



**PROJECT NAME**  
**RENOVATION/ REHABILITATION/ UPGRADATION OF CUSTOMS ACADEMY OF**  
**PAKISTAN AT OLD CUSTOM HOUSE BUILDING AT EDULJEE DINSHAW ROAD,**  
**KARACHI**

**TENDER DETAILS**  
**EPC BID FOR RENOVATION/ REHABILITATION/ UPGRADATION OF CUSTOMS**  
**ACADEMY OF PAKISTAN AT OLD CUSTOM HOUSE BUILDING AT EDULJEE DINSHAW**  
**ROAD, KARACHI**

**CLIENT**

**CUSTOMS ACADEMY OF PAKISTAN**  
**OLD CUSTOM HOUSE BUILDING, EDULJEE DINSHAW**  
**ROAD, KARACHI**

**CONSULTANT:**



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## **(I) INVITATION FOR BIDS**



GOVERNMENT OF PAKISTAN  
**CUSTOMS ACADEMY OF PAKISTAN**  
Old Custom House Building, Eduljee Dinshaw Road, Karachi.  
Phone # 021-99214932, Email : karachicustomstraining@gmail.com

**NOTICE INVITING**  
**TENDER**

Customs Academy of Pakistan, Karachi invites sealed bids/ Request for Proposal for Renovation/ Rehabilitation/ Upgradation of Custom Academy of Pakistan at Old Custom House Building, Eduljee Dinshaw Road, Karachi

NAME OF PROJECT	PEC CODES REQUIREMENT	TENDER FEES	BID SECURITY
EPC Bid For Renovation/ Rehabilitation/ Upgradation Of Customs Academy Of Pakistan At Old Custom House Building At Eduljee Dinshaw Road, Karachi	<p>i. Valid Registration of Constructor with Pakistan Engineering Council (PEC) in relevant Category C-3 or above and having specialization codes CE10, EE11, CE11(vii), BC02, ME01, EE06, BC04, EE07.</p> <p>ii. The bidder has to add in their team a Consulting firm for preparation of architecture rehabilitation plans and 3d views, structural re-strengthening details, finishing works details, MEP works details, quantities of the proposed option in EPC Bid as per mode boards needed in the Project. The Consultant must be a PEC registered firm having Project Profile Codes 1201 (i), (ii), (vi), (viii) and Service Codes needed are 0531, 0532, 0537, 0542, 0543, &amp; 0575.</p>	Pkr. 5,000/-	Bid- Security of Rs. 14 Million

DESCRIPTION	1ST ATTEMPT
<b>Issuance of Bidding Document</b>	From Date of Publication of NIT
<b>Last Date for Issuance of Bidding Document</b>	March 16, 2026, 02:00 PM
<b>Last Date for Submission of Bidding Document</b>	March 16, 2026, 03:00 PM



GOVERNMENT OF PAKISTAN  
**CUSTOMS ACADEMY OF PAKISTAN**  
Old Custom House Building, Eduljee Dinshaw Road, Karachi.  
Phone # 021-99214932, Email : [karachicustomstraining@gmail.com](mailto:karachicustomstraining@gmail.com)

<b>Date &amp; Time for Opening of Bidding Document</b>	March 16, 2026, 03:30 PM
<b>Procurement Procedure</b>	<b>Single Stage - Two Envelope</b> Quality & Cost Based Selection (QCBS)

Interested and eligible bidders registered with PEC, FBR, SRB may review Eligibility Condition along with detailed Evaluation Criteria in the bidding document which can be downloaded from the EPADs/PPRA website with payment of **Rs. 5,000/- (Non-refundable)** in form of Pay Order in favor of “**Directorate General of Training and Research (Customs), Karachi**”, which will be submitted with the technical submission

**(Muhammad Zohaib)**

Deputy Director

Customs Academy of Pakistan

Phone: 0321-6844996

Email:

[karachicustomstraining@gmail.com](mailto:karachicustomstraining@gmail.com)

**SUBJECT: INVITATION TO BID FOR RENOVATION/ REHABILITATION/  
UPGRADATION OF CUSTOM ACADEMY OF PAKISTAN AT OLD CUSTOM  
HOUSE BUILDING, EDULJEE DINSHAW ROAD, KARACHI**

The Customs Academy of Pakistan is located in Karachi's historic Imperial Custom House Building at Eduljee Dinshaw Road, Karachi and stands as a symbol of the nation's customs heritage and professional excellence. Designed by George Wittet in 1915, the building combines British, Hindu, and Gothic architectural elements and was originally used as the Imperial Customs House. It also served as a military hospital during World War I before returning to Customs use.

Since 1986, it has housed the Customs Academy, dedicated to capacity building and professional training for Customs officers. The site now features modern facilities, including computer labs, seminar halls, La Maison hostel, the Kami I Museum of Customs, and the Syed Ali Rizvi Library. Declared a Protected Heritage Site in 1995, the building preserves its colonial charm while functioning as a center for learning, history, and institutional pride.

With a vision to become a leader in customs education and training, CAP is actively involved in various academic, industrial, and commercial initiatives to create a lasting impact on the country's trade infrastructure and economy.

The primary objective of this assignment is to engage a professional constructor/contractor to act in accordance with the governing agreement to assist execute work Renovation/ Rehabilitation/ Upgradation of Custom Academy of Pakistan for the following works:

**Key Features of the Project:**

The work comprises comprehensive documentation, rehabilitation, strengthening, upgrading, and refurbishment of the existing Old Custom House building to restore its structural integrity, improve functional efficiency, enhance safety standards, and upgrade building services.

1. Structural Strengthening
2. Architectural Improvement & Functional Upgradation
3. Electrical Works Improvement & Functional Upgradation
4. Plumbing Works Improvement & Functional Upgradation
5. Fire Fighting & Fire Safety Works
6. Roof Repair works and Waterproofing.
7. Repair/ Rehabilitation/ Refurbishment of Furniture
8. Repair of Air Conditioning (AC)
9. Miscellaneous other allied works
10. Preparation of Shop drawings including 3d views and as-built drawings.

**Submission Details:**

Sealed bids (Technical and Financial) are invited under EPC (Engineering, Procurement

& Construction) mode, in accordance with the Single-Stage, Two Envelope Procedure PPRA Rules 2004 amended upto date. Bidders will be evaluated through Quality and Cost Based (QCBS) method, 50% weightage for technical and 50% for financial bids.

The bids that achieve a minimum threshold of 50% in the technical evaluation will be considered for opening of financial bids, while the remaining financial bids will be returned unopened. Any clarification needed by the bidder shall be submitted online on EPADS at least 7 working days before the submission of bid and the response to queries will be clarified online through EPADS at least 5 days before the deadline for submission of bid.

Interested Bidders can download the bidding documents online from the PPRA website ([www.ppra.org.pk](http://www.ppra.org.pk)) starting from the date of publishing of this advertisement.

The bid must be accompanied by a bid security of Rs. 14 Million PKR, payable from any scheduled bank of Pakistan, in favor of “**Directorate General of Training & Research (Customs) Karachi**”

Both technical and financial Bids shall be submitted on E-PADS in their respective sections. Only the original Bid Security and all undertakings on non-judicial stamp paper needed in the tender document shall be submitted before the submission deadline at the office of Procurement Committee at Customs Academy of Pakistan, Old Custom House Building, Eduljee Dinshaw, Karachi.

Custom Academy of Pakistan reserves the right to accept or reject any or all bids, without assigning any reasons.

