dissipation calculations shall have to be submitted along with the offer.
- i. TOTAL MINIMUM OIL VOLUME:

Sr. Nos.	KVA rating	Oil in liters (exclusive of oil absorbed in core & coil assembly)
		11 kV/ 22 kV
1.	25 KVA	100 Liters minimum

- j. NOTE: Transformer shall be supplied complete with first filling of oil and 10 % extra of total volume of oil in separate container/ drum to the concerned stores/ sites. Detailed calculation of absorption should be submitted.

7.0 CONSERVATOR:

No conservator tank is required for 25 kVA transformers.

8.0 BREATHER: No breather is required for 25 kVA transformers.

9.0 TERMINALS :

- 9.1 Brass rods 12 mm. dia. for HT with necessary nuts, check-nuts and plain thick tinned washer.
- 9.2 Tinned copper rods 12 mm for 25 kVA transformers for LT extension as shown in the drawing for cable lug connections, with necessary nuts, check nuts and plain thick tinned washers.

10.0 BUSHINGS & CONNECTIONS:

- 10.1 For 11 kV class 12 kV bushing, for 22 kV class 24 kV bushing shall be used and for 433 volts 1.0 kV bushing shall be used. Bushings of the same voltage class shall be interchangeable. Bushings with plain shed, as per relevant IS amended up to date shall

be mounted on the side of the tank for the rectangular shape tank transformers and not on the top cover.

10.2 However, in case of Round/ Hexagonal shape tanks, the HV Bushings shall be mounted on top cover of the transformer and LV Bushings shall be fixed on tank body at equidistance through out on opposite side of HV Bushings.

10.3 Only sheet metal pocket shall be provided for mounting of HV bushings and the same shall not be fixed on pipes. Sheet metal pocket shall be designed in such a way that all H.T. Bushings shall remain parallel and at equi- distance throughout. Bushings having type tested, as per relevant IS amended up to date shall only be acceptable.

10.4 The minimum creepage distance for all the bushings shall not be less than 25 mm per kV.

11.0 INTERNAL CONNECTIONS:

11.1 H.V. WINDING:

- i. In case of H.V. winding all jumpers from winding to bushing shall have cross section larger than winding conductor.
- ii Inter coil connection shall be by crimping and brazing.
- iii In case of Copper Winding Delta joints shall be with crimping and Brazing only.
- iv Lead from delta joint shall be connected to bushing rod by brazing only.

11.2 L.V. WINDING:

- i. L.T. Star point shall be formed of Copper flat of sufficient length. Lead from winding shall be connected to the flat by crimping and brazing.
- ii. Firm connections of L.T. winding to bushing shall be made of adequate size of 'L' shaped flat. Connection of L.T. Coil lead to 'L' shape flat shall be by crimping and brazing. Alternatively 'L' shape lug of adequate capacity effectively crimped shall be acceptable.
- iii. 'L' shape flat/lug shall be clamped to L.V. Bushing metal part by using nut, lock - nut and washers.
- iv For Aluminum windings, L&T Alkapee aluminum brazing rods with suitable flux shall be used. For copper winding crimping and silver brazing alloy shall be used.

12.0 TANK BASE CHANNEL:

The tank base channel for 25 KVA transformers - 75 mm x 40 mm.

13.0 TERMINAL MARKING PLATES AND RATING PLATES:

Terminals shall be provided with terminal marking plates. The transformer shall be provided with riveted rating plate of minimum 8 SWG aluminium anodized material sheet in a visible position. The entries of the rating plate shall be indelibly marked (i.e. by etching, engraving or stamping).

Marking as 'M.S.E.D.C.L'S and 'Sr. Nos.' of transformer shall be engraved on transformer main tank below L.T. bushings.

The name of the company, order Nos., capacity, month and year of manufacturing shall be engraved on the tank of transformer just below the nameplate clearly visible. The engraving can be done on separate plate which shall be firmly welded to main tank and shall form integral part of the tank.

14.0 FITTINGS:

The fittings on the transformers shall be as under :

1	Rating and diagram plate	1 Nos.
2	Earthing terminals with crimping lugs.	2 nos.
3	Lifting lugs	4 nos. (for tank)
4	Thermometer pocket	1 Nos.

5	Platform mounting channel with suitable holes	2 nos.
6	HT & LT bushing	3 nos. of HT bushing and 4 nos. of LT bushing shall be provided. Each bushing (HV & LV) should be provided with 3 nos. of brass nuts and 2 plain brass washer.
7	Pulling lugs	4 nos.

15.0 TRANSFORMER OIL:

Transformer oil to be used in all the Distribution transformers shall comply with the requirements of latest IS 335/1983 amended up to date thereof. In addition the oil should conform to 'Ageing Characteristics' specified below for New Oil and Oil in transformers. Type test certificates of oil being used shall be produced to employer's representative at the time of stage inspection.

New oil - Ageing characteristics after accelerated ageing test 96 hrs at 115° C (open beaker method with copper catalyst)

- 4.1 Specific Resistance(Resistivity)
 - a) at 20 ° C : 2.5 x 10¹² Ohm-Cm (Min)
 - b) at 90 ° C : 0.2 x 10¹² Ohm-Cm (Min)
- 4.2 Dielectric dissipation factor - 0.20 (Max.tan delta) at 90 °C.
- 4.3 Total acidity mg/KOH/gm- 0.05(Max)
- 4.4 Total sludge value (%) by weight - 0.05(Max.)
- 4.5 The method of testing these aging characteristics is given in Appendix C of IS 335 amended up to date.
- 4.6 Oil filled in Transformers:

The important characteristics of the transformer oil after it is filled in the transformer (within 3 months of filling) shall be as follows:

Sr. Nos.	Characteristics	Specifications
1.	Electric Strength (Breakdown voltage)	30 kV (Min)
2.	Dielectric dissipation factor (Tan Delta) at 90 deg.C.)	0.01 (Max)
3.	Specific Resistance (Resistivity) at 27 deg. C (ohm-cm)	10 x 10 ¹²
4.	Flash Point, P.M. (closed)	140 ° C (Min)
5.	Inter facial tension at 27 ° C.	0.03N/M (Min)
6.	Neutralization value (total acidity)	0.05Mg.KOH/gm (Max.)
7.	Water content PPM	35 (Max)

16.0 TEST AND INSPECTION:

16.1 ROUTINE TESTS:

- i. All transformers shall be subjected to the following routine tests at the manufacturer's works. The tests are to be carried out in accordance with the details specified in IS 2026 or as agreed upon between the employer and the manufacturer.
 1. Measurement of winding resistance.
 2. Ratio, polarity and phase relationship.

3. Impedance voltage.
4. Load losses.
5. No-load losses and No-load current.
6. Insulation resistance.
7. Induced over voltage withstand.
8. i. Separate source voltage withstand.
- ii. All the routine tests shall be conducted in the suppliers' laboratory at their cost.
- iii. Heat run test shall be arranged free of cost on the unit selected from the lot by Executive Engineer / Authorized Representative.
- iv. The calculations to confirm the thermal ability as per Clause Nos. 9.1 of latest IS: 2026 Part-I or equivalent International Standard.

VII) DG Set:

This specification covers the design, manufacture test at works, supply, installation testing and commissioning of 25KVA Air cooled silent type Diesel Generating set complete with all accessories like, starting batteries control panel, interconnecting cable, tank, fuel/coolant/ exhaust pipes, silencer, anti-vibration mountings, foundation etc. 2. STANDARD:- The generating set shall be designed, manufactured and tested in accordance with the latest revision of Indian standards. IS 10002/1981- Specification for Diesel Engines as amended up to date IS 4722/2001-Rotating Electrical Machines -Specification(second revision) 3. GENERAL- The generating sets shall be robust in construction factory tested and assembled to ensure perfect alignment of Engine and Alternator on a common base frame. The base frame shall be fabricated out of adequate thickness rolled steel sections. The set shall be mounted on anti-vibration mounting to prevent transfer of vibration to the foundation and structures. The equipment shall be suitable for operating at a hot humid and saline atmosphere at an ambient temperature of 45 degree centigrade.

DIESEL ENGINE:

Type : 4 strokes
 No of Cylinders : 6 cylinders
 Cooling : Air cooled and turbo charged, Diesel Engine Minimum required
 BHP @ 1500 RPM
 Capacity : NTP conditions

Engine designed to run continuously, conforming to BS: 5514/DIN-6271/IS 10002/ ISO – 3046 with an overload capacity of 10% for one hour in any 12 hours continuous operation.

1.0 The engine shall be complete with the following accessories

- 1.1 Heat Exchanger
- 1.2 Corrosion inhibitor coolant
- 1.3 Paper element filters for fuel, lube oil and by-pass
- 1.4 Flywheel to single bearing alternator with housing.
- 1.5 Dry type air cleaners and vacuum indicators
- 1.6 PT Self Adjusting direct fuel injection system
- 1.7 Silencer
- 1.8 Stainless steel exhaust flexible bellows
- 1.9 Electronic Control panel with digital governor suitable for synchronization.
- 1.10 Electric Starter
- 1.11 Battery charging alternator
- 1.12 Electronic Instrument panel (Displaying the following):
- 1.13 Battery Voltage
- 1.14 Coolant Water Temperature
- 1.15 Lubricating Oil Pressure

- 1.16 Engine Speed
 1.17 Engine Hours
 1.18 Safety Control : High water temperature (HWT)
 (Trip & Indication for) : Low lube oil pressure (LLOP)

Over speed stop Air inlet system, Charging system, Control system, Exhaust system.

2.0 **Fuel consumption:** At 75% of rated load the Bench Mark- Fuel Consumption is 9.0 litres /hr. The fuel consumption indicated by the supplier shall be guaranteed for first 600 hours of operation / first one year whichever is earlier. Suppliers offering equipment with higher fuel consumption shall be loaded for extra cost of fuel. For increase or decrease of every litre per hour of specified fuel consumption, cost of the additional fuel would be loaded (added/ reduced) from quoted DG Set price as per loading factor given later in this document to arrive at final tender value.

3.0 **Efficiency:** 90% or higher Performance Guarantee Certificate (Specifically indicated from Authorized agency for Certification) to be provided by the supplier for Type approval and conformity of production testing of DG set.

4.0 Alternator:

Alternator confirming to BS:5000/IS:4722 with standard design with IP 23 Protection, suitably rated at 25 KVA at 0.8pf, 433 Volts, 3 phase, 4 Wires, 50 Hz., 1500 RPM, self excited (brushless excitation) and self regulated, Band of Voltage Regulation +/- 1.5% of rated voltage (from no load to full load) and Class "H" Insulation. Alternator should be mounted on a common single base frame and coupled directly to the engine.

5.0 Base Frame:

Sturdy, fabricated / welded construction, made out of high quality Steel section suitable for mounting the engine and alternator. The base frame shall be suitably designed to simplify transportation, handling, slinging, E&C Shall have provision for levelling adjustments, as required during installation.

6.0 AMF Control Panel

Cubicle type, floor mounting Control Panel, with dust and vermin proof for accommodating the following:

♣ Suitable Moulded Case Circuit Breaker, Ammeter with Selector switch

1. Voltmeter with Selector Switch, 500 Volts
2. Frequency Meter
3. KWH Meter
4. KW Meter
5. Current Transformers

6. Indicating Lamps for supply “ON” & Load “ ON”

7. Instrument fuses

- ♣ FUEL TANK: Fuel Tank should be located nearest to the DG set enclosure to ensure free flow of Diesel.
- ♣ BATTERY: Suitable Dry type Batteries of Standard Make with leads and Terminals shall be part of the equipment. The pack shall be suitably positioned and modular withdraw able to ease of servicing. The Battery pack shall be minimum 180 AH; Lower capacity battery pack will be loaded to equipment cost.
- ♣ NOISE LEVEL OUTSIDE the enclosure: 75 dbA at a distance of 1metre under free field condition and adhere to the guide lines of MOEF (Ministry of Environment and Forest) and CPCB (Central Pollution and Control Board) norms.
- ♣ Provision to log essential parameters at 1minutes interval shall be provided along with Optional Data logger, to be quoted separately.
- ♣ Desirable maximum ambient temperature without derating : Base level 480C but not less than 450C, considering peak summer temperature.
- ♣ Lube oil System: Complete with cooling system, oil temperature monitor, filtration system up to 20 microns, level indicator and fume disposal system to be provided. Fuel system with primary and secondary fuel filter, fuel pump to be provided.

List of Laboratory Equipment (Table 100-2 of MORT&H)

SI. No	Name of the Project	Number
A)	GENERAL	
1	Weigh Balances	
	a) 5 - 20 kg capacity Electronic type -Accuracy 1 gm	1 Nos.
	b) 500 gm capacity-Electronic Type Accuracy 0.01 gm	1 Nos.
	c) Electronic 5 kg capacity Accuracy 0.5 gm	1 Nos.
	d) Platform Balance scale-300 kg capacity	1 Nos.
	e) Chemical Balance 100 gm capacity-accuracy 0,001 gm	1 Nos.
2	Oven-electrically operated, thermostatically controlled (including thermometer), stainless steel interior from 0°C to 220°C Sensitivity 1°C	1 Nos.
3	Sieves: as per IS:460-1962	
	a) I.S. sieves 450 mm internal dia of sieve sets as per BIS of required sieve sizes complete with lid and pan	1 set
	b) IS sieve 200 mm internal dia (brass frame and steel/or brass wire cloth mesh) consisting of sieve sets of required sieve sizes complete with lid	2 set
4	Sieve shaker capable of taking 200 mm and 450 mm diasieves electrically operated with time switch	1 Nos.
5	200 tonnes compression testing machine	1 Nos.
6	Stop watches 1/5 sec. accuracy	1 Nos.
7	Glassware comprising beakers, pipettes, dishes, measuring cylinders (100 to 1000 cc capacity) glass rods and funnels, glass thermometers range 0°C to 100aC and metallic thermometers range upto 300°C.	2 Nos. each
8	Hot plates 200 mm dia (1500 watt.)	1 No
9	Enamel trays	
	a) 600 mm x 450 mm x 50 mm	2Nos
	b) 450 mm x 300 mm x 40 mm	2Nos
	c) 300 mm x 250 mm x 40 mm	2Nos
	d) Circular plates of 250 mm dia	2Nos
10	Water Testing Kit	1 Nos.
B	FOR SOILS	
1	Water still	
2	Liquid limit, grain size distribution and plasticity index device with ASTM grooving tools as per IS:2720	1 Nos.
3	Sampling pipettes fitted with pressure and suction inlets, 10 ml. Capacity	1 set

C	FOR CEMENT, CEMENT CONCRETE AND MATERIALS	
1	Water still	
2	Vicat needle apparatus for setting time with plungers as per IS:269-1967	1 No
3	Moulds	
	a) 150 mm x 300 mm ht. Cylinder with capping component along with the capping set and compound as per IS	As Require
	b) Cube 150 mm, and 100 mm (each size)	As Require
4	Flakiness index test apparatus	1 No
5	Aggregate impact test apparatus as per IS:2386 (Part 4) 1963	1 No
6	Los-Angeles's abrasion test apparatus as per IS:2386 (Part 4) 1963	1 No
7	Equipment for slump test	1 No
8	Equipment for determination of specific gravity or fine and coarse aggregate as per IS:2386 (Part 3) 1963	1 No
9	Compression and Flexural strength testing machine of 200 T capacity with additional dial for flexural testing	1 No
10	Core cutting machine with 10 cm dia diamond cutting edge	1 No
11	Needle vibrator	2Nos
12	0.5 Cft, 1 Cft cylinder for checking bulk density of aggregate with tamping rod	As required
13	Soundness testing apparatus for cement (<i>Le Chatelier</i>)	1 set

The Details of the tests carried out in laboratory will be as below. Few special required tests may be carried out from the outside laboratory approved by the IWD.