Best Regards,

**Deputy Director  
Customs Academy of Pakistan**

## **(II) INSTRUCTIONS TO BIDDERS & APPENDICES**

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# **INSTRUCTIONS TO BIDDERS**

## **(A) GENERAL**

### **IB.1 Scope of Bid and Source of Funds**

#### **1.1 Scope of Bid**

Additional Director Custom Academy of Pakistan (hereinafter called the "Employer") wishes to receive Bids on EPC mode for the scope of work which includes, but shall not be limited to:

- Structural Strengthening
- Architectural Improvement & Functional Upgradation
- Electrical Works Improvement & Functional Upgradation
- Plumbing Works Improvement & Functional Upgradation
- Fire Fighting & Fire Safety Works
- Roof Repair works and Waterproofing.
- Repair/ Rehabilitation/ Refurbishment of Furniture
- Repair of Air Conditioning (AC)
- Miscellaneous other allied works
- Preparation of Shop drawings including 3d views and as-built drawings.

A detailed scope of work has been described in these documents. The successful Bidder will be expected to complete the works within the stipulated period of (180 days) as specified in bidding documents.

Bidders must quote prices for the complete scope of work. Any bid covering partial scope of work will be non-responsive, pursuant to Clause IB.24.

#### **1.2 Source of Funds**

Grant for Rehabilitation/ Repair/ Renovation/ Refurbishment from Government of Pakistan.

### **IB.2 Eligible Bidders**

- 2.1 Bidding is open to all firms and persons meeting the documents submission requirements mentioned in **IB.9 – Documents Comprising the Bid.**

### **IB.3 Eligible Goods and Services**

- 3.1 All Goods & ancillary Services to be supplied under this Contract shall have their origin in eligible countries as per Appendix 'A' to Instructions to Bidders and all expenditures made under the Contract will be limited to such Goods and Services.

### **IB.4 Cost of Bidding**

- 4.1 The Bidder shall bear all costs associated with the preparation and submission of

its Bid and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding process.

## **(B) BIDDING DOCUMENTS**

### **IB.5 Contents of Bidding Documents**

5.1 In addition to Invitation for Bids, the Bidding Documents are those stated below, and should be read in conjunction with any Addenda issued in accordance with Clause IB.7. All submissions needed in the bid are mandatory to be submitted in their respective section and tables else the detail submitted shall not be considered.

1. Instructions to Bidders (ITB) with Appendices to ITB
2. Letter of Technical Bid & All Schedules to Bid are Mandatory documents for submission  
Schedules to Bid are the following:
  - (i) Schedule A: Specific Works data
  - (ii) Schedule B: Proposed Organization for the Project
  - (iii) Schedule C: Methodology along with Drawings (Mood boards, Plans and 3d Views) of each items as needed in the Tender Document to be provided in the Technical Proposal (Soft copy of all 3d's Views & Mood Boards shall be submitted for checking and review else the bid shall be rejected).
  - (iv) Schedule D: Proposed Programme of Works
  - (v) Schedule E: Work to be Performed by Subcontractors
  - (vi) Schedule F: Deviations from Technical & Contractual Provisions
  - (vii) Schedule G: Specific Operation/Plant and Equipment Details
  - (viii) Schedule H: Specimen JV Agreement
  - (ix) Schedule I: Past Performance and Present Commitments
3. Letter of Price Bid & Schedules to Bid  
Schedules to Bid are the following:
  - (i) Schedule J: Integrity Pact
  - (ii) Schedule K: Estimated Progress Payments
  - (iii) Schedule L: Cost Breakup for Major Cost Items
4. Schedule of Prices
5. Preamble to Conditions of Contract
6. General Conditions of Contract (GCC)
7. Particular Conditions of Contract (PCC)

8. Standard Forms

Forms include the following:

- (i) Form of Bid Security
- (ii) Form of Contract Agreement
- (iii) Form of Performance Security
- (iv) Form of Bank Guarantee for Advance Payment
- (v) Indemnity Bond for Secured Advance

9. Specifications - Special & Technical Provisions

10. Drawings

5.2 The Bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of Bid submission will be at the Bidders own risk. Pursuant to Clause IB.24, Bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.

**IB.6 Clarification of Bidding Documents**

6.1 A prospective Bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer in writing or by fax. Employer will examine the request for clarification of the Bidding Documents, which it receives not later than seven (7) days prior to the deadline for the submission of bids and if needed will issue the clarification/amendment of the Bidding Documents before the date of submission of Bids to all prospective Bidders who have purchased the Bidding Documents.

**IB.7 Amendment of Bidding Documents**

7.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by issuing addendum.

7.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to Sub-Clause 7.1 hereof, and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective Bidders shall acknowledge receipt of each addendum in writing to the Employer. The Bidder shall also confirm in the Form of Bid that the information contained in such addenda have been considered in preparing his Bid.

7.3 To afford 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 submission of Bids in accordance with Clause IB.19.

## **(C) PREPARATION OF BIDS**

### **IB.8 Language of Bid**

- 8.1 The Bid prepared by the Bidder and all correspondence and documents relating to the Bid, exchanged by the Bidder shall be written in the English language, provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English translation of its pertinent passages in which case, for purposes of interpretation of the Bid, the English translation shall govern.

### **IB.9 Documents Comprising the Bid**

- 9.1 It is mandatory to submit all details needed in the bid and in case of any missing detail needed in the bid then the bid shall be declared non-responsive. The Bid prepared by the Bidder shall comprise the documents needed in the bid.

### **IB.10 Letters of Bids and Schedules**

- 10.1 The Bidder shall complete, sign and seal the Letters of Bids, Schedules (A to L, or as modified) to Bid and Schedule of Prices furnished in the Bidding Documents and shall also enclose other information as detailed in Clause IB.9.

### **IB.11 Bid Prices**

- 11.1 The Bidder shall fill up the Schedule of Prices attached to these documents indicating the unit rates and prices of the Works to be performed under the Contract. Prices on the Schedule of Prices shall be entered keeping in view the instructions contained in the Preamble to the Schedule of Prices and Annexures attached of each work.
- 11.2 The Bidder shall fill in rates and prices for all items of the Works described in the Schedule of Prices. Items against which no rate or price is entered by a Bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Schedule of Prices. In case any necessary item description is missed the same shall be informed to the procurement committee else the cost shall be considered included in the bid amount.
- 11.3 The Bidder's breakup of price components in accordance with Sub-Clause 11.1 above will be solely for the purpose of facilitating the comparison of Bids by the Employer and will not in any way limit its right to contract on any of the terms offered.
- 11.4 Unless otherwise stipulated in the Conditions of Contract, prices quoted by the Bidder shall remain fixed during the Bidder's performance of the Contract and not subject to variation on any account. When the Bidders are required to quote only fixed price(s), a Bid submitted with an adjustable price quotation will be treated as non-responsive, pursuant to Clause IB.24.
- 11.5 Any discount offered shall be valid for at least the period of validity of the Bid. A discount valid for lesser period shall be considered null and void.

### **IB.12 Currencies of Bid**

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- 12.1 Prices shall be quoted in the following currencies:
- (a) For Plant/Goods and Services which the Bidder will supply from within Pakistan, the prices shall be quoted in the Pak. Rupees (to be included in quoted rates)
  - (b) For Plant/Goods and Services which the Bidder will supply from outside Pakistan, the prices shall be quoted either in the U.S Dollars or in any other freely convertible currency. **(NOT APPLICABLE)**
- 12.2 Further, a Bidder expecting to incur a portion of its expenditure in the performance of the Contract in more than one currency (but use no more than 3 foreign currencies), and wishing to be paid accordingly, shall so indicate in its bid **(NOT APPLICABLE)**
- 12.3 The currencies of payment shall be as stated in Particular Conditions of Contract (PKR only).

### **IB.13 Documents Establishing Bidder's Eligibility and Qualifications**

- 13.1** Pursuant to Clause IB.9, the Bidder shall furnish, as part of its Bid, documents establishing the Bidder's eligibility to Bid and its qualifications to perform the Contract if its Bid is accepted.
- 13.2** The documentary evidence of the Bidder's eligibility to Bid shall establish to the Employer's satisfaction that the Bidder, at the time of submission of its Bid is from an eligible source country as defined under Clause IB.2.
- (a) The documentary evidence of the Bidder's qualifications to perform the Contract if its Bid is accepted, shall establish to the Employer's satisfaction that the Bidder has the financial, technical and Design capability necessary to perform the Contract.

### **13.4 (A) EVALUATION OF TECHNICAL PROPOSAL**

Check List/Preliminary Requirements, as set-forth in this proposal are based on mandatory requirements, for objective assessment of the efficacy of the design concept/proposal;

#### **Eligibility Criteria to Bid**

Interested bidders must submit following;

#### **Minimum Eligibility Criteria to Bid**

- i. Copy of CNIC of Proprietor / Partners/ Directors.
- ii. Bid should be signed along-with company's stamp on each page of financial & technical documents.
- iii. Integrity Pact on the non-judicial E-Stamp Paper worth Rs.100/-.
- iv. Valid Registration of Constructor with Pakistan Engineering Council (PEC) in relevant Category C-3 or above and having specialization codes CE10, EE11(vii),

CE11(vii), BC02, ME01, EE06, BC04, EE07.

- v. The bidder has to add in their team a Consulting firm for preparation of architecture rehabilitation plans and 3d views, structural re-strengthening details, finishing works details, MEP works details, quantities of the proposed option in EPC Bid as per mode boards needed in the Project. The Consultant must be a PEC registered firm having Project Profile Codes 1201 (i), (ii), (vi), (viii) and Service Codes needed are 0531, 0532, 0537, 0542, 0543, & 0575.
- vi. Bidders shall be on an active Tax Payer List (ATL) of Federal Board of Revenue (FBR) and Sindh Revenue Board (SRB) failing to which the bidder shall not be eligible to take part in the bid.
- vii. Participation in the bid in the form of Joint Venture is not allowed.
- viii. Undertaking on Original E-Stamp Paper (NON-JUDICIAL) of Rs. 100/- (Mandatory) containing that:
  - The firm was not involved in any litigation, no work was rescinded in the past (List of cases entered into arbitration / litigation & list of works where penalty is involved, if any must be attached).
  - The firm was not black listing (Attach all details if any). Not doing so will result in rejection of tender
  - The information / documents submitted are correct and true.
- ix. Terms and conditions given in NIT must be followed.
- x. The audited balance sheets from ICAP registered Auditor for the last year shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.
- xi. Original Bid Security along with original undertaking as mentioned in the tender documents shall be submitted at the office of the procurement committee before the closing of bid submission otherwise the bid shall stand rejected.
- xii. Detailed evaluation along with marking criteria is attached as APPENDIX B, all forms attached along with complete details must be completed accurately and submitted using the prescribed format. Failure to submit complete forms or required attachments will result in no marks being awarded for those sections.

**(APPENDIX B)**

**DETAILED EVALUATION ALONG WITH MARKING CRITERIA**

Aggregate Qualifying Score is **80%**, but it is mandatory to obtain at least **50% marks** in each of the following sections.

<b>QUALIFICATION REQUIREMENT</b>	
COMPANY PROFILE	10 MARKS
EXPERIENCE RECORD	20 MARKS
PERSONNEL CAPABILITIES	20 MARKS
FINANCIAL SOUNDNESS	10 MARKS
PRESENTATION - METHODOLOGY ALONG WITH DRAWINGS AND 3DS PRESENTATION OF DESIGN PROPOSAL	40 MARKS
<b>TOTAL</b>	<b>100 MARKS</b>

- (A) Company Profile** **10 Marks**
- 1. Period since bidder is in construction business** **05 Marks**
- Between 3-5 years 02 Marks
- OR Above 5 years 05 Marks
- 2. Office facilities** **05 Marks**
- a) In Sindh province 03 Mark
- b) In any other province/Islamabad 02 Marks

- (B) Experience Record** **20 Marks**
- 1. SIMILAR EXPERIENCE (IN-HAND/COMPLETED)** 15 Marks
- Similar nature of works in last 5 years (In-hand/ completed).  
Attach Work Order/ Performance Certificate/ Completion Certificate.
- a) At least one similar nature EPC work having minimum cost 80% of the estimated cost of work OR  
At least two similar nature EPC works each having minimum cost 50% of the estimated cost.

**2. GENERAL EXPERIENCE (IN-HAND/COMPLETED)**

05 Marks

General Civil works in last 5 years (In-hand/ completed).  
Attach Work Order/ Performance Certificate/ Completion Certificate.

- a) At least one similar nature of work having minimum cost 80% of the estimated cost of work OR At least two similar nature works each having minimum cost 50% of the estimated cost

**(C) Personnel Capabilities required for this project****20 Marks**

(CVs template / form is attached for submission)

S.No	Position With Experience & Qualification	Nos.	Marks Assigned	Remarks
1	<b>Project Manager</b> B.E (Civil) with min. 25 years of experience and must be registered with Pakistan Engineering Council as a Professional Engineer	1	09	- 05 Marks for 25 years of experience. - 02 Marks for more than 25 years of experience. - 02 Marks for experience of 2 similar nature projects
2	<b>Site Engineer (Civil)</b> B.E (Civil) with min. 15 years of experience and must be registered with Pakistan Engineering Council as Professional Engineer	1	05	- 02 Marks for 15 years of experience. - 01 Marks for more than 15 years of experience. - 02 Marks for experience of 2 similar nature projects
3	<b>Site Engineer Electrical/ Mechanical</b> B.E (Electrical/Mechanical) with min. 10 years of experience and must be registered with Pakistan Engineering Council	1	04	- 1.50 Marks for 5 years of experience. - 1.50 Marks for more than 5 years of experience. - 1.00 Marks for experience of 2 relevant projects
4	<b>Quantity Surveyor</b> B.Tech in (Civil) with min. 20 years of experience.	1	02	- 1.00 Marks for 5 years of experience. - 0.50 Marks for more than 5 years of experience. - 0.50 Marks for experience of 2 relevant projects

*Attach Documentary evidence/ proof of employment that the proposed personnel is working with the bidder. Salary evidence for the last month and Educational documents of the proposed staff must be submitted with the bid else the CV's will not be considered and evaluated.*

**(D) Financial Soundness /Status - 10 Marks**

- The Bidder shall demonstrate that it has access to, or has available, liquid assets, and financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements.