Name of the Test (to be conducted in accordance with the relevant Codal provisions)
Embankment, Concreting & Structures
Gradation of Coarse & Fine Aggregate
FDD Test
Slump tests
pH & TDS Test
Cube Tests
PI
Gradation
AIV
Flakiness Index
Cement
Steel
Curing Compound

Cement Test
<i>Soundness by Le Chatelier</i>
<i>Fineness by specific Surface</i>
<i>Compressive Strength</i>
<i>Initial and final setting</i>
<i>Consistency tests</i>
Coarse Aggregate Tests
<i>Loss Angles Abrasion Value</i>
<i>Bulk Density</i>
<i>Elongation Index</i>
<i>Flakiness Index</i>
<i>Sp Gravity and Water Absorption</i>
<i>Impact test</i>
<i>Grading/ Mechanical Analysis</i>
Curing Compound Test
<i>Water Retaliation</i>
<i>Reflection Test</i>
<i>Drying Time Test</i>
Test for Steel
<i>Rebend Test</i>
<i>Bend Test</i>
<i>Tensile /Elongation &Wt/Mt (A) up to 20mm</i>

“Equivalency of Standards and Codes

An indicative list of Bureau of Indian Standards (BIS) IS Codes and IRC codes to be followed is as under, unless otherwise specified in the work item in technical specifications.

S. Nos.	Material / Work Type	IS Code	IS Code Name
1	Earth Work	IS: 1498-1970	Classification and identification of soils for general engineering purposes
		IS: 3764-1992	Safety code for excavation work
2	Form Work	IS: 1730-1989	Dimensions for steel plates, sheets strips and flats for general engineering purposes
		IS: 808-1989	Dimensions for Hot Rolled Steel Beam, Column, Channel and Angle Sections
		IS: 723-1972	Specification for Steel Countersunk Head Wire Nails

S. Nos.	Material / Work Type	IS Code	IS Code Name
3	Aggregates	IS: 383-1970	Specification for coarse and fine aggregates from natural sources for concrete
4	Concrete Works	IS: 456-2000	Plain and Reinforced Concrete - Code of Practice
		SP 16	Design Aid for IS: 456
		SP 34	Handbook of Concrete Reinforcement and Detailing
		IS: 516-1959	Method of tests for strength of concrete
		IS: 1199-1959	Methods of sampling and analysis of concrete
		IS: 2386-1963 (Part 1)	Methods of Test for Aggregates for Concrete - Part 1: Particle Size and Shape
		IS: 2386-1963 (Part 2)	Methods of test for Aggregates for Concrete - Part 2: Estimation of deleterious materials and organic impurities
		IS: 2386-1963 (Part 3)	Methods of test for Aggregates for Concrete - Part 3: Specific gravity, density, voids, absorption and bulking
		IS: 2386-1963 (Part 4)	Methods of test for Aggregates for Concrete - Part 4: Mechanical properties
		IS: 2645-2003	Integral Waterproofing Compounds for Cement Mortar and Concrete – Specification
		IS: 3812-2003 (Part 1)	Pulverized Fuel Ash - Specification - Part 1: For Use as Pozzolana in Cement, Cement Mortar and Concrete
		IS: 3812-2003 (Part 2)	Pulverized Fuel Ash - Specification - Part 2: For Use as Admixture in Cement Mortar and Concrete
		5	Ordinary Portland Cement (OPC) for Masonry and PCC works
IS: 455-1989	Specification for Portland Slag Cement		
IS: 8112-1989	Specification for 43 grade Ordinary Portland Cement		
6	Ordinary Portland Cement (OPC) for RCC works	IS: 12269-1987	Specification for 53 grade Ordinary Portland Cement
7	Portland Pozzolana Cement (PPC) for other concrete work	IS: 1489-1991 (relevant parts)	Specification for Portland Pozzolana Cement

S. Nos.	Material / Work Type	IS Code	IS Code Name
8	MS bars and wires	IS: 280-2006	Mild Steel Wire for General Engineering Purposes
		IS: 432-1982 (Part 1)	Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement–Mild steel and medium tensile steel bars
		IS: 432-1982 (Part 2)	Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement–Hard drawn steel wire
9	Reinforcement Steel – Tor Steel (cold twisted deformed bars)	IS: 1786-2008	High strength deformed steel bars and wires for concrete reinforcement – Specification
10	Stone Work	IS: 1121-1974 (Part 1 to 4)	Methods of test for determination of strength properties of natural building stones: Part 1 - Compressive strength, Part 2 - Transverse Strength, Part 3 - Tensile Strength, Part 4 - Shear strength
		IS: 1122-1974	Method of test for determination of true specific gravity of natural building stones
		IS: 1123-1975	Method of identification of natural building stones
		IS: 1124-1974	Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones
		IS: 1125-1974	Method of test for determination of weathering of natural building stones
		IS: 1126-1974	Method of test for determination of durability of natural building stones
		IS: 1127-1970	Recommendations for dimensions and workmanship of natural building stones for masonry work
		IS: 1129-1972	Recommendation for dressing of natural building stones
		IS: 1597-1992 (Part 1 to 2)	Construction of Stone Masonry - Code of Practice: Part 1 - Rubble Stone Masonry, Part 2 - Ashlar masonry
		IS: 1805-1973	Glossary of terms relating to stones, quarrying and dressing

S. Nos.	Material / Work Type	IS Code	IS Code Name
11	Brick Work	IS: 1077-1992	Common burnt clay building bricks – Specification
		IS: 2212-1991	Code of practice for brickworks
		IS: 3495-1992 (Part 1 to 4)	Methods of tests of burnt clay building bricks: Part 1 - Determination of compressive strength, Part 2 - Determination of water absorption, Part 3 - Determination of efflorescence, Part 4 - Determination of warpage
		IS: 5454-1978	Methods of sampling of clay building bricks
12	Structural Steel	IS: 226-1975	Structural Steel (Standard Quality) (Fifth Revision)
		IS-808-1989	Dimensions for Hot Rolled Steel Beam, Column, Channel and Angle Sections.
		SP 6	Handbook of Structural Engineers
13	Welding Steel Work	IS: 814-2004	Covered Electrodes for Manual Metal Arc Welding of Carbon and Carbon Manganese Steel – Specification
		IS 816--1969	Code of practice for use of metal arc welding for general construction in mild steel.
		IS: 822-1970	Code of Procedure for inspect of welds
		IS: 1635-1992	Code of practice for field slaking of building lime and preparation of putty
		IS: 2402-1963	Code of Practice for External Rendered Finishes
		IS: 428-2000	Washable Distemper - Specification
		IS: 3400-2004 (Part 9)	Methods of Test for Vulcanized Rubber - Part 9 : Rubber, Vulcanized - Determination of Density
		IS: 4905-1968	Methods for random sampling
		IS: 733-1983	Specification for Wrought Aluminum and Aluminum Alloy Bars, Rods and Sections (for General Engineering Purposes)
		IS: 1868-1996	Anodic Coatings on Aluminum and its Alloys – Specification
		14	Sheet Piles
15	HDPE Bags	IS-1969 2009	Tensile properties of Fabrics
		IS-14252 2003	Textiles - High Density Polyethylene. (HDPE)/Polyethylene (PP) Woven Sack for Filling Sand

S. Nos.	Material / Work Type	IS Code	IS Code Name
		IS-1964 2001	Methods for Determination of Mass per Unit Length and Mass per Unit Area of Fabrics.
16	Building measurement methods	IS: 2-1960	Rules for Rounding off Numerical Values
		IS: 1200 (Relevant parts)	Measure of method of building and civil engineering works
		SP: 27-1987	Handbook on method of measurement of building works
17	WBM Subbase/Base	IRC:19-2005	Standard Specification and Code of Practice for Water Bound Macadam (Third Revision)
18	Subbase / embankment	IRC:36-2010	Recommended Practice for Construction of Earth Embankments and Sub-Grade for Road Works (First Revision)
19/1	Electromechanical Gates	IS : 1030	Cast Steel component of Wheel, Guide roller
19/2		IS : 305/ 318	Bush Bearing
19/3		IS : 1570	Wheel / Axel
19/4		IS : 210	C.I Ballast Weight
19/5		SS: 316	Nuts & Bolts
19/6		IS : 11855- 1986	Rubber Seal
19/7		ASTM : A36	Carbon Steel
19/8		ASTM : A992	High strength Alloy Steel
19/9		IS : 2062	Structural Steel
19/10		IS : 325	Gate Motor
19/11		AISI : 420 or EN 9	Stem
19/12		IS : 2266	Wire Rope
19/13		IS : 2004	Pinion / Shaft
19/14		IS : 1477	Sand blasting
19/15		IS : 14177 : 1994	Painting & surface preparation

S. Nos.	Material / Work Type	IS Code	IS Code Name
20/1	Electromechanical Gates (Electrical portion)	IS : 1239	Street pole / post
20/2		IS : 1944 (Part- I & II)	Lighting calculation
20/3		IS : 7098 (Part-I & II)	Electrical Cable
20/4		IS: 3043	Earthing
20/5		IS : 732	Wiring
20/6		IS : 3975	Steel Wire
20/7		IS : 2026	Transformer
20/8		IS : 4722	D G Set

Notwithstanding the specifications for all items and supply of materials (including all other items and materials) as mentioned above shall comply to printed Specifications of USoR (I&WD) 2018, Specifications of SOR (roads & Bridge works) –Volume III,2018, PWD (WB), Sanitary & Plumbing Works (Volume -II), 2017,PWD (WB) & SOR (building works) Volume I,2017 PWD (WB) I&WD, Mechanical Circle, SoR 2011, Water Resource Department, Government of Karnataka SoR 2018-19, Government of India, Central Public Works Department, Delhi, SoR (E&M), 2018. Government of West Bengal, PWD, SoR for Electrical Works, Vol-I, Nov 2017, GoI CPWD supplement to plinth area Rates -01.10.2012 for specialized E&M works norms and the Indian Standard specification and any work not covered there shall be carried out as per best practice adopted in this country according to the direction and satisfaction of the Engineer-in charge.

Annexure-IV: Drawings

Drawings with Maps.

The following typical drawings of different structures along with general index map are attached through a separate drawing file as reference only.

SI No	Drawing / Map Number
1	INDEX MAP SHOWING PROPOSED SITE OF AMTA FIELD HOSTEL AND MEETING HALL
2	GENERAL ARRANGEMENT & REINFORCEMENT DETAIL DRAWING

Annexure-V: Supplementary Information

The Contractors' Obligation

1. Contractor shall mobilise all required Technical Staff, Labour, Equipment, identify quarries, check the quality of locally available materials, Install and commission a "Field Laboratory" to ensure quality control, during execution of the work within the stipulated time and as per the specification and drawings, of the Contract Agreement
2. Contractor shall submit in a detailed Construction Program in MS Project including L2 level PERT Chart within 14 days of delivery of Letter of Acceptance, in consultation with and necessary modification of (if required) the Construction Schedule (attached as Annexure-A, Appendix to Technical Part, as Technical Proposal Forms under Section IV), and, Quality Assurance Programme as per guidelines and contents provided in "A-1.2, Section A- General Specifications under Section VII-Works' Requirement", for Project Manager's approval.
3. Any agency among the agencies appointed or authorized by the Employer will undertake Independent third-party inspections and testing for supply of material for works and/ or any Executed works. The Contractor shall be wholly responsible to make his own arrangements with the approved third-party inspection agencies for carrying out the required tests.
4. The Contractor shall be responsible to obtain permission for and provide all facilities to such agency for carrying out such inspections or testing as may be required. The Third Party Inspection charges of the agency only will be paid by the employer and all the other costs for such independent inspection and testing shall be borne by the contractor.
5. The Employer or Project Manager or his authorized representative or authorized agency may make inspections at any of the manufacturing or shipping points at any time in addition to the schedule provided in the specification at the cost of Employer. However, during such inspection, if it is found that any of the items are not being manufactured or shipped in accordance with the specifications, the contractor shall bear all expenses including fees incurred by the employer in respect of such inspection.
6. If as a result of the inspection or testing referred to in this Clause, the Project Manager Determines that the materials or plant are defective or otherwise not in accordance with the Contract, he may reject the materials or plant and shall notify the contractor accordingly. The Contractor shall then promptly make good the defect or replace the same. All costs incurred by the Project Manager or the Third-Party inspection agency for the inspection of the tests shall be determined by the Project Manager and shall be recoverable form the from the contractor and may be deducted from any money's due that the Contractor and the Project Manager shall notify the Contractor accordingly.
7. Any inspection carried out by the Project Manager shall not relieve the contractor of his obligations under the contract.

Contractor's General Responsibilities

1. The Contractor shall, with due care and diligence, design (to the extent provided for by the Contract), execute and complete the Works and remedy any defects therein accordance with the provisions of the Contract. The Contractor shall provide all superintendence, labour, materials, Plant, Contractor's Equipment and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of any defects, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract. The Contractor shall promptly notify the Project Manager, of any error, omission, fault or other defect in the design of or Specification for the Works which he discovers when reviewing the Contract or executing the Works.
2. The Contractor shall take full responsibility for the adequacy, stability and safety of all Site operations and methods of construction. Provided that the Contractor shall not be responsible (except as stated hereunder or as may be otherwise agreed) for the design or specification of Permanent Works, not prepared by the Contractor. Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall be fully responsible for that part of such Works, notwithstanding any approval by the Employer.
3. The Contractor shall provide all necessary superintendence during the execution of the Works and as long as thereafter as the Project Manager may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract.
4. Representative shall receive, on behalf of the Contractor, instructions from the Engineer. If the approval of the representative is withdrawn by the Project Manager, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving notice of such withdrawal, remove the representative from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another representative approved by the Project Manager.
5. No public road shall be closed during execution of work and necessary arrangement for smooth movement of traffic shall be made by the contractor at his own cost as per the submitted traffic Management Plan.
6. The Contractor shall be responsible for:
 - (a) the accurate setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing,
 - (b) the correctness, subject as above mentioned, of the position, levels, dimensions and alignment of all parts of the Works, and
 - (c) the provision of all necessary instruments, appliances and labour in connection with the foregoing responsibilities.

7. If, any time during the execution of the Works, any error appears in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Project Manager, shall, at his own cost, rectify such error to the satisfaction of the Project Manager, unless such error is based on incorrect data supplied in writing by the Project Manager, in which case the Project Manager shall determine an addition to the Contract Price as per the relevant provisions of the contract and shall notify the Contractor accordingly.
8. The checking of any setting-out or of any line by the Project Manager shall not in any way relieve the Contractor of his responsibility for the accuracy thereof and the Contractor shall carefully protect and preserve all bench-marks, sight-rails, pegs and other things used in setting out the Works.
9. The Contractor shall establish site office for his staff and also make provision of space and furniture for Employer's Representative at his own cost.

Water for works and workforce, Electricity, Power, Fuel etc.

10. The contractor at his own expenses should provide water from municipal mains or other sources for the use of work and workmen. The contractor shall be fully responsible to arrange such electricity, power, water, and fuel as may be necessary to complete the works and fulfill his obligations under the Contract. The unit rates and prices quoted by the Bidder in the Bill of Quantities shall include the cost of all electricity, power, water, and fuel as may be required.

Site Office for the supervision for the work

11. The Contractor shall at his own cost make available during the progress of the works and until the date of final completion thereof an Office in all respect suitable for the purpose of a Site Office for the Project Manager and its representatives, and a no less than 40 sqm, together with a laboratory as mentioned in Section 6 under Supplementary Information to be established by the Contractor. The office shall contain no less than sufficient number of tables, chairs, steel Almirahs, a sufficient number of display boards and toilet facilities. All such office, laboratory and other facilities shall be made available within 30 days from the date of commencement of work as per requirements and directions of the Project Manager, including maintenance of the same. The said office shall be removed from the site on the completion of the Work. All dismantled items of the Site Office and furniture items shall be the property of the Contractor at the completion of the work and its onward disposal shall remain the responsibility of the Contractor.
12. The rates for all items of work unless clearly specified otherwise shall include cost of all labour, materials and other inputs involved, complete and as required to the satisfaction of the Project Manager, in the execution of the items.
13. The Project Manager, when delegated, shall be the sole deciding authority as to the meaning, interpretation and implications for various provisions of the specifications.
14. Whenever any reference is made to any Indian Standard [e.g. Codes / Standards / Manuals of Bureau of Indian Standard (IS), Indian Roads Congress (IRC), Ministry of Road Transport &

Highways (MOR&TH), etc.] it shall be taken as reference to the latest edition with all amendments issued thereto or revisions thereof if any, up to the date of submission of bid.