(Attach proof of financial soundness either account maintenance certificate mentioning account balance on the date of NIT or Credit line Facility in favor of the project)

- |    |  |          |
|----|--|----------|
| a) | Above 10% of the Estimated Cost          | 10 Marks |
| b) | Between 05% to 10% of the Estimated Cost | 05 Marks |
| c) | Less than 05% of the Estimated Cost      | 01 Marks |

**(E) Presentation on Methodology of work along with conceptual Shop Drawings (Plans and 3d Views) of each items as needed in the Tender Document (All Generated Views & Mood Boards will be rejected. Softcopy of the model file will be submitted in USB/CD format) – 40 Marks**

- |    |  |          |
|----|--|----------|
| 1. | Methodology to perform the works mentioned in BOQ  | 15 Marks |
| 2. | <u>3d/ interior design views and plans</u> as per Mood Boards<br>(According to the Items specified in BOQ) | 25 Marks |

*It is very important to conduct detailed site visit before finalization of Methodology of works and submission of 3d/ interior design views and plans and financial bid. Presentation will also be taken on (E) and marks will be assigned accordingly.*

#### **13.4 (b) Evaluation of Financial Proposal (50% Weightage)**

##### **IB.14 Deleted**

##### **IB.15 Bid Security**

- 15.1 Each Bidder shall furnish, as part of his Bid, a Bid Security of an amount of Pak Rupees (Rupees 14 Million of the Bid Security to be enclosed with the Technical Bid. Bid Security shall be in the form of Bank Guarantee or in the form of deposit at call from any scheduled bank of State Bank of Pakistan in favor of “Directorate General of Training & Research (Customs) Karachi”
- 15.2 The Bid Security is required to protect the Employer against the risk of Bidder’s conduct which would warrant the security’s forfeiture, pursuant to Sub-Clause 15.7 hereof.
- 15.3 Any Bid not accompanied by an acceptable Bid Security shall be considered by the Employer as non-responsive bid.
- 15.4 The Bid securities of unsuccessful Bidders will be returned upon award of contract to the successful Bidder or on the expiry of validity of Bid Security whichever is earlier.
- 15.5 The Bid Security of the successful Bidder will be returned when the Bidder has furnished the required Performance Security, pursuant to Clause IB.34 and signed the Contract Agreement, pursuant to Clause IB.35.
- 15.6 The Bid Security may be forfeited:

- (a) if a Bidder withdraws his Bid during the period of Bid validity;
- (b) if a Bidder does not accept the correction of his Bid Price, pursuant to Sub-Clause 24.2 hereof; or
- (c) in the case of a successful Bidder, if he fails to:
  - (i) furnish the required Performance Security in accordance with Clause IB.34, or
  - (ii) sign the Contract Agreement, in accordance with Clause IB.35.

#### **IB.16 Validity of Bids**

- 16.1 Bids shall remain valid for 90 days after the date of Bid opening as prescribed in Clause IB.19.
- 16.2 In exceptional circumstances prior to expiry of original Bid validity period, the Employer may request the Bidders to extend the period of validity for a specified additional period which shall in no case be more than the original Bid validity period. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiture of his Bid Security. A Bidder agreeing to the request will be required to extend the validity of his Bid Security for the period of the extension, and in compliance with Clause IB.15 in all respects in which case, the Employer will be obligated to compensate the Bidders, upon substantiation for their increase in costs (if it is a fixed price bid).

#### **IB.17 Format and Signing of Bid**

- 17.1 Bidders are particularly directed that the amount entered on the Form of Bid shall be for performing the Contract strictly in accordance with the Bidding Documents.
- 17.2 All Schedules to Bid (A to L) etc. are to be properly completed and signed.
- 17.3 No alteration is to be made in the Form of Bid nor in the Schedules thereto except in filling up the blanks as directed. If any alteration be made or if these instructions be not fully complied with, the Bid may be rejected.
- 17.4 Both technical and financial Bids shall be submitted on EPADS in the respective sections.
- 17.5 The Bid shall contain no alterations, omissions or additions, except to comply with instructions issued by the Employer, or as are necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.
- 17.6 Bidders shall indicate in the space provided in the Form of Bid their full and proper addresses at which notices may be legally served on them and to which all correspondence in connection with their Bids and the Contract is to be sent.
- 17.7 Bidders should retain a copy of the Bidding Documents as their file copy.

## **(D) SUBMISSION OF BIDS**

### **IB.18 Sealing and Marking of Bids**

18.1 Each Bidder shall submit his Bid as under:

- (a) Proposal will be submitted through E-PADS. Technical and Financial proposal to be submitted in the respective section as per single stage two envelope system.

### **IB.19 Deadline for Submission of Bids**

- 19.1 (a) Bids must be received through E-Pads as specified in Invitation for Bids not later than the time and date stipulated in the Invitation for Bids.
  - (b) Physical bid is not needed due to online bidding, only original bid security payorder and affidavits on Non-Judicial Stamp papers needed in the tender shall be submitted to the procurement committee before the deadline of submission of bids
- 19.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an addendum in accordance with Clause IB.7, in which case all rights and obligations of the Employer and the Bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

### **IB.20 Late Bids**

20.1 Bids are only acceptable at EPADS.

### **IB.21 Modification, Substitution and Withdrawal of Bids**

The bids received by the client through EPADS cannot be Modified, substituted and also cannot be withdrawn. In case of any error or modification needed the same shall be done on EPADS before the deadline of submission of bid.

## **(E) BID OPENING AND EVALUATION**

### **IB.22 Bid Opening**

22.1 A committee consisting of nominated members by the Employer will open the Bids received on EPADS, in the presence of Bidders' authorized representatives who choose to attend, at the time, date and location stipulated in the Invitation for Bids. Bids comprising of financial & technical details will be opened at the same time in presence of Procurement Committee members.

Initially the Technical bid will be opened and bids of only technically qualified bidders financial bid shall be opened later for which date , time and venue shall be confirmed.

The Bidders' representatives who are present shall sign in a register evidencing their attendance.

22.2 The Bidder's name, Bid Prices, unit rates, any discount offered, or absence of Bid Security, and such other details as the Employer at its discretion may consider appropriate, will be announced by the Employer at the Bid opening. The Employer will record minutes of Bid opening.

22.3 Discounts offered for lesser period than the Bid validity shall not be considered in evaluation.

### **IB.23 Clarification of Bids**

23.1 To assist in the examination, evaluation and comparison of Bids, the Procurement Authority may, at its discretion, ask the Bidder for a clarification of its Bid. The request for clarification and the response shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

### **IB.24 Preliminary Examination & Determination of Responsiveness of Bids**

24.1 Prior to detailed evaluation pursuant to Clause IB.26, the Project Manager/Engineer will determine the responsiveness of the Bids as follows:

- (a) the Procurement Committee will examine the Bids to determine whether;
  - (i) the Bid is complete and does not deviate from the scope,
  - (ii) any computational errors have been made,
  - (iii) required sureties have been furnished,
  - (iv) the documents have been properly signed,
  - (v) the Bid is valid till required period,
  - (vi) the Bid prices are firm during currency of contract if it is a fixed price bid,
  - (vii) completion period offered is within specified limits,
  - (viii) the Bidder/Manufacturer is eligible to Bid and possesses the requisite experience,
  - (ix) the Bid does not deviate from basic technical requirements; and
  - (x) the Bids are generally in order.
- (b) A bid is likely not to be considered, if;
  - (i) it is unsigned,
  - (ii) its validity is less than specified,
  - (iii) it is submitted for incomplete scope of work,
  - (iv) it indicates completion period later than specified,
  - (v) it indicates that Works and materials to be supplied do not meet eligibility requirements,
  - (vi) it indicates that Bid prices do not include the amount of income tax, and
  - (vii) Alteration in Form of Bid as per IB.17.3.
- (c) A bid will not be considered, if;
  - (i) it is not accompanied with bid security,
  - (ii) it is submitted by a Bidder who has participated in more than one Bid,
  - (iii) it is received after the deadline for submission of Bids,

- (iv) it is submitted through fax, telex, telegram or email,
- (v) it indicates that prices quoted are not firm during currency of the contract whereas the Bidders are required to quote fixed price(s),
- (vi) the Bidder refuses to accept arithmetic correction,
- (vii) it is materially and substantially different from the Conditions/ Specifications of the Bidding Documents.

It is after review and determination of the responsiveness as per above that further action on technical evaluation will be taken.

24.2 Arithmetical errors will be rectified on the following basis:

If there is a discrepancy between the unit price and total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between the words and figures the amount in words shall prevail. If there is a discrepancy between the total Bid price entered in Form of Price Bid and the total shown in Schedule of Prices Summary, the amount stated in the Form of Price Bid will be corrected by the Procurement Committee in accordance with the Corrected Schedule of Prices.

If the Bidder does not accept the corrected amount of Bid, his Bid will be rejected and his Bid Security forfeited.

24.3 Prior to the detailed evaluation, pursuant to Clause IB.26 the Procurement Committee will determine the substantial responsiveness of each Bid to the Bidding Documents. For purpose of these Clauses, a substantially responsive Bid is one which conforms to all the terms and conditions of the Bidding Documents without material deviations.

A material deviation or reservation is one:

- (i) which affect in any substantial way the scope, quality or performance of the Works;
- (ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the Bidder's obligations under the Contract; or
- (iii) whose rectification/adoption would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

The Procurement Committee determination of a Bid responsiveness will be based on the contents of the Bid itself without recourse to irrelevant evidence.

24.4 A Bid determined as substantially non-responsive will be rejected and will not subsequently be made responsive by the Bidder by correction of the non-conformity.

24.5 Any minor informality or non-conformity or irregularity in a Bid which does not constitute a material deviation may be waived by Employer, as long as the waiver does not prejudice or affect the relative ranking of any Bidder.

## **IB.25 Conversion to Single Currency (Deleted as bids are only ACCEPTABLE IN PKR)**

- 25.1 To facilitate evaluation and comparison, the Procurement Committee will convert all Bid Prices, expressed in the amounts in various currencies in which bid Price is quoted, to Pak Rupees at the telegraphic Transfer and Over Draft (TT&OD) composite selling exchange rate published/authorized by the State Bank of Pakistan and applicable to similar transaction, on the date of bid opening.

## **IB.26 Detailed Evaluation of Bids**

- 26.1 Only the Bids previously determined to be substantially responsive pursuant to Clause IB.24 will be evaluated and compared in detail by the Procurement Committee as per the requirements given hereunder:

### **26.2 Evaluation and Comparison of Bids**

- (a) Bids will be evaluated for each item and/or complete scope of work.

(b) **Basis of Price Comparison**

The prices will be compared on the basis of the Evaluated Bid Price pursuant to Para (e) herein below.

(c) **Bid Evaluation**

- (i) Technical Bid Evaluation

- Mandatory Requirements
- Detailed Evaluation (Annex A)

(ii) **Financial Bid Evaluation**

It will be examined in detail whether the Bids comply with the commercial/contractual conditions of the Bidding Documents. It is expected that no major deviation/stipulation shall be taken by the Bidders.

Initially the arithmetical calculation will only be carried out of financial bids. After announcement of most advantageous bidder on QCBS method, the successful bidder within one-week time will submit all details measurements and rate analysis needed by the Procurement committee for the detailed evaluation of Financial Bid. In case of non-submission of details the bid shall be declared non-responsive and second most advantageous bidder will be called for financial evaluation and the same process will be followed for financial evaluation.

(d) **Evaluated Bid Price**

In evaluating the Bids, the Employer will determine for each Bid in addition to the Bid Price, the following factors (adjustments) in the manner and to the extent indicated below to determine the Evaluated Bid Price:

- (i) making any correction for errors pursuant to Sub-Clause 24.2 hereof.
- (ii) excluding Provisional Sums, if any, but including priced Day work.
- (iii) making an appropriate adjustment for any other acceptable variation or deviation.

### 26.3 Evaluation Methods

Pursuant to Sub-Clause 26.2, Para (e)(iii) following evaluation methods for price adjustments will be followed in the financial evaluation:

- (a) Price Adjustment for Completeness in Scope of Work
- (b) Price Adjustment for Technical Compliance
- (c) Price Adjustment for Commercial Compliance
- (d) Price Adjustment for Completion Schedule

#### (a) Price Adjustment for Completeness in Scope of Work

In case of omission in the scope of work of a quoted item, no price adjustment for the omitted item(s) shall be applied provided that the Bidder has mentioned in his Bid that the same is covered in any other item.

The price adjustment shall not justify any additional payment by the Employer. The price(s) of omitted item(s) shall be deemed covered by other prices of the Schedule of Prices.

#### (b) Price Adjustment for Technical Compliance

The cost of making good any deficiency resulting from technical noncompliance will be added to the Corrected Total Bid Price for comparison purposes only. The adjustments will be applied taking the average price quoted by other Bidders being evaluated in detail in their original Bids for corresponding item. In case of non-availability of price from other Bidders, the price will be estimated by the Project Manager/Engineer.

#### (c) Price Adjustment for Commercial Compliance

The cost of making good any deficiency resulting from any quantifiable acceptable variations and deviations from the Bid Schedules and Conditions of Contract, as determined by the Project Manager/Engineer will be added to the Corrected Total Bid Price for comparison purpose only. Adjustment for commercial compliance will be based on Corrected Total Bid Prices.

#### (d) Price Adjustment for Completion Schedule

Bids indicating completion in advance of the dates stated in Preamble to Conditions of Contract, no credit will be given in this evaluation.

Bids indicating completion period later than the period set out in Preamble to Conditions of Contract shall be adjusted in the evaluation by adding a factor of 0.05% of the Corrected Total Bid Price for each calendar day of completion later than specified period of the completion.

Bids indicating completion beyond 15 days later than the dates set out in Preamble to Conditions of Contract shall not be considered and rejected as non-responsive.

- 26.4 If the Bid of the successful Bidder is seriously unbalanced in relation to the Employer's estimate of the cost of work to be performed under the Contract, the Employer may require the Bidder to produce detailed price analyses for any or all

items of the Schedule of Prices to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in Clause IB.34 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

**IB.27. Deleted**

**IB.28 Process to be Confidential**

28.1 Subject to Clause 23 heretofore, no Bidder shall contact Employer and/or Project Manager/Engineer on any matter relating to its Bid from the time of the Bid opening to the time the Bid evaluation result is announced by the Employer. The evaluation result shall be announced in line with PPRA rules. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices, technical evaluations, etc. and recommendations against all the Bids evaluated.

After completing all codal formalities defined by PPRA the letter of award will be issued to the most advantageous bidder.

28.2 Any effort by a Bidder to influence Employer and/or Project Manager/Engineer in the Bid evaluation, Bid comparison or Contract Award decisions may result in the rejection of his Bid. Whereas any Bidder feeling aggrieved may lodge a written complaint as per PPRA Rules; however, mere fact of lodging a complaint shall not warrant suspension of the procurement process.

## **(F) AWARD OF CONTRACT**

### **IB.29 Post-Qualification**

- 29.1 The Employer, at any stage of the bid evaluation, having credible reasons for or *prima facie* evidence of any defect in supplier's or contractor's capacities, may require the suppliers or contractors to provide information concerning their professional, technical, financial, legal or managerial competence whether already pre-qualified or not:
- Provided that such qualification shall only be laid down after recording reasons therefore in writing. They shall form part of the records of that bid evaluation report.
- 29.2 The determination will take into account the Bidder's financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualification submitted under Appendix B to Instructions to Bidders "Evidence of Bidder's Capability" by the Bidder pursuant to Clause IB.13, as well as such other information as required under the Bidding Documents.
- 29.3 An affirmative determination will be a pre-requisite for award of the Contract to the lowest evaluated Bidder. A negative determination will result in rejection of that Bidder's Bid in which event, Employer will proceed to undertake a similar determination of the next lowest evaluated Bidder's capabilities to perform the Contract satisfactorily.