15. The Work shall be carried out in accordance with drawings, to be issued by the Project Manager. The drawings shall have to be properly co-related to the site conditions before executing the Work, and in case of any difference noticed between site conditions and drawings, final decision, in writing of the Engineer / Project Manager, shall be obtained by the Contractor. The Work shall include the sequence of work activities from clearing the site / leveling if any, correctly laying out the structural footprint, all construction activities thereafter, commissioning and handover of the completed Work to the Employer.
16. **Site:** The 'site' shall mean the land/ or other places on, in, into or through which the Work is to be executed under the Contract or any adjacent land, path or street through which the Work is to be executed under the Contract, or any adjacent land, which may be allotted or used for the purpose of carrying out the Contract.
17. **Store:** The 'store' shall mean the place of storage of construction materials brought to site by the contractor, to be used for execution of the work under the subject contract and also from where materials will be issued to be used at the site of work. The arrangement of land for temporary storage of materials will be the responsibility of the contractor for which the Contractor should acquaint themselves with the ground reality before bidding.
18. **Best:** The word 'best' when used shall mean that in the opinion of the Project Manager, there is no superior material / article and workmanship obtainable in the market and trade respectively.
As far as possible the standard required shall be specified in preference to the word 'best.'
19. **Measurements:**
 - a. In booking dimensions, the order shall be consistent and in the sequence of length, width and height or depth or thickness. The Work shall be executed, measured, and quantity arrived at as per the metric dimension given in the Schedule / Bill of Quantities, drawings etc.
 - b. Rounding off: Rounding off where required shall be done in accordance with IS: 2-1960. The number of significant places rounded in the rounded off value should be as specified.
22. **Materials:**
 - a. Samples of all materials to be used on the Work shall be got approved by the Contractor from the Project Manager, as applicable well in time. The approved samples duly authenticated and sealed shall be kept in the custody of the Project Manager, PIU till the completion of the Work. All materials to be provided by the Contractor shall be brand new and as per the samples approved by the Project Manager.
 - b. Materials obtained by the Contractor from the sources approved by the Project Manager shall be subjected to the Mandatory tests. Where such materials do not conform to the relevant specifications, the matter shall be taken up by the Project Manager, as applicable for appropriate action against the defaulters. In all such cases, necessary documents in

original and proof of payment relating to the procurement of materials shall be made available by the Contractor to the Project Manager.

- c. Samples, whether submitted for approval to govern bulk supplies or required for testing before use and also the sample of materials bearing 'Standard Mark,' if required for testing, shall be provided free of cost by the Contractor. All other incidental expenditure to be incurred for testing of samples e.g. packaging, sealing, transportation, loading, unloading etc. to the satisfaction of Project Manager shall be borne by the Contractor.
- d. The materials, supplied by the Employer, if any shall be deemed to be complying with the specifications.
- e. Materials stored at site, depending upon the individual characteristics, shall be protected from atmospheric effects due to rain, sun, wind and moisture to avoid deterioration.
- f. Materials like timber, paints, oils and other hazardous materials etc. shall be stored as per relevant specifications in such a way that there may not be any possibility of fire hazards. Paints, oils and other hazardous materials need to be stored on a raised platform so that they are not in direct contact with the ground. Any spills need to be cleaned and area rehabilitated immediately. Inflammable materials and explosives shall be stored in accordance with the relevant rules and regulations or as approved by Project Manager in writing so as to ensure desired safety during storage.
- g. Materials like geo-synthetic filter shall be stored in such a manner that it should be protected from getting degraded from UV ray of direct sunlight before laying.

23. Safety in Construction:

- a. The Contractor shall employ only such methods of construction, tools and plant as are appropriate for the type of work or as approved by Project Manager in writing.
- b. The Contractor shall take all precautions and measures to ensure safety of works and workman as per provision of the CoC and Contractor's ESHS-MSIP and shall be fully responsible for the same. Safety pertaining to construction works such as excavation, centering and shuttering, trenching, Sheet Piling, Boulder pitching, blasting if any, demolition, electric connections, scaffolds, ladders, working platforms, gangway, mixing of bituminous materials, electric and gas welding, use of hoisting and construction machinery shall be governed by WB-PWD Safety Code/any other relevant safety codes and the direction of Project Manager.

PART 3 – Conditions of Contract and Contract Forms

Section VIII - General Conditions of Contract

These General Conditions of Contract (GCC), read in conjunction with the Particular Conditions of Contract (PCC) and other documents listed therein, should be a complete document expressing fairly the rights and obligations of both parties.

These General Conditions of Contract have been developed on the basis of considerable international experience in the drafting and management of contracts, bearing in mind a trend in the construction industry towards simpler, more straightforward language.

The GCC can be used for both smaller admeasurement contracts and lump sum contracts.

General Conditions of Contract

A. General

1. Definitions

Boldface type is used to identify defined terms.

- (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
- (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump-sum contract. It includes a lump-sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.
- (c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.
- (d) **Bank** means the financing institution **named in the PCC**.
- (e) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.
- (f) **Compensation Events** are those defined in GCC Clause 46 hereunder.
- (g) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 57.1.
- (h) 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 Sub-Clause 2.3 below.
- (i) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer.
- (j) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer.
- (k) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.
- (l) **Days** are calendar days; months are calendar months.
- (m) **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.

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- (n) A **Defect** is any part of the Works not completed in accordance with the Contract.
 - (o) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.
 - (p) The **Defects Liability Period** is the period **named in the PCC** pursuant to GCC Sub-Clause 38.1 and calculated from the Completion Date.
 - (q) **Drawings** means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.
 - (r) The **Employer** is the party who employs the Contractor to carry out the Works, **as specified in the PCC**.
 - (s) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
 - (t) "**In writing**" or "**written**" means hand-written, type-written, printed or electronically made, and resulting in a permanent record;
 - (u) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.
 - (v) 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 PCC. The **Intended Completion Date** may be revised only by the Project Manager by issuing an extension of time or an acceleration order.
 - (w) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.
 - (x) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.
 - (y) The **Project Manager** is the person named in the PCC (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.
 - (z) **PCC** means Particular Conditions of Contract.
 - (aa) The **Site** is the area defined as such in the PCC.
 - (bb) **Site Investigation Reports** are those that were included in the bidding document and are factual and interpretative

reports about the surface and subsurface conditions at the Site.

- (cc) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.
- (dd) The **Start Date** is **given in the PCC**. 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.
- (ee) 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.
- (ff) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.
- (gg) A **Variation** is an instruction given by the Project Manager which varies the Works.
- (hh) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the PCC.
- (ii) **“Contractor’s Personnel”** refers to all personnel whom the Contractor utilizes on the Site or other places where the Works are carried out, including the staff, labor and other employees of each Subcontractor.
- (jj) **“Key Personnel”** means the positions (if any) of the Contractor’s personnel that are stated in the Specification.
- (kk) **“ES”** means Environmental and Social (including Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH)).
- (ll) **“Sexual Exploitation and Abuse” “(SEA)”** means the following:

Sexual Exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;

Sexual Abuse is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.
- (mm) **“Sexual Harassment” “(SH)”** is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Contractor’s Personnel with other Contractor’s or Employer’s Personnel; and

- (nn) “**Employer’s Personnel**” refers to the Project Manager and all other staff, labor and other employees (if any) of the Project Manager and of the Employer engaged in fulfilling the Employer’s obligations under the Contract; and any other personnel identified as Employer’s Personnel, by a notice from the Employer or the Project Manager to the Contractor.

2. Interpretation

- 2.1 In interpreting these GCC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
- 2.2 If sectional completion is **specified in the PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
- 2.3 The documents forming the Contract shall be interpreted in the following order of priority:
- (a) Agreement,
 - (b) Letter of Acceptance,
 - (c) Contractor’s Bid,
 - (d) Particular Conditions of Contract,
 - (e) General Conditions of Contract, including Appendices,
 - (f) Specifications,
 - (g) Drawings,
 - (h) Bill of Quantities,²⁶ and
 - (i) any other document **listed in the PCC** 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 PCC**.
- 3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer’s country when
- (a) as a matter of law or official regulations, the Borrower’s country prohibits commercial relations with that country; or
 - (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the

²⁶ In lump-sum contracts, delete “Bill of Quantities” and replace with “Activity Schedule.”

United Nations, the Borrower's Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.

- 4. Project Manager's Decisions** 4.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
- 5. Delegation** 5.1 Unless otherwise **specified in the PCC**, the Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may revoke any delegation after notifying the Contractor.
- 6. Communications** 6.1 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.
- 7. Subcontracting** 7.1 The Contractor may subcontract with the approval of the Project Manager but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. The Contractor shall require that its Subcontractors execute the Works in accordance with the Contract, including complying with the relevant ES requirements and the obligations set out in Sub-Clause 28.1.
- 8. Other Contractors** 8.1 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 PCC**. 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.
- 8.2 The Contractor shall also, as stated in the Specifications or as instructed by the Project Manager, cooperate with and allow appropriate opportunities for the Employer's or any other personnel, notified to the Contractor by the Employer or Project Manager, to conduct any environmental and social assessment.

9. Personnel and Equipment

- 9.1 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.
- 9.2 The Project Manager may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Key Personnel (if any), who:
- (a) persists in any misconduct or lack of care;
 - (b) carries out duties incompetently or negligently;
 - (c) fails to comply with any provision of the Contract;
 - (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment;
 - (e) based on reasonable evidence, is determined to have engaged in Fraud and Corruption during the execution of the Works;
 - (f) has been recruited from the Employer's Personnel;
 - (g) undertakes behavior which breaches the Code of Conduct for Contractor's Personnel (ES).

If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience.

Notwithstanding any requirement from the Project Manager to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor's Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above."

- 9.3 The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party associated with the use of, if any, Equipment on public roads or other public infrastructure. The Contractor shall monitor road safety incidents and accidents to identify negative safety issues, and establish and implement necessary measures to resolve them.
- 9.4 Labor
- 9.4.1 *Engagement of Staff and Labor.* The Contractor shall provide and employ on the Site for the execution of the Works such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged, to the extent practicable and reasonable, to employ

staff and labor with appropriate qualifications and experience from sources within the Country.

Unless otherwise provided in the Contract, the Contractor shall be responsible for the recruitment, transportation, accommodation and welfare facilities in accordance with GCC Sub-Clause 9.4.6, of the Contractor's Personnel, and for all payments in connection therewith.

The Contractor shall provide the Contractor's Personnel information and documentation that are clear and understandable regarding their terms and conditions of employment. The information and documentation shall set out their rights under relevant labor laws applicable to the Contractor's Personnel (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from any requirements in the Specifications. The Contractor's Personnel shall be informed when any material changes to their terms or conditions of employment occur.

9.4.2 *Conditions of Labor.* The Contractor shall inform the Contractor's Personnel about:

- (a) any deduction to their payment and the conditions of such deductions in accordance with the applicable laws or as stated in the Specifications; and
- (b) their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the laws of the Country for the time being in force.

The Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws.

Where required by applicable laws or as stated in the Specifications, the Contractor shall provide the Contractor's Personnel written notice of termination of employment and details of severance payments in a timely manner. The Contractor shall have paid the Contractor's Personnel (either directly or where appropriate for their benefit) all due wages and entitlements including, as applicable, social security benefits and pension contributions, on or before the end of their engagement/ employment.

9.4.3 The Contractor may bring into the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.

- 9.4.4 The Contractor shall at its own expense provide the means of repatriation to and the Contractor's Personnel employed on the Contract at the Site to their various home countries. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.
- 9.4.5 *Disorderly conduct.* The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst the Contractor's Personnel.
- 9.4.6 *Facilities for Staff and Labor.* Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. If stated in the Specification, the Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the Contractor's Personnel. The Contractor shall also provide similar facilities for the Employer's Personnel if stated in the Specifications.
- 9.4.7 The Contractor shall, in all dealings with the Contractor's Personnel, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor. The Contractor shall provide the Contractor's Personnel annual holiday and sick, maternity and family leave, as required by applicable laws or as stated in the Specifications.
- 9.4.8 *Supply of Foodstuffs.* The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.
- 9.4.9 *Supply of Water.* The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.
- 9.4.10 *Measures against Insect and Pest Nuisance.* The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.
- 9.4.11 *Alcoholic Liquor or Drugs.* The Contractor shall not, otherwise than in accordance with the laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.

- 9.4.12 *Arms and Ammunition.* The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
- 9.4.13 *Funeral Arrangements.* The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.
- 9.4.14 *Forced Labor.* The Contractor, including its Subcontractors, shall not employ or engage forced labor. Forced labor consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements.

No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harboring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.

- 9.4.15 *Child Labor.* The Contractor, including its Subcontractors, shall not employ or engage a child under the age of 14 unless the national law specifies a higher age (the minimum age). The Contractor, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that 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.

The Contractor including its Subcontractors, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Contractor with the Project Manager's approval. The Contractor shall be subject to regular monitoring by the Project Manager that includes monitoring of health, working conditions and hours of work.

Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:

- (a) with exposure to physical, psychological or sexual abuse;
- (b) underground, underwater, working at heights or in confined spaces;
- (c) with dangerous machinery, equipment or tools, or involving handling or

- (d) transport of heavy loads;
- (e) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or
- (f) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.

9.4.16 *Employment Records of Workers.* The Contractor shall keep complete and accurate records of the employment of labor at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the project Manager.

9.4.17 *Workers' Organizations.* In countries where the relevant labor laws recognize workers' rights to form and to join workers' organizations of their choosing and to bargain collectively without interference, the Contractor shall comply with such laws. In such circumstances, the role of legally established workers' organizations and legitimate workers' representatives will be respected, and they will be provided with information needed for meaningful negotiation in a timely manner. Where the relevant labor laws substantially restrict workers' organizations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. The Contractor shall not seek to influence or control these alternative means. The Contractor shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and collective bargaining or alternative mechanisms. Workers' organizations are expected to fairly represent the workers in the workforce.

9.4.18 *Non-Discrimination and Equal Opportunity.* The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.

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. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal

opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (of working age in accordance with GCC Sub-Clause 9.4.15).

- 9.4.19 *Contractor's Personnel Grievance Mechanism.* The Contractor shall have a grievance mechanism for Contractor's Personnel, and where relevant the workers' organizations stated in GCC Sub-Clause 9.4.17, to raise workplace concerns. The grievance mechanism shall be proportionate to the nature, scale, risks and impacts of the Contract. The mechanism shall address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned in a language they understand, without any retribution, and shall operate in an independent and objective manner.

The Contractor's Personnel shall be informed of the grievance mechanism at the time of engagement for the Contract, and the measures put in place to protect them against any reprisal for its use. Measures will be put in place to make the grievance mechanism easily accessible to all Contractor's Personnel.

The grievance mechanism shall not impede access to other judicial or administrative remedies that might be available, or substitute for grievance mechanisms provided through collective agreements.

The grievance mechanism may utilize existing grievance mechanisms, providing that they are properly designed and implemented, address concerns promptly, and are readily accessible to Contractor's Personnel. Existing grievance mechanisms may be supplemented as needed with Contract-specific arrangements.

- 9.4.20 *Training of Contractor's Personnel.* The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training referred to in GCC Sub-Clause 18.2.

As stated in the Specifications or as instructed by the Project Manager, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be trained on ES aspects of the Contract by the Employer's Personnel.

The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.

10. Employer's and Contractor's Risks

- 10.1 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.

11. Employer's Risks

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

- (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to
 - (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or
 - (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.
- (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

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

- (a) a Defect which existed on the Completion Date,
- (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or
- (c) the activities of the Contractor on the Site after the Completion Date.

12. Contractor's Risks

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

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles **stated in the PCC** for the following events which are due to the Contractor's risks:

- (a) loss of or damage to the Works, Plant, and Materials;
- (b) loss of or damage to Equipment;
- (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
- (d) personal injury or death.

- 13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
- 13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums 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.
- 13.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.
- 13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Data

- 14.1 The Contractor shall be deemed to have examined any Site Data **referred to in the PCC**, supplemented by any information available to the Contractor.

15. Contractor to Construct the Works

- 15.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
- 15.2 If the Contract specifies that the Contractor shall design any part of the permanent Works, the Contractor shall take into account the Employer's requirements which may include, if stated in the Specifications:
- (a) designing structural elements of the Works taking into account climate change considerations;
 - (b) applying the concept of universal access (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances; and
 - (c) considering the incremental risks of the public's potential exposure to operational accidents or natural hazards, including extreme weather events.