### **IB.30 Award Criteria**

- 30.1 Subject to Clause IB.32, the Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding Documents and who has offered the lowest evaluated Bid Price, provided that such Bidder has been determined to be qualified to satisfactorily perform the Contract in accordance with the provisions of Clause IB.29.

### **IB.31 Employer's Right to Vary Quantities**

- 31.1 Employer reserves the right at the time of award of Contract to increase or decrease by up to 25% the quantity of Services contained in the Schedule of Prices without any change in the unit price or other terms and conditions.

### **IB.32 Employer's Right to Accept any Bid and to Reject any or all Bids**

- 32.1 Notwithstanding Clause IB.30, 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 award of Contract, without thereby incurring any liability to the affected Bidders or any obligation to inform the affected Bidders of the grounds for the Employer's action except that the grounds for its rejection shall upon request be communicated, to any Bidder who submitted a Bid, without justification of grounds. Rejection of all Bids shall be notified to all Bidders promptly.
- 32.2 No negotiation with the Bidder having been evaluated as lowest responsive or any other Bidder shall be permitted. However, the Employer may have clarification meeting(s) to get clarified any item(s) in the Bid evaluation report.

### **IB.33 Notification of Award**

- 33.1 Prior to expiration of the period of Bid validity prescribed by the Employer, the Employer will notify the successful Bidder in writing (“Letter of Acceptance”) that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the design, execution and completion of the Works/facility by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the “Contract Price”).
- 33.2 The Letter of Acceptance and its acceptance by the Bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.
- 33.3 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and return their Bid securities.

#### **IB.34 Performance Security**

- 34.1 The successful Bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Conditions of Contract within a period of fourteen (14) days after the receipt of Letter of Acceptance.
- 34.2 Failure of the successful Bidder to comply with the requirements of Sub-Clauses IB.34.1, IB.35 or Clause IB.44 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security.

#### **IB.35 Signing of Contract Agreement**

- 35.1 Within fourteen (14) days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will send to the successful Bidder the Form of Contract Agreement provided in the Bidding Documents, duly filled in and incorporating all agreements between the parties for signing and return it to the Employer.
- 35.2 The formal Agreement between the Employer and the successful Bidder shall be executed within fourteen (14) days of the receipt of such Form of Contract Agreement by the successful Bidder from the Employer.

## **(G) ADDITIONAL INSTRUCTIONS**

### **IB.36 Instructions not Part of Contract**

36.1 Bids shall be prepared and submitted in accordance with the above Instructions to Bidders including Additional Instructions which are provided to assist Bidders in preparing their Bids, and do not constitute part of the Bid or the Contract Documents.

### **IB.37 Contract Documents**

37.1 The Documents which will be included in the Contract are listed in the Form of Contract Agreement set out in these Bidding Documents.

### **IB.38 Sufficiency of Bid**

38.1 Each Bidder shall satisfy himself before bidding as to the correctness and sufficiency of his Bid and of the rates and prices entered in the Schedule of Prices. Except insofar as it is otherwise expressly provided in the Contract, the rates and prices entered in the Schedule of Price shall cover all his obligations under the Contract and all matters and things necessary for the proper completion of the Works/facility.

### **IB.39 One Bid per Bidder**

39.1 Each Bidder shall submit only one Bid either by himself, or as a partner in a joint venture. A Bidder who submits or participates in more than one Bid will be disqualified and Bids submitted by him shall not be considered for evaluation and award.

### **IB.40 Bidder to inform himself**

40.1 The Bidder is advised to obtain for himself at his own cost and responsibility all information that may be necessary for preparing the Bid and entering into a Contract for execution of the Works/facility. This shall include but not be limited to the following:

- (a) inquiries on Pakistani Income Tax to the Commissioner of the Income Tax and Sales Tax.
- (b) inquiries on customs duties and other import taxes, to the concerned authorities of Customs and Excise Department.
- (c) information regarding port clearance facilities, loading and unloading facilities, storage facilities, transportation facilities and congestion at Pakistan seaports.
- (d) investigations regarding transport conditions and the probable conditions which will exist at the time the Plant will be actually transported.

### **IB.41 Alternate Proposals by Bidder**

41.1 Should any Bidder consider that he can offer any advantage to the Employer by a modification to the designs, specifications or other conditions, he may, in addition

to his Bid to be submitted in strict compliance with the Bidding Documents, submit any Alternate Proposal(s) containing (a) relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any other relevant details / conditions, provided always that the total sum entered on the Form of Bid shall be that which represents complete compliance with the Bidding Documents.

- 41.2 Alternate Proposal(s), if any, of the lowest evaluated responsive Bidder only may be considered by the Employer as the basis for the award of Contract to such Bidder.

#### **IB.42 Site Visit and Local Conditions**

- 42.1 Bidder must verify and supplement by his own investigations the information about site and local conditions. However, Employer will assist the Bidder wherever practicable and possible.
- 42.2 All Bidders are required to visit the site at their own expense to review the areas allocated for the Plant and the interfacing facilities, if any. Bidders may also wish to study local conditions, available facilities, communications, craft wages, roads and other transport facilities. Bidders shall also acquaint themselves with the relevant laws, rules, and regulations of Pakistan.
- 42.3 The Bidders and any of their personnel or agents will be granted permission by the Employer to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the Bidders, their personnel and agents, will release and indemnify the Employer, his 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 such inspection.

#### **IB.43 Pre-Bid Meeting**

- 43.1 The Employer may, at his own or at the request of any prospective Bidder(s), hold a Pre- Bid meeting to clarify issues and to answer any questions on matters related to the Bidding Documents. The date, time and venue of Pre-Bid meeting, if convened, shall be intimated through letter for invitation.

All prospective Bidders or their authorized representatives shall be invited to attend such a Pre-Bid meeting.

#### **IB.44 Integrity Pact**

- 44.1 The Bidder shall sign and stamp the Integrity Pact provided in Schedule-J to Bid in the Bidding Documents for all Federal Government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the Bid non-responsive.

#### **IB.45 General Performance of the Bidders**

- 45.1 The Employer reserves the right to obtain information regarding performance of the Bidders on their previously awarded contracts/works (Schedule-I to bid). The Employer may in case of consistent poor performance of any Bidder as reported by the employers of the previously awarded contracts, inter-alia, reject his bid and/or refer the case to the Pakistan Engineering Council. Upon such reference,

PEC in accordance with its rules, procedures and relevant laws of the land take such action as may be deemed appropriate under the circumstances of the case including black listing of such Bidder and debarring him from participation in future bidding for similar works.

## **(H) APPENDICES**

The Appendices to ITB are as given below:

- Appendix-A: Name of Eligible Countries
- Appendix-B: Evidence of Bidder's Capabilities
- Appendix-C: Domestic Goods (value added in Pakistan) Appendices are given here below:

**NAME OF ELIGIBLE COUNTRIES**

All countries of the World with whom Islamic Republic of Pakistan has commercial relations except Israel and India.