16. The Works to Be Completed by the Intended Completion Date

- 16.1 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 by the Intended Completion Date.
- 16.2 The Contractor shall not carry out mobilization to the Site unless the Project Manager gives approval, an approval that shall not be unreasonably delayed, to the measures the Contractor proposes to address environmental and social risks and impacts, which at a minimum shall include applying the Management Strategies and Implementation Plans (MSIPs) and Code of Conduct for

Contractor's Personnel submitted as part of the Bid and agreed as part of the Contract.

The Contractor shall submit, to the Project Manager for its approval any additional MSIPs as are necessary to manage the ES risks and impacts of ongoing Works. These MSIPs collectively comprise the Contractor's Environmental and Social Management Plan (C-ESMP). The Contractor shall review the C-ESMP, periodically (but not less than every six (6) months), and update it as required to ensure that it contains measures appropriate to the Works. The updated C-ESMP shall be submitted to the Project Manager for its approval.

- 17. Approval by the Project Manager**
- 17.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.
- 17.2 The Contractor shall be responsible for design of Temporary Works.
- 17.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.
- 17.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.
- 17.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.
- 18. Health, Safety and Protection of the Environment**
- 18.1 The Contractor shall be responsible for the safety of all activities on the Site.
- 18.2 The Contractor shall:
- (a) comply with all applicable health and safety regulations and Laws;
 - (b) comply with all applicable health and safety obligations specified in the Contract;
 - (c) take care for the health and safety of all persons entitled to be on the Site and other places, if any, where the Works are being executed;
 - (d) keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons;
 - (e) provide fencing, lighting, safe access, guarding and watching of the Works until the issue of the Contract Completion Certificate;
 - (f) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and

protection of the public and of owners and occupiers of adjacent land;

- (g) provide health and safety training of Contractor's Personnel as appropriate and maintain training records;
- (h) actively engage the Contractor's Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor's Personnel, training on occupational safety and health, and provision of personal protective equipment without expense to the Contractor's Personnel;
- (i) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health.
- (j) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;
- (k) where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and
- (l) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment.

Subject to GCC Sub-Clause 16.2, the Contractor shall submit to the Project Manager for its approval a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works.

The health and safety manual shall be in addition to any other similar document required under applicable health and safety regulations and laws.

The health and safety manual shall set out all the health and safety requirements under the Contract,

- (a) which shall include at a minimum:

- (i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control measures for chemical, physical and biological substances and agents;
- (ii) details of the training to be provided, records to be kept;
- (iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning);
- (iv) remedies for adverse impacts such as occupational injuries, deaths, disability and disease;
- (v) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases,
- (vi) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labor;
- (vii) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation and welfare facilities are provided by the Contractor in accordance with GCC Sub-Clause 9.4.6; and

(b) any other requirements stated in the Specification

18.3 Protection of the environment

The Contractor shall take all necessary measures to:

18.3.1 protect the environment (both on and off the Site); and

- 18.3.2 limit damage and nuisance to people and property resulting from pollution, noise and other results of the Contractor's operations and/ or activities.

The Contractor shall ensure that emissions, surface discharges, effluent and any other pollutants from the Contractor's activities shall exceed neither the values indicated in the Specifications, nor those prescribed by applicable laws.

In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor's operations, the Contractor shall agree with the Project Manager the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its cost to the satisfaction of the Project Manager.

19. Archaeological and Geological Findings

- 19.1 All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:

- (a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor's Personnel or other persons from removing or damaging any of these findings;
- (b) train relevant Contractor's Personnel on appropriate actions to be taken in the event of such findings; and
- (c) implement any other action consistent with the requirements of the Specifications and relevant laws.

The Contractor shall, as soon as practicable after discovery of any such finding, notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

20. Possession of the Site

- 20.1 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 PCC**, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.

21. Access to the Site

- 21.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager (including the Bank staff or consultants acting on the Bank's behalf, stakeholders and third parties, such as independent experts, local communities, or non-governmental organizations), including to carry out environmental and social audit, as appropriate, 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.

22. Instructions, Inspections and Audits

22.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.

22.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and subconsultants 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.

22.3 Inspections & Audit by the Bank

Pursuant to paragraph 2.2 e. of Appendix A to the GCC- Fraud and Corruption, the Contractor shall permit and shall cause its agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and personnel, to permit, the Bank and/or persons appointed by the Bank to inspect the site and/or the accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have such accounts, records and other documents audited by auditors appointed by the Bank. The Contractor's and its Subcontractors' and subconsultants' attention is drawn to GCC Sub-Clause 25.1 (Fraud and Corruption) which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).

23. Appointment of the Adjudicator

23.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority **designated in the PCC**, to appoint the Adjudicator within 14 days of receipt of such request.

23.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority **designated in the PCC** at the request of either party, within 14 days of receipt of such request.

- 24. Procedure for Disputes**
- 24.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.
- 24.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.
- 24.3 The Adjudicator shall be paid by the hour at the **rate specified in the PCC**, together with reimbursable expenses of the types **specified in the PCC**, and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision shall be final and binding.
- 24.4 The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and in the place **specified in the PCC**.
- 25. Fraud and Corruption**
- 25.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Appendix A to the GCC.
- 25.2 The Employer requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.
- 26. Stakeholder Engagement**
- 26.1 The Contractor shall provide relevant contract-related information, as the Employer and/or Project Manager may reasonably request to conduct Stakeholder engagements. "Stakeholder" refers to individuals or groups who:
- (i) are affected or likely to be affected by the Contract; and
 - (ii) may have an interest in the Contract.
- The Contractor may also directly participate in Stakeholder engagements, as the Employer and/or Project Manager may reasonably request
- 27. Suppliers (other than Subcontractors)**
- 27.1 Forced Labor: The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labor including trafficked persons as described in GCC Sub-Clause 9.4.14. If forced labor/trafficking cases are identified, the Contractor shall take measures to require the

suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.2 *Child Labor:* The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labor as described in GCC Sub-Clause 9.4.15. If child labor cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.3 *Serious Safety Issues:* The Contractor, including its Subcontractors, shall comply with all applicable safety obligations, including as stated in GCC Sub-Clause 18.2. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to adopt procedures and mitigation measures adequate to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.4 *Obtaining natural resource materials in relation to supplier:* The Contractor shall obtain natural resource *materials* from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from river beds or beaches.

If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats.

28. Code of Conduct

28.1 The Contractor shall have a Code of Conduct for the Contractor's Personnel.

The Contractor shall take all necessary measures to ensure that each Contractor's Personnel is made aware of the Code of Conduct including specific behaviors that are prohibited, and understands the consequences of engaging in such prohibited behaviors.

These measures include providing instructions and documentation that can be understood by the Contractor's Personnel and seeking to obtain that person's signature acknowledging receipt of such instructions and/or documentation, as appropriate.

The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor's Personnel, Employer's Personnel and the local community.

The Contractor's Management Strategy and Implementation Plans shall include appropriate processes for the Contractor to verify compliance with these obligations.

29. Security of the Site

29.1 The Contractor shall be responsible for the security of the Site, and:

- (a) for keeping unauthorized persons off the Site;
- (b) authorized persons shall be limited to the Contractor's Personnel, the Employer's Personnel, and to any other personnel identified as authorized personnel (including the Employer's other contractors on the Site), by a notice from the Employer or the Project Manager to the Contractor.

Subject to GCC Sub-Clause 16.2, the Contractor shall submit for the Project Manager's No-objection a security management plan that sets out the security arrangements for the Site

The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor's Personnel, Employer's Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specifications.

The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.

In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Specification."

B. Time Control

30. Program and Progress Reports

- 30.1 Within the time **stated in the PCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump-sum contract, the activities in the Program shall be consistent with those in the Activity Schedule. 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.
- 30.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
- 30.3 The Contractor shall monitor progress of the Works and submit to the Project manager progress report and any updated Program showing the actual progress achieved and the effect of the progress achieved on the timing of the remaining Works, including any changes to the sequence of the activities, at intervals no longer than the period **stated in the PCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount **stated in the PCC** 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 lump-sum Contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.
- 30.4 Unless otherwise stated in the Specifications, each progress report shall include the Environmental and Social (ES) metrics set out in Appendix B.
- 30.5 In addition to the progress reports, the Contractor shall inform the Project Manager immediately of any allegation, incident or accident in the Site, which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer's Personnel, Project Manager's personnel or Contractor's Personnel. This includes, but is not limited to, any incident or accident causing fatality or serious injury; significant adverse effects or damage to private property; or any allegation of SEA and/or SH. In case of SEA and/or SH, while maintaining confidentiality as appropriate, the type of allegation (sexual exploitation, sexual abuse or sexual harassment), gender and age of the person who experienced the alleged incident should be included in the information.

The Contractor, upon becoming aware of the allegation, incident or accident, shall also immediately inform the Project Manager

of any such incident or accident on the Subcontractors' or suppliers' premises relating to the Works which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer's Personnel, or Contractor's, its Subcontractors' and suppliers' personnel. The notification shall provide sufficient detail regarding such incidents or accidents. The Contractor shall provide full details of such incidents or accidents to the Project Manager within the timeframe agreed with the Project Manager.

The Contractor shall require its Subcontractors and suppliers (other than Subcontractors) to immediately notify the Contractor of any incidents or accidents referred to in this Subclause.

- 31. Extension of the Intended Completion Date**
- 31.1 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.
- 31.2 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. 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.
- 32. Acceleration**
- 32.1 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.
- 32.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
- 33. Delays Ordered by the Project Manager**
- 33.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
- 34. Management Meetings**
- 34.1 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.
- 34.2 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.

- 35. Early Warning**
- 35.1 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.
- 35.2 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

- 36. Identifying Defects**
- 36.1 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.
- 37. Tests**
- 37.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specifications 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.
- 38. Correction of Defects**
- 38.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is **defined in the PCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- 38.2 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.
- 39. Uncorrected Defects**
- 39.1 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

- 40. Contract Price²⁷** 40.1 The Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.
- 41. Changes in the Contract Price²⁸** 41.1 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 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.
- 41.2 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.
- 42. Variations** 42.1 All Variations shall be included in updated Programs ²⁹ produced by the Contractor.
- 42.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Contractor shall also provide information of any ES risks and impacts of the Variation. 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.
- 42.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.
- 42.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered

²⁷ In lump-sum contracts, replace GCC Sub-Clauses 40.1 as follows:

40.1 The Contractor shall provide updated Activity Schedules within 14 days of being instructed to by the Project Manager. 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.

²⁸ In lump-sum contracts, replace entire GCC Clause 41 with new GCC Sub-Clause 41.1, as follows:

41.1 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.

²⁹ In lump-sum contracts, add "and Activity Schedules" after "Programs."

without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

- 42.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 42.6 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 Sub-Clause 41.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.³⁰
- 42.7 Value Engineering: The Contractor may prepare, at its own cost, a value engineering proposal at any time during the performance of the contract. The value engineering proposal shall, at a minimum, include the following;
- (a) the proposed change(s), and a description of the difference to the existing contract requirements;
 - (b) a full cost/benefit analysis of the proposed change(s) including a description and estimate of costs (including life cycle cost) the Employer may incur in implementing the value engineering proposal;
 - (c) a description of any effect(s) of the change on performance/functionality; and
 - (d) a description of the proposed work to be performed, a program for its execution and sufficient ES information to enable an evaluation of ES risks and impacts.

The Employer may accept the value engineering proposal if the proposal demonstrates benefits that:

- (a) accelerates the contract completion period; or
- (b) reduces the Contract Price or the life cycle costs to the Employer; or
- (c) improves the quality, efficiency, safety or sustainability of the Facilities; or
- (d) yields any other benefits to the Employer,

without compromising the functionality of the Works.

If the value engineering proposal is approved by the Employer and results in:

³⁰ In lump-sum contracts, delete this paragraph.

- (a) a reduction of the Contract Price; the amount to be paid to the Contractor shall be the **percentage specified in the PCC** of the reduction in the Contract Price; or
- (b) an increase in the Contract Price; but results in a reduction in life cycle costs due to any benefit described in (a) to (d) above, the amount to be paid to the Contractor shall be the full increase in the Contract Price.

43. Cash Flow Forecasts

43.1 When the Program,³¹ is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

44. Payment Certificates

44.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

44.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

44.3 The value of work executed shall be determined by the Project Manager.

44.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed.³²

44.5 The value of work executed shall include the valuation of Variations and Compensation Events.

44.6 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.

44.7 If the Contractor was, or is, failing to perform any ES obligations or work under the Contract, the value of this work or obligation, as determined by the Project Manager, may be withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Project Manager, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:

- (a) failure to comply with any ES obligations or work described in the Works' Requirements which may include: working outside site boundaries, excessive dust, failure to keep public roads in a safe usable condition, damage to offsite vegetation, pollution of water courses

³¹ In lump-sum contracts, add "or Activity Schedule" after "Program."

³² In lump-sum contracts, replace this paragraph with the following: "The value of work executed shall comprise the value of completed activities in the Activity Schedule."

from oils or sedimentation, contamination of land e.g. from oils, human waste, damage to archeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion;

- (b) failure to regularly review C-ESMP and/or update it in a timely manner to address emerging ES issues, or anticipated risks or impacts;
- (c) failure to implement the C-ESMP e.g. failure to provide required training or sensitization;
- (d) failing to have appropriate consents/permits prior to undertaking Works or related activities;
- (e) failure to submit ES report/s (as described in Appendix B), or failure to submit such reports in a timely manner;
- (f) failure to implement remediation as instructed by the Project Manager within the specified timeframe (e.g. remediation addressing non-compliance/s).

45. Payments

- 45.1 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 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest 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 at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.
- 45.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or 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.
- 45.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.
- 45.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

46. Compensation Events

- 46.1 The following shall be Compensation Events:
- (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 20.1.

- (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.
- (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
- (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- (e) The Project Manager unreasonably does not approve a subcontract to be let.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effects on the Contractor of any of the Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.

46.2 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.

46.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

46.4 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.

47. Tax

47.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 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 Clause 49.

48. Currencies

48.1 Where payments are made in currencies other than the currency of the Employer's country **specified in the PCC**, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.

49. Price Adjustment

49.1 Prices shall be adjusted for fluctuations in the cost of inputs only if **provided for in the PCC**. 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 in each currency. A separate formula of the type specified below applies to each Contract currency:

$$P_c = A_c + B_c \text{ Imc/Ioc}$$

where:

P_c is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."

A_c and B_c are coefficients³³ **specified in the PCC**, representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency "c;" and

Imc is the index prevailing at the end of the month being invoiced and Ioc is the index prevailing 28 days before Bid opening for inputs payable; both in the specific currency "c."

49.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next payment certificate. The index value shall be deemed to take account of all changes in cost due to fluctuations in costs.

³³ The sum of the two coefficients A_c and B_c should be 1 (one) in the formula for each currency. Normally, both coefficients shall be the same in the formulae for all currencies, since coefficient A, for the nonadjustable portion of the payments, is a very approximate figure (usually 0.15) to take account of fixed cost elements or other nonadjustable components. The sum of the adjustments for each currency are added to the Contract Price.

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- 50. Retention**
- 50.1 The Employer shall retain from each payment due to the Contractor the proportion **stated in the PCC** until Completion of the whole of the Works.
- 50.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC Sub-Clause 57.1, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an “on demand” Bank guarantee.
- 51. Liquidated Damages**
- 51.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the PCC** 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 PCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.
- 51.2 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 Sub-Clause 45.1.
- 52. Bonus**
- 52.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the PCC** 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.
- 53. Advance Payment**
- 53.1 The Employer shall make advance payment to the Contractor of the amounts **stated in the PCC** by the date **stated in the PCC**, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies 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.
- 53.2 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.

53.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the 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.

54. Securities

54.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the PCC**, by a bank or surety acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Certificate of Completion in the case of a Performance Bond.

55. Dayworks

55.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

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

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

56. Cost of Repairs

56.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

57. Completion

57.1 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 whole of the Works is completed.

58. Taking Over

58.1 The Employer shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.

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- 59. Final Account** 59.1 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 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 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.
- 60. Operating and Maintenance Manuals** 60.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates **stated in the PCC**.
- 60.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the PCC** pursuant to GCC Sub-Clause 60.1, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the PCC** from payments due to the Contractor.
- 61. Termination** 61.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
- 61.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:
- (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;
 - (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
 - (c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
 - (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager's certificate;
 - (e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
 - (f) the Contractor does not maintain a Security, which is required;

- (g) 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 PCC**; or
- (h) if the Contractor, in the judgment of the Employer has engaged in Fraud and Corruption, as defined in paragraph 2.2 a of the Appendix A to the GCC, in competing for or in executing the Contract, then the Employer may, after giving fourteen (14) days written notice to the Contractor, terminate the Contract and expel him from the Site.

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

61.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

61.5 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 Sub-Clause 61.2 above, the Project Manager shall decide whether the breach is fundamental or not.

62. Payment upon Termination

62.1 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 and less the percentage to apply to the value of the work not completed, as **specified in the PCC**. 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.

62.2 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.

63. Property

63.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.

64. Release from Performance

64.1 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.

**65. Suspension of
Bank Loan or
Credit**

65.1 In the event that the Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

- (a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the Bank's suspension notice.
- (b) If the Contractor has not received sums due to it within the 28 days for payment provided for in GCC Sub-Clause 45.1, the Contractor may immediately issue a 14-day termination notice.

APPENDIX A TO GENERAL CONDITIONS

Fraud and Corruption

(Text in this Appendix shall not be modified)

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

- a. Defines, for the purposes of this provision, the terms set forth below as follows:
 - i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
 - iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - v. "obstructive practice" is:
 - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank 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
 - (b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers,

- suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
 - d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;³⁴ (ii) to be a nominated³⁵ sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;
 - e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect³⁶ all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

³⁴ For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

³⁵ A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

³⁶ Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

Section IX - Particular Conditions of Contract

(Whenever there is a conflict, the provisions herein shall prevail over those in the
Section VIII – General Conditions of Contract)

A. General	
GCC 1.1 (d)	The financing institution is: The World Bank & AIIB
GCC 1.1 (r)	The Employer is: Additional Project Director – IV, DPMU - II – WBMIFMP , Address: Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City Floor/ Room number: Ninth Floor , City: Kolkata ZIP Code: 700-091 Country: India Authorised Representative: Additional Project Director – IV, DPMU - II – WBMIFMP
GCC 1.1 (v)	The Intended Completion Date for the whole of the Works shall be XX/XX/2023 (365 days after commencement of work as per agreement)
GCC 1.1 (y)	Project Manager is Team Leader, Project Management Consultant (PMC), Ninth Floor, Jalasampad Bhavan, Western Block, Bidhannagar, Salt Lake City, Kolkata – 700091, West Bengal, India The employer shall provide for the same in writing, to act as Project Manager.
GCC 1.1 (aa)	The Sites is located at Howrah in Index Map : General : <ul style="list-style-type: none">• WBMIFMP/INDEX_AMTA
GCC 1.1 (dd)	The Start Date shall be XX/XX/2023 [+7 days from the date of issuance of Notice to Proceed]
GCC 1.1 (hh)	Name: “Construction of two storied irrigation field hostel and meeting room at Amta Irrigation Campus in Block Amta-1, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal.” Identification number of Contract is: 01/WBMIFMP/APD-IV/NCB/23-24/AMTA FIELD HOSTEL
GCC 1.1 (ii)	GCC 1.1 (jj) is replaced with the following: “Key Personnel are the Contractor’s personnel named in GCC 9.1 of the Particular Conditions of Contract.”
GCC 2.2	Sectional Completions are: NOT APPLICABLE

GCC 2.3(i)	The following documents also form part of the Contract:		
	S. Nos.	Document	Description of the document
	1.	Construction Methodology	Construction methodology given in bid, amended as per comments of Project Manager given in letter of acceptance.
	2.	Quality control	Quality control procedures and assurance plans given in the bid and amended as per comments of Employer given in letter of acceptance.
	3.	Quality Assurance Programme	Quality Assurance Programme prepared as per guidelines and contents provided in “A-1.2, SECTION A-GENERAL SPECIFICATIONS under Section VII- Works’ Requirement” to be submitted within 14 days of delivery of Letter of Acceptance and as approved by the Project Manager.
	4.	Construction Programme	A detailed Construction Programme in MS project including L2 PERT Chart to be submitted within 14 days of delivery of Letter of Acceptance, in consultation with and necessary modification of (if required) the Construction Schedule (attached as Annexure-A, Appendix to Technical Part, in Technical Proposal Forms under Section IV) and as approved by the Project Manager.
	5.	Fraud and Corruption	Appendix A – Fraud and Corruption
	6.	JV Agreement	Joint Venture Agreement (for JVs only).
	7.	Other documents	(i) Preamble to BOQ (ii) Scope of Work (iii) Supplementary Information All the three documents stated above have been provided in Section VII.
GCC 3.1	<p>The following is inserted as a sub-clause at the end of GCC 3.1:</p> <p>“Salient features of major labour and other laws that are applicable to construction industry in India are given as Appendix 1 to these General Conditions of Contract.”</p> <p>The language of the contract is <i>English</i>.</p> <p>The law that applies to the Contract are the laws of Union of India.</p>		
GCC 4.1	<p>The following is inserted as a sub-paragraph at the end of GCC 4.1:</p> <p>“However, if the Project Manager is required, under the rules and regulations and orders of the Employer, to obtain approval of some other authorities for specific actions, he will so obtain the approval. Provided further that any requisite approval shall be deemed to</p>		

	have been given by the Employer for any such authority exercised by the Project Manager.”
GCC 5.1	As and when required upon employer explicit prior permission in writing the Project Manager may delegate any of his duties and responsibilities, to his/her authorized representative/s for the time period agreed by the employer.
GCC 6.1	The following is inserted at the end of GCC 6.1: “All oral instructions shall be confirmed in writing in seven working days.”
GCC 7	<p>The first sentence of GCC 7. 1 is modified as:</p> <p>“The Contractor may subcontract with the approval of the Project Manager up to a ceiling specified in PCC but may not assign the Contract without the approval of the Employer in writing.”</p> <p>The following sub-clauses are inserted at the end of GCC 7.1:</p> <p>“7.2 The Project Manager should satisfy himself before recommending to the Employer whether:</p> <ul style="list-style-type: none"> a) the circumstances warrant such sub-contracting; and, b) the sub-Contractor so proposed for the Work possesses the experience, qualifications and equipment necessary for the job proposed to be entrusted to him in proportion to the quantum of Works to be sub-contracted. <p>7.3 If payments are proposed to be made directly to that sub-contractor, this should be subject to specific authorization by the prime contractor so that his arrangement does not alter the contractor’s liability or obligations under the contract.</p> <p>7.4 The Contractor shall not be required to obtain any consent from the Employer for:</p> <ul style="list-style-type: none"> (a) the sub-contracting of any part of the Works for which theSub-Contractor is already named in the contract. (b) the provision for labour, or labour component, and, (c) the purchase of materials which are in accordance with the standards specified in the contract. <p><i>(Note: 1. All bidders are expected to indicate clearly in the bid, if they proposed sub-contracting elements of the works amounting to more than 10 percent of the Bid Price. For each such proposal the qualification and the experience of the identified sub-contractor in the relevant field should be furnished along with the bid to enable the employer to satisfy himself about their qualifications before agreeing for such sub-contracting and include it in the contract. In view of the above, normally no additional sub-contracting should arise during execution of the contract.</i></p> <p><i>2. However, [a] sub-contracting for certain specialized elements of the work is not unusual and acceptable for carrying out the works more effectively; but vertical splitting of the works for sub-contracting is not acceptable. [b] In any case, proposal for sub-contracting in addition to what was specified in bid and stated in contract agreement will not be acceptable if the value of such additional sub-contracting exceeds 25% of value of work which was to be executed by Contractor without sub-contracting.</i></p>

	<i>3. Assignment of the contract may be acceptable only under exceptional circumstances such as insolvencies/liquidation or merger of companies etc.)”</i>
GCC 7.1	The ceiling for sub-contractor is 20% of the Contract Value. Hiding information about any sub-contracting not authorized by the Employer shall be treated as violation of Appendix A to General Conditions (Fraud and Corruption).
GCC 8.1	Schedule of other contractors: Normally no contractor, other than the contractor(s) awarded with the Lot(s) under the Package will be working in the site, as visualized by the Employer, at this point in time. However, in case of flood exigencies, other contractors may be engaged to tackle the emergent situation, and, in that case, the contractor(s) awarded with the Lot(s) will be notified accordingly and the Package Contractor(s) will have to comply with any such instruction/s issued by the Project Manager.
GCC 9	<p>The following is inserted as a sub-clause at the end of GCC 9.2:</p> <p>“In all the above cases, the contractor shall ensure that the person leaves the site within seven days and has no further connection with the work in the contract. The Contractor shall appoint a suitable replacement within 28 days or earlier as may be agreed to between the Project Manager and the Contractor.”</p> <p>The following sentence is deleted from first paragraph of GCC 9.4.1:</p> <p>“The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.”</p> <p>GCC 9.4.3 and GCC 9.4.4 are deleted.</p> <p>The following sub-clauses are inserted at the end of GCC 9.4:</p> <p>“9.5 The Contractor shall not employ any retired Gazetted officer who has either not completed two years after the date of retirement or has not obtained permission from the Government authorities for employment with the Contractor³⁷.</p> <p>9.6 During continuance of the Contract, the Contractor and his Sub-Contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour laws (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law prevailing on the Base Date either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contraventions including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Project Manager/ Employer shall have the right to deduct any money due to the Contractor including his amount of performance security and if</p>

³⁷Based on Government Directives.

	<p>applicable, the Environmental and Social (ES) Performance Security. The Employer/ Project Manager shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.</p> <p>9.7 The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.</p> <p>9.8 The Contractor shall duly comply with the provisions of the Apprentices Act 1961 (III of 1961) and the rules made there under, and comply, failure or neglect to shall be subject to all liabilities and penalties provided in the said Act and Rules.”</p>																															
GCC 9.1	<p>Key Personnel and equipment:</p> <p><i>[insert the name/s of each Key Personnel agreed by the Employer prior to Contract signature, Schedule of Key Personnel and equipment as indicated in accepted bid & construction methodology].</i></p>																															
GCC 13.1	<p>The minimum insurance amounts and deductibles shall be:</p> <table border="1"> <thead> <tr> <th>Sl.Nos.</th> <th>Description</th> <th>Minimum cover for Insurance</th> <th>Maximum deductible for Insurance</th> </tr> </thead> <tbody> <tr> <td>(i)</td> <td>Works and Plant and Materials which are incorporated in works</td> <td>INR 0.88 Crore</td> <td>5% of Claim amount subject to a minimum of Rs 50,00,000 /- for normal losses and Rs. 1,00,00,000/- for AOG/Collapse/Major Perils</td> </tr> <tr> <td>(ii)</td> <td>Loss or damage to Construction Equipment</td> <td>INR 1.96 Crore</td> <td>do</td> </tr> <tr> <td>(iii)</td> <td>Other Property</td> <td>INR 1.00 Crore</td> <td>do</td> </tr> <tr> <td>(iv)</td> <td>Personal injury or death insurance:</td> <td>INR 1.00 Crore</td> <td>do</td> </tr> <tr> <td></td> <td>a) for other people</td> <td></td> <td></td> </tr> <tr> <td></td> <td>b) for Contractor’s Employees</td> <td colspan="2">In accordance with the statutory requirements applicable in India</td> </tr> </tbody> </table> <p>Note:- The deductible amount from the total claim amount shall be borne by the contractor, for which no additional claim will be entertained.</p>				Sl.Nos.	Description	Minimum cover for Insurance	Maximum deductible for Insurance	(i)	Works and Plant and Materials which are incorporated in works	INR 0.88 Crore	5% of Claim amount subject to a minimum of Rs 50,00,000 /- for normal losses and Rs. 1,00,00,000/- for AOG/Collapse/Major Perils	(ii)	Loss or damage to Construction Equipment	INR 1.96 Crore	do	(iii)	Other Property	INR 1.00 Crore	do	(iv)	Personal injury or death insurance:	INR 1.00 Crore	do		a) for other people				b) for Contractor’s Employees	In accordance with the statutory requirements applicable in India	
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GCC 14.1	<p>Site Data are: reflected in the drawings which are specific to the bid and are part of this bid document.</p>																															
GCC 15.1	<p>GCC 15.1 is replaced with the following: “The Contractor shall construct and install the Works in accordance with the Specifications and Drawings and as per instructions of Project Manager.”</p>																															

GCC 18 (add new 18.3.3)	The following is inserted as a new sub-clause 18.3.3: “18.3.3 During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and by-laws of the State or Central Government, or local authorities and other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority. Salient features of the major laws are given in Appendix 1 to the General Conditions of Contract.”
GCC 20.1	The Site Possession Dates shall be: <u>XX/XX/2024 (To be mentioned in the Notice to Proceed)</u>
GCC 23	The following is inserted as a new sub-clause 23.1.1: “23.1.1 The Adjudicator should be in position before “notice to proceed with work” is issued to the Contractor and an agreement should be signed with the Adjudicator jointly by the Employer and the Contractor in the form attached – Appendix 3.”
GCC 23.1	Name of the agreed Adjudicator (<i>insert name before signing contract</i>). Appointing Authority for the Adjudicator: <i>Indian Council of Arbitration (ICA)</i>
GCC 23.2	Appointing Authority for the Adjudicator: Indian Council of Arbitration (ICA)
GCC 24	In the first sentence in GCC 24.3, the words “The Adjudicator shall be paid by the hour at the rate” are replaced by the words “The Adjudicator shall be paid daily at the rate”
GCC 24.3	The daily fee for this proposed Adjudicator shall be: <i>Rs 10,000 per day Plus reimbursable expenses (actual boarding, lodging, travel & other incidental expenses)</i>

<p>GCC 24.4</p>	<p>The procedure for ad-hoc arbitration will be as follows:</p> <p>(a) In case of Dispute or difference arising between the Employer and a Contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act 1996 as amended by the Arbitration and Conciliation (Amendment) Act, 2015. The arbitral tribunal shall consist of 3 Arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding Arbitrator. In case of failure of the two Arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the Arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the Indian Council of Arbitration</p> <p>(b) If one of the parties fails to appoint its Arbitrator in pursuance of sub-clause (a) above within 30 days after receipt of the notice of the appointment of its Arbitrator by the other party, then the Indian Council of Arbitration, both in cases of Foreign Contractor as well as Indian Contractor, shall appoint the Arbitrator. A certified copy of the order of the Indian Council of Arbitration, making such an appointment shall be furnished to each of the parties.</p> <p>(c) Arbitration may be commenced prior to or after completion of the Works, provided that the obligations of the Employer, the Project Manager, the Contractor and the Adjudicator shall not be altered by reason of the arbitration being conducted during the progress of the Works.</p> <p>(d) Arbitration proceedings shall be held at Kolkata, India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.</p>
	<p>(e) The decision of the majority of Arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as determined by the arbitral tribunal. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the Arbitrator appointed by such party or on its behalf shall be borne by each party itself.</p> <p>(f) Where the value of the contract is Rs.50 million and below, the disputes or differences arising shall be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority, namely the Indian Council of Arbitration.</p> <p>(g) The Arbitrator should give final award within 120 days of starting of the proceedings.</p> <p>(h) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceedings.</p>

B. Time Control	
GCC 30.1	<p>The Contractor shall submit for approval a Program for the Works within 14 days of delivery of the Letter of Acceptance.</p> <p>Any revision in Program should only be agreed in writing.</p> <p><i>[This program should be in adequate detail and generally conform to the program submitted along with bid. Deviations if any from that should be clearly explained and should be satisfactory to the Project Manager]</i></p> <p>The phrase “(revising the program given along with the bid <i>including ESHSMSIP to comply with the applicable Laws / Rules / Regulations for protection of environment, public health and safety, and the applicable parts of the Environment Management Plan of the Project</i>)” shall be inserted in the 3rd line after the phrase “for approval a revised Program”.</p>
GCC 30.3	<p>The period between Program updates is 30 days.</p> <p>The amount to be withheld for late submission of an updated Program is INR 5,00,000.</p> <p>The period for submission of progress reports is 30 days.</p>
GCC 31	<p>GCC 31.1 is replaced with the following:</p> <p>“31.1 The Project Manager shall extend the Intended Completion Date including milestones if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date as per the agreed milestones without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.”</p> <p>In GCC 31.2, replace the words “Intended Completion Date” at the first occurrence by the words “Intended Completion Date/ Milestones”; and at the second occurrence by the words “Intended Completion Date/ Milestone”.</p>
GCC 34	<p>GCC 34.1 is replaced with the following:</p> <p>“Either the Project Manager or the Contractor may require the other to attend a management meeting (which will be held at the place indicated in PCC. The periodicity shall be fixed by Project Manager/ Contractor jointly). The business of a management meeting shall be to review the progress of construction with reference to the construction program given in accordance with GCC 30.1, the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.”</p>
GCC 34.1	<p>Venue of management meeting will be in the office of the Executive Engineer, Howrah Irrigation Division, (DPIU-II), Howrah, WBMIFMP, P.S. Shibpur, Dist. – Howrah, Onkarmal Jetia Road, P.O-Botanical Garden, PIN-711103.</p>