**LETTER OF TECHNICAL BID AND  
SCHEDULES TO BID**

**(III) LETTER OF TECHNICAL BID AND SCHEDULES TO BID**

- Schedule A to Bid: Specific Works Data
- Schedule B to Bid: Proposed Organization for the Project
- Schedule C to Bid: Method of Performing Works
- Schedule D to Bid: Proposed Programme of Works
- Schedule E to Bid: Works to be Performed by Subcontractors
- Schedule F-1 to Bid: Deviations from Technical Provisions
- Schedule F-2 to Bid: Deviations from Contractual Conditions
- Schedule G to Bid: Specific Operation/Plant and Equipment Detail
- Schedule H To Bid: Deleted
- Schedule I To Bid: Past Performance and Present Commitments

Note:

*It is mandatory to attach all the documents mentioned in schedule from A to D.*

**LETTER OF TECHNICAL BID**

Bid Reference No.: ..... Package  
No.:.....

To: .....  
.....  
[Name of Works]

.....  
.....  
.....

Gentlemen,

1. Having examined the Bidding Documents including Instructions to Bidders, Conditions of Contract, Specifications, Drawings, Schedules to Bid, Schedule of Prices and Addenda Nos. .... for the execution of the above-named Works, we, the undersigned, being a company doing business under the name of and address ..... and being duly incorporated under the laws of ..... hereby offer to execute and complete such Works and remedy any defects therein in conformity with the said documents including Addenda thereto.
2. We understand that all the Schedules attached hereto form part of this Bid.
3. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of ..... drawn in the favor of, or made payable to the Employer, ..... and valid for a period .... days beyond the period of validity of Bid.
4. We undertake, if our Bid is accepted, to commence the Works and to deliver and complete the whole of the Works comprised in the Contract within the time(s) stated in Preamble to the Conditions of Contract.
5. We agree to abide by this Bid for the period of ..... days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
7. We undertake, if our Bid is accepted to execute the Performance Security referred to in Clause 10 of Conditions of Contract for the due performance of the Contract.
8. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other person or persons making a Bid for the Works.
9. We do hereby declare that our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries *[insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a consortium or association, and the nationality of each Subcontractor and Supplier]*.

10. We, including any subcontractors or suppliers for any part of the Contract, do not have any conflict of interest.
11. We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process.
12. We confirm, if our Bid is accepted, that all partners of the joint venture shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer. (Please delete in case of Bid from a single firm).

Dated this ..... day of ..... 200...

Signature ..... in the capacity of ..... duly authorized to sign the Bid for and on behalf of .....

(Name of Bidder in Block Capitals) (Seal of Bidder)

Bidder's Address

.....  
 .....

..... Witness:

Signature: ..... Name:  
 .....

Address:

.....  
 .....  
 .....

Occupation .....

**SCHEDULE - A TO BID**

**SPECIFIC WORKS DATA**

The main technical data is prescribed in the relevant sections of the Technical Provisions. However, the Bidder may supplement the main technical data by providing hereunder other salient parameters including main plant make, capacity and suitability for the works under consideration to enable the Employer/Project Manager/Engineer to assess technical conformance of the proposed process and the means available with the contractor to do it.

Initials of Signatory to Bid:.....

**SCHEDULE - B TO BID**

**PROPOSED ORGANIZATION FOR THE PROJECT**

The Bidder shall provide in this Schedule Organization chart indicating the key personnel he will employ for Head office and for Site office involved in management, supervision and Project Manager/Engineering of the Works to be done under the Contract to direct and execute the Works, together with their names, qualifications, experience, positions held and their nationalities.

**Summary of qualifications, experience**

**Designation**

**Name of present position and**

**Nationality person**

- Head Office:
- Site Office:
- Contractor's Representative
- Site Superintendent
- Supervising engineers
- Plant Erectors
- Construction Supervisors
- Other Key Staff

Initials of Signatory to Bid:.....

**METHOD OF PERFORMING THE WORKS**

The Bidder is required to submit a narrative outlining the method of performing the Works. The narrative should indicate in detail and include but not be limited to:

- The sequence and methods in which he proposes to carry out the Works, including the number of shifts per day and hours per shift, he expects to work.
- A list of all major items of constructional and erection plant, tools and vehicles proposed to be used in carrying out the Works at Site, including number of each kind, make, type, capacity of all equipment, working condition, which shall be deployed by him for Civil Work and Erection, Testing and Commissioning of the Works, in sufficient detail to demonstrate fully that the equipment will meet all the requirements of the Specifications.
- The procedure for installation/erection of equipment and transportation of equipment and materials to the site.
- Details regarding mobilization in Pakistan, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.
- The Contractor shall provide description of his construction camp’s facilities and staff housing requirements.
- The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor’s construction camp and staff housing facilities. The Bidder shall list or explain his plans for providing these facilities for the service of the Contract as follows:
  1. Site Preparation (clearing, land preparation, etc.).
  2. Provision of Services.
    - a) Power (expected power load, etc.).
    - b) Water (required amount and system proposed).
    - c) Sanitation (sewage disposal system, etc.).

**3. Construction of Facilities**

- a) Contractor's Office, Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).
  - b) Warehouses and Storage Areas (area required, type of construction and layout).
  - c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.)
4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).
5. Other Items Proposed (Security services, etc.).

Initials of Signatory to Bid:.....

**SCHEDULE - D TO BID**

**PROPOSED PROGRAMME OF WORKS**

Bidder shall provide a programme in a bar-chart/CPM/PERT form showing the sequence of work items by which he proposes to complete the Work of the entire Contract. The programme should indicate the sequences of work items and the period of time during which he proposes to complete the Works including the activities like designing, schedule of submittal of drawings, ordering/procurement of materials, manufacturing, delivering, design & construction of associated civil works, installation/erection, testing and commissioning of Works to be executed under the Contract.

Initials of Signatory to Bid:.....

**SCHEDULE - E TO BID**

**WORK TO BE PERFORMED BY SUB-CONTRACTORS**

The Bidder will do the work with his own forces except the part (s) of the Works listed below which he intends to sub-contract.

<u>Items of Works to be Sub-Contracted</u>	<u>Name and address of Sub-Contractor</u>	<u>Statement of similar works _____ previously Executed _____ (attach evidence)</u>
--	---	---

Note:

1. No change of Sub-Contractor shall be made by the Bidder without prior approval of the Employer.
2. The truthfulness and accuracy of the statement as to the experience of Subcontractors is guaranteed by the Bidder. The Employer's judgment shall be final as to the evaluation of the experience of Subcontractors submitted by the Bidder.
3. Statement of similar works shall include description, location & value of work, year completed and name & address of the clients.
4. This may include manufacturer(s) who are proposed here and their relevant details to be provided accordingly including make, capacity and salient features to make it particularly suitable for the works. The technology used should also be detailed adequately.

Initials of Signatory to Bid:.....

**DEVIATIONS FROM TECHNICAL PROVISIONS**

It is presumed that the Bidder shall not take any deviation. However, if he intends to take deviations to the specified technical provisions, those must be listed in the space provided below:

---

<b>Sr. No.</b>	<b>Clause No. / Section No.</b>	<b>Deviations/Clarifications</b>
----------------	---------------------------------	----------------------------------

---

Note: Attach additional sheets, if necessary

Initials of Signatory to Bid:.....

**DEVIATIONS FROM CONTRACTUAL CONDITIONS**

It is presumed that the Bidder shall not take any deviation. However, if he intends to take deviations to the specified Contractual/Commercial Conditions, those must be listed in the space provided below:

---

<b>Sr. No.</b>	<b>Clause No. / Section No.</b>	<b>Deviations/Clarifications</b>
----------------	---------------------------------	----------------------------------

---

Note: Attach additional sheets, if necessary

Initials of Signatory to Bid:.....

**SCHEDULE - G TO BID**

**SPECIFIC OPERATION/PLANT AND EQUIPMENT DETAIL**

Note: Attach additional sheets, if necessary

Initials of Signatory to Bid:.....