C. Quality Control	
GCC 36	The following sub-clause is inserted at the end of GCC 36.1: “36.2 The contractor shall permit the Employer’s Technical auditor to check the contractor’s work and notify the Project Manager and Contractor of any defects that are found. Such a check shall not affect the Contractor’s or the Project Manager’s responsibility as defined in the Contract Agreement.”
GCC 37	The following sub-clauses are inserted before GCC 37.1, and GCC 37.1 is re-numbered as GCC 37.3: “GCC 37.1 The Contractor shall institute Quality Assurance (QA) and Quality Control (QC) systems in accordance with Quality Assurance Plan to demonstrate compliance with the requirements of the Contract as approved by the Project Manager. Compliance with the QA/QC systems shall not relieve the Contractor of any of his duties obligations or responsibilities under the Contract. GCC 37.2 The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently.”
GCC 38.1	The Defects Liability Period is: 365 days .
GCC 39.1	The following notes are added at the end of GCC 39.1: “Note: 1. Where in certain cases, the technical specifications provide for acceptance of works within specified tolerance limits at reduced rates, Project Manager will certify payments to Contractor accordingly. 2. Where the failure to correct a particular defect within the specified time is considered as a fundamental breach of contract a notice should be given to the contractor as stated in GCC 61.2(e).”
D. Cost Control	
GCC 41	GCC 41.1 is replaced with the following, and existing GCC 41.2 is re-numbered as GCC 41.3: “41.1 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 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. (a) If the quantity of work executed exceeds the quantity of the item in BOQ beyond the higher specified limit the Project Manager shall fix the rate to be applied for the additional quantity of the work executed. (b) If the quantity of work executed is less than the quantity of the item in BOQ and is lesser than the lower specified limit, the Project Manager shall fix the rate to be applied for whole of the quantity of the work so executed

	41.2 The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.”
GCC 42	<p>In GCC 42.2, the first sentence is modified as follows:</p> <p>“The Contractor shall provide the Project Manager with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Project Manager. The Contractor shall also provide a description of the varied work performed or to be performed, including details of the resources and methods adopted or to be adopted by the Contractor.”</p> <p>In the first sentence in GCC 42.3, after the words ‘If the Contractor’s quotation is unreasonable’, the following is added:</p> <p>“[or if contractor fails to provide the Project Manager with a quotation within a reasonable time specified by Project Manager in accordance with GCC 42.2]”</p>
GCC 42.7	Provisions related to Value Engineering do not apply .
GCC 43.1	The second sentence in GCC 43.1 is replaced with the following: “The cash flow forecast shall be in Indian Rupees.”
GCC 44	<p>At the end of GCC 44.1 after the word ‘previously’, the following words are added:</p> <p>“alongwith details of measurement of the quantity of works executed in a tabular form approved by the Project Manager”</p> <p>At the end of GCC 44.2 after the words ‘the Contractor’, the following words are added:</p> <p>“after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amount and under conditions set forth in GCC Sub-Clause 53.1 (Secured Advance)”</p>
GCC 44.1	The Contractor shall submit to the Project Manager monthly statements of the approved executed works for a net amount of not less than five percent (5%) of the contract value of the work.
GCC 44.8 (New Clause)	However, in case of non-compliance of adherence to ESHS-MSIP requirements as per Clause 15.3 of PCC, the Project manager shall forfeit 2 % of the payment on the value of work for the current interim payment after two advance warnings (at two weeks interval) are issued to the contractor by the Project Manager.
GCC 45	<p>GCC 45.1 is replaced with the following:</p> <p>“Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of contract & taxes to be deducted at source [TDS] as per applicable law. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall</p>

	be calculated from the date by which the payment should have been made up to the date when the late payment is made at the rate stated in the PCC .
GCC 45.1	Interest rate for Delayed payment is 6.5.% per annum or <i>State Bank of India prime lending rate</i> whichever is lower.
GCC 45.3	All payments (and deductions) shall be paid or charged in Indian Rupees.
GCC 47	The following sub-clause is inserted before GCC 47.1, and GCC 47.1 is re-numbered as GCC 47.2: “47.1 The rates quoted by the Contractor shall be deemed to be inclusive of the VAT, Sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source [TDS] as per applicable law.” In first line of the re-numbered GCC 47.2, replace the words ‘the date 28 days before’ with the words ‘the deadline for’
GCC 48	All payments shall be made in Indian Rupees
GCC 49	GCC 49.1 is replaced with the following: <p>“Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants and other inputs to the works in accordance with the principles and procedures outlined below. A table of adjustment data is included in the PCC which indicates the coefficients of various inputs and the sources of indices for various schedules of BOQ. If the PCC does not include a table of adjustment data this sub clause shall not apply and there shall be no price adjustment.</p> <p>(a) The price adjustment according to sub para (d) below, shall apply for the work done from the start date given in the PCC up to the end of the Intended Completion Date. If there is delay in completion beyond such date for reasons attributable to the contractor, the Price Adjustment for the work carried out during such period, for reasons attributable to the Contractor, shall be regulated by sub-para (g) below.</p> <p>(b) The Contract Price shall be adjusted to take account of any increase or decrease in cost after the base date, which affect the Contractor in performance of obligations under the Contract.</p> <p>(c) The total value (R) of the work done during the specified period [GCC 44.1] shall be as under:</p> $R = \text{SUM} (R_{S1} + R_{S2} + R_{S3} + \dots R_{Sn}),$ <p>Where,</p> <p>‘R_{sn}’ is the value of work done during the specified period to which the price adjustment shall be applied for the relevant schedule of Bill of Quantities (BOQ) specified in P.C.C during the specified period, and represented as under:</p> $R_{sn} = (V_{sn} + S_{sn}) \text{ minus (amount of secured advance recovered in the same period + value of works executed under variations for which price adjustments will be}$

	<p>worked separately based on terms mutually agreed between the Project Manager and the Contractor)</p> <p>where,</p> <p>V_{sn} is the total value of work done during the specified period for the respective schedule of BOQ, and</p> <p>S_{sn} is the secured advance paid during the specified period for the respective schedule of BOQ,</p> <p>(d) The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the appropriate schedule of BOQ and certified in Payment Certificates, shall be determined from formulae which shall be of the following general type: $P_n = a + b L_n/L_o + c E_n/E_o + d M_n/M_o + \dots\dots\dots$ <p>where,</p> <p>“P_n” is the adjustment multiplier to be applied to the value of the work done during the period “n”, this period being a month unless otherwise stated in the PCC.</p> <p>“a” is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;</p> <p>“b”, “c”, “d”,... are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;</p> <p>“L_n”[<i>Labour</i>], “E_n”[<i>Equipment</i>], “M_n”[<i>Material</i>], are the current cost indices or reference prices for period “n”, each of which is applicable to the relevant tabulated cost element [<i>Labour, Equipment, Steel, Cement, Fuel/Lubricants, Bitumen, others</i>] on the date, specified in the Table-2 of Adjustment Data, prior to the last day of the period (to which the particular Payment Certificate relates); and</p> <p>“L_o”, “E_o”, “M_o”,are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date.</p> <p>(e) The cost indices or reference prices stated in the tables of adjustment data given in PCC shall be used. The base date shall be the deadline for submission of bids.</p> <p>(f) If the Contractor fails to complete the Works within the Intended Completion date, adjustment of prices thereafter shall be made using either:</p> <p>(i) index or price applicable for each cost element tabulated in the tables of adjustment data on the specified date prior to the expiry of the Intended Completion Date, or</p> <p>(ii) the current index or price applicable for the period in question whichever is more favourable to the Employer.</p> </p>
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	<p>(g) The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be varied by the Project Manager if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.</p> <p>(h) Unless otherwise stated in the P.C.C., the Price adjustment shall be done in each monthly Interim Payment Certificate [IPC]. The coefficients and indices are given in the Tables of Adjustment Data in Contract data.</p> <p>To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.”</p>
GCC 49.1	Price Adjustment: NOT APPLICABLE
GCC 50.1	The proportion of payments retained (Retention Money) shall be 6% from each bill subject to the maximum of 5% of final contract price.
GCC 50.2	The last line of GCC 50.2 is replaced with the following: “On completion of the whole works the Contractor may substitute the balance retention money with an “on demand” Bank guarantee.”
GCC 51	<p>In the first sentence of GCC 51.1, the following words are inserted after the words ‘Intended Completion Date’: “(for the whole of the works or the milestones as stated in the PCC)”</p> <p>The following is inserted as a sub-paragraph at the end of GCC 51.1: “Time is the essence of the contract and payment or deduction of liquidated damages shall not relieve the contractor from his obligation to complete the work as per agreed construction program and milestones, or from any of the Contractor’s other obligations and liabilities under the contract.”</p> <p>In the first sentence in GCC 51.2 the following words are inserted after the words ‘Intended Completion Date’: “including milestones”</p>
GCC 51.1	<p>The liquidated damages for the whole of the Works are 0.1% per day. The maximum amount of liquidated damages for the whole of the Works is 10% of the final Contract Price.</p> <p>The Contractor shall pay liquidated damages to the Employer at the rate of 0.1% per day if,</p> <ol style="list-style-type: none"> the Contractor fails to submit invoices totalling to at least 30% of the contract value before elapse of 50% of the allotted time. the Contractor fails to complete the whole work within the Intended date of Completion.
GCC 52.1	Not applicable
GCC 53	<p>The following is inserted as a new sub-clause 53.4:</p> <p>“The Project Manager shall make advance payment in respect of materials intended for but not yet incorporated in the Works in accordance with conditions stipulated in the PCC.”</p>

GCC 53.1	The amount of the Advance Payments are:		
	<u>Nature of Advance</u>	<u>Amount (Rs.)</u>	<u>Conditions to be fulfilled</u>
	1. Mobilization	5% of the Contract price	On submission of un-conditional Bank Guarantee. <i>(to be drawn before end of 20% of Contract period)</i>
	2. Equipment <i>(This advance is not applicable for equipment already owned or hired/leased by the contractor.)</i>	Not Applicable	
	3. Secured advance for non-perishable materials brought to site:	Not Applicable	
	(The advance payment will be paid to the Contractor no later than 15 days after fulfillment of the above conditions).		
	<p>Repayment of advance payment for mobilization and equipment:</p> <p>The advance shall be repaid with percentage deductions from the interim payments certified by the Project Manager under the Contract. Deductions shall commence in the next Interim Payment Certificate following that in which the total of all such payments to the contractor has reached not less than 15% percent of the Contract Price or One (1) month from the date of payment of first installment of advance, whichever period concludes earlier, and shall be made at the rate of 15% percent of the amounts of all Interim Payment Certificates until such time as the advance has been repaid, always provided that the advance shall be completely repaid prior to the expiry of the original time for completion.</p> <p>Repayment of secured advance: NA</p>		
GCC 54	<p>“GCC 54.1 is replaced with the following</p> <p>The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in the amounts specified in the PCC (for GCC 54.1), and shall be issued by a Nationalized or Scheduled bank in India. The Performance Security including additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the Certificate of Completion.”</p>		
GCC 54.1	The Performance Security amount is eight percent (8%) percent of accepted Contract Amount plus ten percent (10%) of the accepted Contract Amount as additional security for unbalanced bids [in terms of ITB Clause 41.2, and plus Environmental Social Health		

	<p>and Safety (ESHS) Performance Security amount is two percent (2%) percent of the accepted Contract Amount.</p> <p>The standard forms of Performance Security and if applicable ESHS Security acceptable to the Employer shall be unconditional Bank Guarantees from Scheduled or Nationalized banks in India of the types as presented in Section X of the Bidding Document.</p> <p>[Notes: The Bank Guarantees shall be unconditional (on demand) (see Section X, Contract Forms).</p> <p>The sum of the total “demand guarantees” (a) Performance Security and ES Performance Security shall normally not exceed 10 % of the Accepted Contract Amount for bids which are not unbalanced, front loaded or substantially below updated estimates; and (b) Performance Security,; additional Performance Security for bids which are seriously unbalanced, front-loaded or substantially below updated estimates; and ES Performance Security shall normally not exceed 20 % of the Accepted Contract Amount].</p> <p>Throughout this bidding document the term ‘Performance security’, unless the context clearly indicates otherwise, means and includes both ‘the Performance security and the ESHS Performance security’ to be submitted by the successful bidder in the amounts specified above.</p>
<p>E. Finishing the Contract</p>	
<p>GCC 59.1</p>	<p>The following is added after the words ‘issue a payment certificate’ at the end of GCC 59.1: “within 56 days of receiving the contractor’s revised account”</p>
<p>GCC 60.1</p>	<p>The date by which operating, and maintenance manuals are required is within 28 days of issue of certificate of completion of whole or section of work, as the case may be <i>[insert date]</i>.</p> <p>The date by which “as built” drawings (in scale...) including a compact disc containing digitized drawings in 2 sets are required, is within 28 days of issue of certificate of completion of whole or section of the work, as the case may be <i>[insert date]</i>.</p>
<p>GCC 60.2</p>	<p>The amount to be withheld for failing to produce “as built” drawings and/or operating and maintenance manuals by the date required in GCC 60.1 is one percent (1%) of the accepted Contract Amount.</p>
<p>GCC 61</p>	<p>The following sub-clauses are added after GCC 61.2 (h):</p> <p>“(i) The contractor has contravened Clauses 7 and 9 of GCC.</p> <p>(a) The contractor does not adhere to the agreed construction program, agreed ES-MSIP [Clause 30 of GCC], and also fails to take satisfactory remedial action as per agreements reached in the management meetings [Clause 30 of GCC] for a period of 60 days.</p> <p>(b) The contractor fails to carry out the instructions of the Project Manager within a reasonable time determined by the Project Manager in accordance with GCC Clause 15.1 and 22.</p>

	(l) The contractor (in case of Joint Venture) has modified the composition of the joint venture and/or the responsibility of each member of the joint venture from what is stated in joint venture agreement without the prior approval of the Employer.”
GCC 61.2 (g)	The maximum number of days is: 100 Days
GCC 61.2 (l)	Hiding any information regarding changes in roles and responsibilities of JV members, which is not authorized by the Employer, shall also be treated as violation of Appendix A to General Conditions (Fraud and Corruption).
GCC 62	The following is added after the words ‘issue of the certificate’ in the first sentence of GCC 62.1; “less other recoveries due in terms of contract, less taxes to be deducted at source [TDS] as per applicable law,” The following is added after the words ‘date of the certificate’ at the end of GCC 62.2: “less other recoveries due in terms of contract, less taxes to be deducted at source [TDS] as per applicable law”
GCC 62.1	The percentage to apply to the value of the work not completed, representing the Employer’s additional cost for completing the Works, is 20% .
GCC 62.2	GCC 62.2 will be applicable subject to the condition that while issuing the certificate, the materials physically brought to site and remaining unused, at the time of issuing the certificate out of the total materials ordered, shall only be considered.
	The Following Clauses are added:
New Clause 66.0	Force Majeure
	66.1.1 “Force Majeure” means an exceptional event or circumstance: <ul style="list-style-type: none"> (a) which is beyond a Party’s control, (b) which such Party could not reasonably have provided against before entering into the Contract, (c) which, having arisen, such Party could not reasonably have avoided or overcome, and (d) which is not substantially attributable to the other Party.
	66.1.2 Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied: <ul style="list-style-type: none"> (a) natural catastrophes such as earthquake, cyclone, hurricane, typhoon, flood or volcanic activity at the Site (b) consequences of pandemic (the term ‘pandemic’ as defined or recognized by the World Health Organization, such as Covid-19).
66.2	Notice of Force Majeure

	<p>66.2.1 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.</p> <p>66.2.2 The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.</p> <p>66.2.3 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.</p>
66.3	Duty to Minimize Delay
	<p>66.3.1 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.</p> <p>66.3.2 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.</p>
66.4	Consequences of Force Majeure
	<p>66.4.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under GCC Sub-Clause 66.2 [Notice of Force Majeure], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to GCC Sub-Clause 24.1 [Procedure for Disputes] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under GCC Sub-Clause 31 [Extension of the Intended Completion Date], and (b) if the event or circumstance is of the kind described in sub-paragraphs (a) to (d) of PCC Sub Clause 66.1.1 above [Definition of Force Majeure] and, PCC Sub Clause 66.1.2 , occurs at the Site , 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 Sub-Clause 13 [Insurance]. <p>66.4.2 After receiving this notice, the Project Manager shall proceed in accordance with GCC Sub-Clause 4 [Project Manager’s Decisions] to agree or determine these matters.</p> <p>66.4.3 In case of occurrence of “Force Majeure” condition, GCC clause number 61.2 (b), will not be applicable.</p>

	66.4.4 In case of occurrence of “Force Majeure” condition, GCC 46 may be invoked only to extend the “Intended Completion Date”, as deemed proper by the Project Manager.
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Appendices to PCC

Appendix 1

Salient Features of Labour & Environment Protection Laws³⁸

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK

- | | |
|-----|---|
| (a) | <u>Employees Compensation Act 1923</u> : The Act provides for compensation in case of injury, disease or death arising out of and during the course of employment. |
| (b) | <u>Payment of Gratuity Act 1972</u> : gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees. |
| (c) | <u>Employees P.F. and Miscellaneous Provision Act 1952 (since amended)</u> : The Act provides for monthly contribution by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are: <ul style="list-style-type: none"> (i) Pension or family pension on retirement or death, as the case may be. (ii) Deposit linked insurance on the death in harness of the worker. (iii) Payment of P.F. accumulation on retirement/death etc. |
| (d) | <u>Maternity Benefit Act 1961</u> : The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc. |
| (e) | <u>Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013</u> : This Act defines sexual harassment in the workplace, provides for an enquiry procedure in case of complaints and mandates the setting up of an Internal Complaints Committee or a Local Complaints Committee |
| (f) | <u>Contract Labour (Regulation & Abolition) Act 1970</u> : The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour. |
| (g) | <u>Minimum Wages Act 1948</u> : The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments. |

³⁸This list is only illustrative and not exhaustive. Bidders and Contractors are responsible for checking the correctness and completeness of the list. The law as current on the date of bid opening will apply.

- (h) Payment of Wages Act 1936: It lays down the mode, manner and by what date the wages are to be paid, what deductions can be made from the wages of the workers.
- (i) Equal Remuneration Act 1976: The Act provides for payment of equal wages for work of equal nature to male and female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (j) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. Some of the State Governments have reduced this requirement from 20 to 10. The Act provides for payments of annual bonus subject to a minimum of 8.33% of the wages drawn in the relevant year. It applies to skilled or unskilled manual, supervisory, managerial, administrative, technical or clerical work for hire or reward to employees who draw a salary of Rs. 10,000/- per month or less. To be eligible for bonus, the employee should have worked in the establishment for not less than 30 working days in the relevant year. The Act does not apply to certain establishments.
- (k) Industrial Disputes Act 1947: the Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations, a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in the Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc.
- (o) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Building and Other Construction Workers Welfare Cess Act, 1996 (BOCWW Cess Act): All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under these Acts. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be notified by the Government. The Employer of the establishment is required to provide safety

measures at the building or construction work and other welfare measures, such as Canteens, First – Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

- (p) Factories Act 1948: the Act lays down the procedure for approval of plans before setting up a factory engaged in manufacturing processes, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power.
- (q) Weekly Holidays Act -1942
- (r) Bonded Labour System (Abolition) Act, 1976: The Act provides for the abolition of bonded labour system with a view to preventing the economic and physical exploitation of weaker sections of society. Bonded labour covers all forms of forced labour, including that arising out of a loan, debt or advance.
- (s) Employer's Liability Act, 1938: This Act protects workmen who bring suits for damages against employers in case of injuries endured in the course of employment. Such injuries could be on account of negligence on the part of the employer or persons employed by them in maintenance of all machinery, equipment etc. in healthy and sound condition.
- (t) Employees State Insurance Act 1948: The Act provides for certain benefits to insured employees and their families in case of sickness, maternity and disablement arising out of an employment injury. The Act applies to all employees in factories (as defined) or establishments which may be so notified by the appropriate Government. The Act provides for the setting up of an Employees' State Insurance Fund, which is to be administered by the Employees State Insurance Corporation. Contributions to the Fund are paid by the employer and the employee at rates as prescribed by the Central Government. The Act also provides for benefits to dependents of insured persons in case of death as a result of an employment injury.
- (u) The Personal Injuries (Compensation Insurance) Act, 1963: This Act provides for the employer's liability and responsibility to pay compensation to employees where workmen sustain personal injuries in the course of employment.
- (v) Industrial Employment (Standing Order) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

SALIENT FEATURES OF SOME OF THE MAJOR LAWS THAT ARE APPLICABLE FOR PROTECTION OF ENVIRONMENT.

1. The Environment (Protection) Act, 1986 and as amended: This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.
2. The Forest Conservation Act, 1980, as amended, and Forest (Conservation) Rules, 1981 as amended: These provides for protection of forests by restricting conversion of forested areas into non- forested areas and prevention of deforestation, and stipulates the procedures for cutting any trees that might be required by the applicable rules. Permissions under the Act also stipulate the norms and compliance requirements of the employer and any contractor on behalf of the employer.
3. State Tree Preservation Acts as may be in force: These provide for protection of trees of important species. Contractors will be required to obtain prior permission for full or partial cutting, uprooting, or pruning of any such trees.
4. The Wildlife (Protection) Act, 1972, and as amended: This provides for protection of wildlife through notifying National Parks and Sanctuaries and buffer areas around these zones; and to protect individuals of nationally important species listed in the Annex of the Act.
5. The Biological Diversity Act, 2002: This provides for conservation of biological diversity, sustainable use of components of biological diversity, and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto.
6. The Public Liability Insurance Act, 1991 as amended and The Public Liability Insurance Rules, 1991 as amended: These provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government.
7. The Ancient Monuments and Archaeological Sites and Remains Act, 1958 and the Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010, the Ancient Monuments and Archaeological Sites and Remains Rules, 1959 amended 2011, the National Monuments Authority Rules, 2011 and the similar State Acts: These provide for conservation of cultural and historical remains found in India. Accordingly, area within the radii of 100m and 300m from the "protected property" are designated as "protected area" and "controlled area" respectively. No development activity (including building, mining, excavating, blasting) is permitted in the "protected area" and development activities likely to damage the protected property is not permitted in the "controlled area" without prior permission of the Archaeological Survey of India (ASI) or the State Departments of Art and

Culture or Archaeology as applicable.

8. The Environmental Impact Assessment Notification, 2006 and as amended: This provides for prior environmental clearance for new, modernization and expansion projects listed in Schedule 1 of the Notification. Contractors will be required to ensure that no work starts until applicable clearances under the Notification is not available. Contractors will be responsible for implementation of any environmental management plan stipulated as per the permission under this Notification; and will be required to prepare and submit to the employer and compliance report stipulated in the permission under the Notification.
9. The Water (Prevention and Control of Pollution) Act, 1974 as amended, and the Water (Prevention and Control of Pollution) Rules, 1975 as amended: These provide for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms. Contractors will need to obtain consent for establishment and consent for operation of any item of work or installation of equipment that generates waste water, and observe the required standards of establishment and operation of these items of work or installations; as well as install and operate all required waste water treatment facilities.
10. The Water (Prevention and Control of Pollution) Cess Act, 1977 and The Water (Prevention and Control of Pollution) Cess Rules, 1978: These provide for the levy and collection of a cess on water consumed by persons carrying on certain industries and by local authorities, with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution under the Water (Prevention and Control of Pollution) Act, 1974.
11. The Air (Prevention and Control of Pollution) Act, 1981 as amended, and the Air (Prevention and Control of Pollution) Rules, 1982: These provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment. Contractors will need to obtain consent for establishment and consent for operation of any item of work or installation of equipment that generates air pollution such as batching plants, hot mix plants, power generators, backup power generation, material handling processes, and observe the required standards of establishment and operation of these items of work or installations.
12. Noise Pollution (Control and Regulation) Rules, 2000, and as amended: This provides for standards for noise for day and night for various land uses and specifies special standards in and around sensitive receptors of noise such as schools and hospitals. Contractors will need to ensure compliance to the applicable standards, and install and operate all required noise control devices as may be required for all plants and work processes.
13. Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996: This provides for Requirement of preparation of on-site and off-site Disaster Management Plans

for accident-prone areas.

14. The Explosives Act 1884 and the Explosives Rules, 2008: These provide for safe manufacture, possession, sale, use, transportation and import of explosive materials such as diesel, Oil and lubricants etc.; and also for regulating the use of any explosives used in blasting and/or demolition. All applicable provisions will need compliance by the contractors.
15. The Petroleum Rules, 2002: This provides for safe use and storage of petroleum products, and will need to be complied by the contractors.
16. The Gas Cylinder Rules 2004 and amendments: This provides for regulations related to storage of gas, and possession of gas cylinder more than the exempted quantity. Contractors should comply with all the requirements of this Rule.
17. Manufacture, Storage and Import of Hazardous Chemical Rules of 1989 and as amended: These provide for use and storage of hazardous material such as highly inflammable liquids like HSD/LPG. Contractors will need to ensure compliance to the Rules; and in the event where the storage quantity exceeds the regulated threshold limit, the contractors will be responsible for regular safety audits and other reporting requirements as prescribed in the Rules.
18. Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016: These provide for protection of general public from improper handling storage and disposal of hazardous waste. The rules prescribe the management requirement of hazardous wastes from its generation to final disposal. Contractors will need to obtain permission from the State Pollution Control Boards and other designated authorities for storage and handling of any hazardous material; and will to ensure full compliance to these rules and any conditions imposed in the permit.
19. The Bio Medical Waste Management Rules, 2016: This provides for control, storage, transportation and disposal of bio-medical wastes. As and where the contractor has any first aid facility and dispensaries, established in either temporary or permanent manner, compliance to these Rules are mandatory.
20. Construction and Demolition Waste Management Rules, 2016: This provides for management of construction and demolition waste (such as building materials possible to be reused, rubble and debris or the like); and applies to all those waste resulting from construction, re-modelling, repair or demolition of any civil structure. Contractor will need to prepare a waste disposal plan and obtain required approval from local authorities, if waste generation is more than 20 tons in any day or 300 tons in any month during the contract period; and ensure full compliance to these rules and any conditions imposed in the regulatory approval.
21. The E-Waste (Management) Rules, 2016: This provides for management of E-wastes (but not covering lead acid batteries and radio-active wastes) aiming to enable the recovery and/or reuse of useful material from e-waste, thereby reducing the hazardous wastes destined for disposal and to ensure the environmentally sound management of all types of waste of electrical and electronic equipment. This Rule applies to every manufacturer, producer, consumer, bulk consumer, collection centers, dealers, e-retailer, refurbisher, dismantler and

recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste or electrical and electronic equipment listed in Schedule I, including their components, consumables, parts and spares which make the product operational.

22. Plastic waste Management Rules, 2016: This provides for control and management of the plastic waste generated from any activity. Contractors will ensure compliance to this Rule.
23. The Batteries (Management and Handling) Rules 2001: This provides for ensuring safe disposal and recycling of discarded lead acid batteries likely to be used in any equipment during construction and operation stage. Rules require proper control and record keeping on the sale or import of lead acid batteries and recollection of the used batteries by registered recyclers to ensure environmentally sound recycling of used batteries. Contractors will ensure compliance to this Rule.
24. The Ozone Depleting Substances (Regulation and Control) Rules, 2000 and as amended: This provides for regulation of production and consumption of ozone depleting substances in the country, and specifically prohibits export to or import from countries not specified in the Rules, and prohibits unless specifically permitted, any use of ozone depleting substance.
25. The Coastal Regulation Zone Notifications, 1991 and as amended: This provides for regulation of development activities within the 500m of high tide line in coastal zone and 100m of stretches of rivers and estuaries influenced by tides. Contractors will be required to ensure that no work starts until applicable clearances under the Notification is not available. Contractors will be responsible for implementation of any plan stipulated as per the permission under this Notification; and will be required to prepare and submit to the employer and compliance report stipulated in the permission under the Notification.
26. The Motor Vehicle Act 1988 as amended (and State Motor Vehicle Acts as may be in force) and the Motor Vehicle Rules, 1989, and as amended (and State Motor Vehicle Rules as may be in force): To minimize the road accidents, penalizing the guilty, provision of compensation to victim and family and check vehicular air and noise pollution. Contractors will be required to ensure full compliance to these rules.
27. Easement Act, 1882: This provides for the rights of landowners on groundwater. Contractors will need to ensure that other landowners' rights under the Act is not affected by any groundwater abstraction by the contractors.
28. State Groundwater Acts and Rules as may be in force and the Guidelines for Groundwater Abstraction for drinking and domestic purposes in Notified Areas and Industry/Infrastructure project proposals in Non-Notified areas, 2012: These provide for regulating extraction of ground water for construction/industrial and drinking and domestic purposes. Contractors will need to obtain permission from Central/State Groundwater Boards prior to groundwater abstraction through digging any bore well or through any other means; and will to ensure full compliance to these rules and any conditions imposed in the permit.
29. The Mines Act, 1952 as amended; the Minor Mineral and concession Rules as amended; and the State Mineral (Rights and Taxation) Acts as may be in force: These provide for for safe and sound mining activity. The contractors will procure aggregates and other building materials from quarries and borrow areas approved under such Acts. In the event the

contractors open any new quarry and/or borrow areas, appropriate prior permission from the State Departments of Minerals and Geology will need to be obtained. Contractors will also need to ensure full compliance to these rules and any conditions imposed in the permit.

30. The Insecticides Act, 1968 and Insecticides Rules, 1971 and as amended: These provide for regulates the manufacture, sale, transport, distribution, export, import and use of pesticides to prevent risk to human beings or animals, and for matters connected therewith. No one should import or manufacture; sell, stock or exhibit foe sale; distribute, transport, use: (i) any misbranded insecticides, (ii) any insecticide the sale, distribution or use of which is for the time being prohibited under the Act; and (iii) any insecticide except in accordance with the condition on which it was registered under the Act.
31. National Building Codes of India, 2005 and as amended: This provides guidelines for regulating the building construction activities in India. The code mainly contains administrative regulations, development control rules and general building requirements; stipulations regarding materials, structural design and construction; and building and plumbing services. Contractors will be required to comply with all Bureau of Indian Standards Codes dealing with: (i) use and disposal of asbestos containing materials in construction; (ii) paints containing lead; (iii) permanent and temporary ventilations in workplace; (iv) safety, and hygiene at the workplace; (v) prevention of fire; (vi) prevention of accidents from faulty electrical gadgets, equipment and accessories; and all other such codes incidental to the Contract.

Appointment of Adjudicator

Suggested Draft of Letter of Appointment of Adjudicators in civil works contracts

Sub: _____ (Name of the Contract)

To

Name and address of the Adjudicator

We hereby confirm your appointment as Adjudicator for the above contract to carry out the assignment specified in this Letter of Appointment.

For administrative purpose _____ (*name of the officer representing the Employer*) has been assigned to administer the assignment and to provide the Adjudicator with all relevant information needed to carry out the assignment on behalf of both the employer and the contractor. The services will be required during the period of contract for the work of (Name of the Contract) _____.

The Adjudicator shall visit the worksite once in 3 (three) months till the completion of the work indicated above or as specifically requested by Employer/ Contractor for the period up to the end of defects liability period with prior intimation to the Employer and the contractor. The duration of each visit shall ordinarily be for one day only. These durations are approximate and (*Name of the employer and Name of the Contractor*) may find it necessary to postpone or cancel the assignment and/or shorten or extend the duration.

The appointment will become effective upon confirmation of letter by you. The appointment of Adjudicator shall be liable for termination under a 30 (thirty) days written notice from the date of issue of the notice, if both Employer and the Contractor so desire. Also the appointment shall automatically stand terminated 14 days after the defect notice / correction period as stated in Clauses 23 and 24 of the Conditions of Contract is over.

The Adjudicator will be paid a fee of Rs. _____ (Rupees _____ only) per each day of visit at the worksite. The actual expenses for boarding and traveling in connection with the assignment will be reimbursed to the Adjudicator. The Adjudicator will submit a pre-receipted bill in triplicate to the employer indicating the date of the visit, fees for the visit and a proof in support of the actual expenditure [only for items valued above Rs. 200 each] incurred by him against boarding, lodging and traveling expenses after performing the visit on each occasion. The Employer will make the admissible payment (both the Employer's and the Contractor's share) to the Adjudicator within 30 days of the receipt of the bill. The Contractor's share on this account (half the paid amount) will be recovered by the Employer from the Contractor's bills against the work.

In accepting this assignment, the Adjudicator should understand and agree that he is responsible for any liabilities and costs arising out of risks associated with travel to and from the place of emergency repatriation, loss or damage to personal/professional effects and property. The Adjudicator is advised to effect personal insurance cover in respect of such risks if he does not already have such cover in place. In this regard, the Adjudicator shall maintain appropriate medical, travel, accident and third-

party liability insurance. The obligation under this paragraph will survive till termination of this appointment.

Procedures for resolution of disputes by the Adjudicator is described in the contract of _____(name of the contract) between the employer and the contractor vide clause Nos.24 of the General Conditions of Contract. Your recommendation should be given in the format attached, within 28 days of receipt of a notification of dispute.

The Adjudicator will carry out the assignment in accordance with the highest standard of professional and ethical competence and integrity, having due regard to the nature and purpose of the assignment, and will conduct himself in a manner consistent herewith. After visiting the worksite, the Adjudicator will discuss the matter with the Employer and if necessary with the Contractor before arriving at any decision.

The Adjudicator will agree that all knowledge and information not within the public domain, which may be acquired while carrying out this service shall be all time and for all purpose, regarded as strictly confidential and held in confidence, and shall not be directly or indirectly disclosed to any party whatsoever, except with the permission of the employer and the contractor. The Adjudicator's decision should be communicated in the form of a speaking order specifying the reasons.

The Adjudicator will agree that any manufacturing or construction firm with which he might be associated with, will not be eligible to participate in bidding for any goods or works resulting from or associated with the project of which this consulting assignment forms a part

Read and Agreed

Name of Adjudicator

Signature

Place:

Date:

Name of Employer

Signature of authorized representative of Employer

Name of the Contractor

Signature of authorized representative of Contractor

Attachment: Copy of contract document between the employer and contractor and format for recommendation.

SUMMARY OF ADJUDICATOR'S RESPONSIBILITIES

The Adjudicator has the following principal responsibilities:

1. Visit the site periodically.
2. Keep abreast of job activities and developments.
3. Encourage the resolution of disputes by the parties.
4. When a dispute is referred to it, conduct a hearing (no legal presentation), complete its deliberations, and prepare a recommendation in a professional and timely manner (as per sample format)

Sample Format of Adjudicator's Recommendation

[Project Name] Recommendation of Adjudicator

Dispute Nos. XX [NAME OF DISPUTE]

Hearing Date: _____

Dispute

Description of dispute. A one or two sentence summation of the dispute.

Contractor's Position

A short summation of the contractor's position as understood by the Adjudicator.

Employer's Position

A short summation of the Employer's position as understood by the Adjudicator.

Recommendation

The Adjudicator's specific recommendation for settlement of the dispute. (*The recommended course is consistent with the explanation*).

Explanation

(*This section could also be called Considerations, Rationale, Findings, Discussion, and so on.*)

The Adjudicator's description of how each recommendation was reached.

Respectfully submitted,

Date : _____

Date : _____

Date : _____

Section X - 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.

NOTIFICATION OF AWARD

Letter of Acceptance

[on letterhead paper of the Employer]

[The Letter of Acceptance shall be the basis for formation of the Contract as described in ITB Clause 47. This Standard Form of Letter of Acceptance shall be filled in and sent to the successful Bidder only upon expiry of the Standstill Period, specified in BDS ITB 42.1 or any extension thereof, or upon satisfactorily addressing a complaint that has been filed within the Standstill Period, subject to any review by the World Bank required under the Loan Agreement.]

..... *[date]*

To: *[name and address of the Contractor]*

.....

Subject: *[Notification of Award Contract No]*.

.....

This is to notify you that your Bid dated . . . *[insert date]* for execution of the *[insert name of the contract and identification number, as given in the PCC]*. for the Accepted Contract Amount of *[insert amount in numbers and words]*, as corrected and modified³⁹ in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security, plus additional security for unbalanced bids in terms of ITB Clause 41 in the form detailed in ITB Clause 50 for amounts⁴⁰ of Rs, and Rs specified therein, within 21 days of the receipt of this letter of acceptance, and visit this office to sign the contract, failing which action as stated in ITB Clause 50.2 will be taken in accordance with the Conditions of Contract. The securities shall be valid up to 28 days from the date of completion i.e. up to and shall be as per the Performance Security Form, included in Section X - Contract Forms, of the bidding document.

[Choose one of the following statements:]

We accept that _____ *[insert the name of Adjudicator proposed by the Bidder]* be appointed as the Adjudicator⁴¹.

[or]

³⁹Delete "corrected and" or "and modified" if not applicable. See Notes on Standard Form of Agreement, next page.

⁴⁰Insert amounts for (i) Performance Security, plus additional security for unbalanced bids in terms of ITB Clause 41; and (ii) ESHS Performance Security respectively.

⁴¹To be used only if the Contractor disagrees in the Bid with the Adjudicator proposed by the Employer in the Instructions to Bidders, and has accordingly offered another candidate.

We do not accept that _____ *[insert the name of the Adjudicator proposed by the Bidder]* be appointed as the Adjudicator, and by sending a copy of this Letter of Acceptance to _____ *[insert name of the Appointing Authority]*, the Appointing Authority, we are hereby requesting such Authority to appoint the Adjudicator in accordance with ITB 51.1 and GCC 23.1⁴².

We note that as per your bid, you do not intend to subcontract any component of work.

[OR]

We note that as per your bid, you propose to employ M/s. as sub-contractor for executing

We have reviewed the construction methodology submitted by you alongwith the bid in response to ITB Clause 16 and our comments are given in the attachment. You are requested to submit a revised Program as per Clause 26 of General Conditions of Contract within 14 days of receipt of this letter of acceptance.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

⁴²To be used only if the Contractor disagrees in the Bid with the Adjudicator proposed by the Employer in the ITB, has accordingly offered another candidate, and the Employer does not accept the counterproposal.

Issue of Notice to proceed with the work

(letterhead of the Employer)

_____ (date)

To

_____ (name and address of the Contractor)

Dear Sirs:

Pursuant to your furnishing the requisite securities as stipulated in ITB clause 50.1, insurance policy as per GCC 13, construction methodology as stated in letter of acceptance and signing of the contract agreement for the construction of _____ @ a Bid Price of Rs. _____, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory
authorized to sign on behalf of
Employer)

Contract Agreement

THIS AGREEMENT made theday 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 therein,

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.
 - (i) This Agreement
 - (ii) the Letter of Acceptance
 - (iii) the Contractor’s Bid including completed schedules and priced bill of quantities,
 - (iv) the addenda Nos. _____(if any)
 - (v) the Particular Conditions
 - (vi) the General Conditions of Contract, including appendix;
 - (vii) the Specification
 - (viii) the Drawings
 - (ix) Construction Program, Methodology, Quality Assurance Program, ESHS Management Strategies and Implementation Plans, and Code of Conduct (ESHS)
 - (x) Joint Venture Agreement [for JVs only]; and
 - (xi) any other document **listed in the PCC** as forming part of the Contract.
3. In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

Signed by: _____
for and on behalf of the Employer

Signed by: _____
for and on behalf the Contractor

in the
presence of: _____
Witness, Name, Signature, Address,
Date

in the
presence of: _____
Witness, Name, Signature, Address, Date

Performance Security - Bank Guarantee
[including Additional Performance Security for unbalanced bids]
[Guarantor letterhead or SWIFT identifier code]

Performance Guarantee No..... *[insert guarantee reference number]*
 Date..... *[insert date of issue of the guarantee]*

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

WHEREAS _____ *[name and address of Contractor⁴³]* (hereinafter called "the Applicant") has undertaken, in pursuance of RFB Nos. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

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

AND WHEREAS we have agreed to give the Applicant such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Applicant, up to a total of _____ *[amount of guarantee⁴⁴]* _____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

⁴³*In the case of a JV, insert the name of the Joint Venture*

⁴⁴*An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract less provisional sums, if any, and denominated in Indian Rupees.*

This guarantee shall be valid until⁴⁵, and any demand for payment under it must be received by us at this office on or before that date.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____

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

⁴⁵*Insert the date twenty-eight days after the expected completion date as described in GC Clause 53.1. 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. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee*

**Advance Payment Security
Demand Guarantee**

[Guarantor letterhead or SWIFT identifier code]

Advance Payment Guarantee No..... *[insert guarantee reference number]*
Date..... *[insert date of issue of the guarantee]*

To: _____ *[name of Employer]*
_____ *[address of Employer]*
_____ *[name of Contract]*

Gentlemen:

In accordance with the provisions of the Conditions of Contract, Subclause 53.1 ("Advance Payment") of the above-mentioned Contract, _____ *[name and address of Contractor⁴⁶]* (hereinafter called "the Applicant") shall deposit with _____ *[name of Employer]* a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of _____ *[amount of guarantee⁴⁷]* _____ *[in words]*.

We, the _____ *[bank or financial institution]*, as instructed by the Applicant, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ *[name of Employer]* on his first demand without whatsoever right of objection on our part and without his first claim to the Applicant, in the amount not exceeding _____ *[amount of guarantee]* _____ *[in words]*.

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

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

⁴⁶ In the case of a JV, insert the name of the Joint Venture

⁴⁷ An amount shall be inserted by the bank representing the amount of the Advance Payment, and denominated in Indian Rupees.

the Applicant. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

Yours truly,

Signature and seal: _____

Name of

Bank: _____

Address: _____

Date: _____

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

Retention Money Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

_____ *[Bank's name and address of issuing branch or office]*

Beneficiary: _____ *[Name and Address of Employer]*

Date: _____

RETENTION MONEY GUARANTEE NOS.: _____

We have been informed that _____ *[name of contractor⁴⁸]* (hereinafter called "the Applicant") has entered into Contract Nos. _____ *[reference number of the contract]* dated _____ with you, for the execution of _____ *[name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment, payment of _____ *[insert the second half of the Retention Money]* is to be made against a Retention Money guarantee.

At the request of the Applicant, we _____ *[name of Bank]* hereby irrevocably undertake to pay you the sum or sums not exceeding in total an amount of _____ *[amount in Rupees]* (_____ *[amount in words⁴⁹]*) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Applicant is in breach of its obligation under the Contract without cavil or argument.

It is a condition for any claim and payment under this guarantee to be made that the payment of the second half of the Retention Money referred to above must have been received by the Applicant on its account number _____ at _____ *[name and address of Bank]*.

This guarantee shall expire, at the latest, 21 days after the date when the Employer has received a copy of the Defects Liability Certificate issued by the Project Manager. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

[Signature(s) and seal of the guarantor]

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

⁴⁸*In the case of a JV, insert the name of the Joint Venture*

⁴⁹*The Guarantor shall insert an amount representing the amount of the second half of the Retention Money.*

.....
2. Contract Forms

2.1 Insert the Form ‘Notification of Intention to Award’ as under:
.....

Notification of Intention to Award

[This Notification of Intention to Award shall be sent to each Bidder that submitted a Bid, unless the Bidder has previously received notice of exclusion from the process at an interim stage of the procurement process]

[Send this Notification to the Bidder’s Authorized Representative named in the Bidder Information Form]

- 1. For the attention of Bidder’s Authorized Representative
- 2. Name: *[insert Authorized Representative’s name]*
 Address: *[insert Authorized Representative’s Address]*
 Telephone/Fax numbers: *[insert Authorized Representative’s telephone/fax numbers]*
 Email Address: *[insert Authorized Representative’s email address]*

[IMPORTANT: insert the date that this Notification is transmitted to Bidders. The Notification must be sent to all Bidders simultaneously. This means on the same date and as close to the same time as possible.]

DATE OF TRANSMISSION: This Notification is sent by: *[email/fax]* on *[date]* (local time)

Notification of Intention to Award

- Employer:** *[insert the name of the Employer]*
- Project:** *[insert name of project]*
- Contract title:** *[insert the name of the contract]*
- Country:** *[insert country where RFB is issued]*
- Loan Nos. /Credit Nos. / Grant Nos.:** *[insert reference number for loan/credit/grant]*
- RFB No:** *[insert RFB reference number from Procurement Plan]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period, you may:

- a) request a debriefing in relation to the evaluation of your Bid, and/or
- b) submit a Procurement-related Complaint in relation to the decision to award the contract.

1. The successful Bidder

Name:	<i>[insert name of successful Bidder]</i>
Address:	<i>[insert address of the successful Bidder]</i>
Contract price:	<i>[insert contract price of the successful Bid]</i>

2. Other Bidders *[INSTRUCTIONS: insert names of all Bidders that submitted a Bid. If the Bid’s price was evaluated include the evaluated price as well as the Bid price as read out.]*

Name of Bidder	Bid price	Evaluated Bid price (if applicable)
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]

3. Reason/s why your Bid was unsuccessful

[INSTRUCTIONS: State the reason/s why this Bidder’s Bid was unsuccessful. Do NOT include: (a) a point by point comparison with another Bidder’s Bid or (b) information that is marked confidential by the Bidder in its Bid.]

4. How to request a debriefing

DEADLINE: The deadline to request a debriefing expires at midnight on [insert date] (local time).

You may request a debriefing in relation to the results of the evaluation of your Bid. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award.

Provide the contract name, reference number, name of the Bidder, contact details; and address the request for debriefing as follows:

Attention: [insert full name of person, if applicable]

Title/position: [insert title/position]

Agency: [insert name of Employer]

Email address: [insert email address]

Fax number: [insert fax number] *delete if not used*

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request. If we are unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end.

The debriefing may be in writing, by phone, video conference call or in person. We shall promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

5. How to make a complaint

Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, [insert date] (local time).

Provide the contract name, reference number, name of the Bidder, contact details; and address the Procurement-related Complaint as follows:

Attention: *[insert full name of person, if applicable]*

Title/position: *[insert title/position]*

Agency: *[insert name of Employer]*

Email address: *[insert email address]*

Fax number: *[insert fax number] delete if not used*

At this point in the procurement process, you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

Further information:

For more information see the [Procurement Regulations for IPF Borrowers \(Procurement Regulations\)\[https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=4005\]](https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=4005) (Annex III). You should read these provisions before preparing and submitting your complaint. In addition, the World Bank’s Guidance [“How to make a Procurement-related Complaint” \[http://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework#framework\]](http://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework#framework) provides a useful explanation of the process, as well as a sample letter of complaint.

In summary, there are four essential requirements:

1. You must be an ‘interested party’. In this case, that means a Bidder who submitted a Bid in this bidding process, and is the recipient of a Notification of Intention to Award.
2. The complaint can only challenge the decision to award the contract.
3. You must submit the complaint within the period stated above.
4. You must include, in your complaint, all of the information required by the Procurement Regulations (as described in Annex III).

6. Standstill Period

DEADLINE: The Standstill Period is due to end at midnight on *[insert date]* (local time).

The Standstill Period lasts ten (10) Business Days after the date of transmission of this Notification of Intention to Award.

The Standstill Period may be extended as stated in Section 4 above.

If you have any questions regarding this Notification, please do not hesitate to contact us.

On behalf of the Employer:

Signature: _____

Name: _____

Title/position: _____

Telephone: _____

Email: _____

.....

GOVT. OF WEST BENGAL
IRRIGATION AND WATERWAYS DIRECTORATE

INDEX MAP SHOWING PROPOSED SITE OF AMTA FIELD HOSTEL
MEETING HALL

SCALE: 1 Inch = 1 Mile

DIST: HOOGHLY

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