**SCHEDULE -I TO BID**

**PAST PERFORMANCE AND PRESENT COMMITMENTS**

**Past Performance**

Sr. No.	Name of project(s)	Name of employer	Completed cost	Start date	Planned completion date	Actual completion date	Satisfactory performance certificate from employer / Remarks regarding delays if applicable
1.							
2.							
3.							
4.							
5.							
6.							
7.							

**Present Commitments**

Sr. No.	Name of ongoing project(s)	Name of employer	Total cost	Start date	Planned completion date	%age of works completed	Award letter / Remarks regarding delays if applicable
1.							
2.							
3.							
4.							
5.							
6.							
7.							

Any Bidder showing projects outside Pakistan, the information provided on the project needs to be substantiated by certification of concerned country's embassy in Pakistan.

**LETTER OF PRICE BID AND SCHEDULES TO BID**

## **LETTER OF PRICE BID AND SCHEDULES TO BID**

### **Letter of Price Bid Schedules to Bid**

- Schedule J to Bid: Integrity Pact
- Schedule K to Bid: Estimated Progress Payments
- Schedule L to Bid: Lump Sum Cost Breakdown for Major Cost Items

### **Schedule of Prices**

- Preamble to Schedule of Prices
- Schedule of Prices
- Summary of Bid Prices

**LETTER OF PRICE BID**

**LETTER OF PRICE BID**

Bid Reference No.: ..... Package  
No.: .....

.....  
.....

*[Name of Works]*

To:  
.....  
.....

..... Gentlemen,

1. Having examined the Bidding Documents including Instructions to Bidders, Conditions of Contract, Specifications, Drawings, Schedules to Bid, Schedule of Prices and Addenda Nos.  
..... for the execution of the above-named Works, we, the undersigned, being a company doing business under the name of and address  
.....  
..... and being duly incorporated under the laws of  
..... hereby offer to execute and complete such Works and remedy any defects therein in conformity with the said Documents including Addenda thereto for the Total Bid Price comprising of Local Currency Component of Pak Rupees ..... (Rs. ....) or such other sum as may be ascertained in accordance with the said Documents.
2. We understand that all the Schedules attached hereto form part of this Bid.
4. We undertake, if our Bid is accepted, to commence the Works and to deliver and complete the whole of the Works comprised in the Contract within the time(s) stated in Preamble to the Conditions of Contract.
5. We agree to abide by this Bid for the period of ..... days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
7. We undertake, if our Bid is accepted to execute the Performance Security referred to in Clause 10 of Conditions of Contract for the due performance of the Contract.
8. We understand that you are not bound to accept the lowest or any Bid you may receive.
9. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other person or persons making a Bid for the Works.
10. We confirm, if our Bid is accepted, that all partners of the joint venture shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer. (Please delete in case of Bid from a single firm).

Dated this ..... day of..... 200...

Signature ..... in the capacity of .....duly authorized to sign the Bid for and on behalf of .....

(Name of Bidder in Block Capitals)

(Seal of Bidder)

Bidder's Address

.....  
..... Witness:

Signature: ..... Name:

..... Address:

.....

.....

Occupation .....

**SCHEDULE - J TO BID**

**Integrity Pact**

*[To be filled and signed by the Bidder]*

**DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC.  
PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN  
CONTRACTS WORTH RS. 10.00 MILLION OR MORE**

Contract No. \_\_\_\_\_

Contract Value: \_\_\_\_\_

Dated \_\_\_\_\_

Contract Title: \_\_\_\_\_

..... [Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[name of Supplier] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Name of Buyer: .....

Name of Seller/Supplier: .....

Signature: .....

Signature: .....

[Seal]

[Seal]

**SCHEDULE - K TO BID**

**ESTIMATED PROGRESS PAYMENTS**

Bidder's estimate of the value of work which would be executed by him during each of the periods stated below, based on his Programme of Works and the Rates in the Schedule of Prices, expressed in foreign and local currency of payments:

<b>Period</b>	<b>Amount</b>	
	<b>LCC (Rs.)</b>	<b>FCC</b>
1 <sup>st</sup> Month		
2 <sup>nd</sup> Month		
3 <sup>rd</sup> Month		
4 <sup>th</sup> Month		
5 <sup>th</sup> Month		
..... Month		
.....Month		
22 <sup>nd</sup> Month		
<b>Total Bid Price</b>		

Initials of Signatory to Bid: .....

**SCHEDULE -L TO BID**

**LUMPSUM COST BREAKUP FOR MAJOR COST ITEMS**

The Bidder is to provide a detailed breakup of his Lumpsum costs in a manner that the overall picture for the quoted price can be understood. It should include major heading wise cost breakup including rate analyses for at least 6 major cost items as required to analyze it.

**PREAMBLE TO SCHEDULE OF PRICES**

**1. General**

- 1.1 The Schedule of Prices shall be read in conjunction with the Conditions of Contract together with the Specifications and Bid Drawings.
- 1.2 The Bidder shall quote for all items of the Works executed on EPC/Turnkey basis and the prices shall be quoted for the complete scope of Work as described or implied from these Bidding Documents in schedule-L to bid.

## **2. Description & Quantities**

- 2.1 Price given in the Schedule of Prices against each item shall be for the scope covered by that item as detailed in the Specifications, Bid Drawings or elsewhere in the Bidding Documents. The general directions and descriptions of work and materials are not necessarily repeated nor summarized in the Schedule of Prices and do not generally give a full description of the Plant and equipment to be supplied and the services to be performed under each item. References to the relevant sections of the Bidding Documents shall be made to ascertain the full scope of the requirements included in each item prior to filling in the rates and prices against each item in Schedule of Prices.

The Schedule of Prices only identifies major components of the structure and it does not restrict the responsibility of the Contractor to furnish all equipment, materials and services as deemed necessary by the Employer/Project Manager/Engineer for making the structure operationally complete and satisfactory as specified and/or implied in the Bidding Documents and subsequent revisions thereto.

- 2.2 The quantities as shown in the Schedule of Prices are estimated quantities and provisional only being given as an indication of the Scope of Work to enable the Bidder to bid for different items of the Works in accordance with his estimate of costs. The estimated quantities shall be used for comparing the Bids. It is, however, to be noted that the basis of payment will be the actual quantities of work executed and measured by the Contractor and verified by the Project Manager/Engineer.
- 2.3 The sizes & dimensions mentioned and/or specified in the various technical descriptions and specifications including Bid Drawings are tentative and not final as the responsibility for detailed design rests with the Contractor under the Contract. If, in the opinion of the Project Manager/Engineer, at the time of review of Contractor's drawings/designs for approval, certain sizes & dimensions of some items have to be increased for proper completion and/or operation of the Works, then revised sizes & dimensions shall be supplied by the Contractor at no extra cost to the Employer.

## **3. Units & Abbreviations**

4. Units of measurement, symbols and abbreviations expressed in the Bidding Documents shall comply both with FPS & MKS System **Rates and Prices**

4.1 Except as otherwise expressly provided under the Conditions of Contract, the unit rates and lump sum amounts entered in the Schedule of Prices will be the rates at which the Contractor will be paid, and shall be deemed to include for the full scope and all costs incurred by the Contractor in the performance of the Works, the provision of services including his overheads, income tax, super tax, other indirect costs, customs & other duties, profits and costs of accepting the general risks, liabilities and obligations set forth or implied in the Contract, except for such costs which are specified as reimbursable under the Contract.

The unit rates shall be extended to show the total amount for each item. The total of the Schedule of Prices is the Total Bid Price and shall be entered in Paragraph 1 of the Form of Price Bid. Where a discrepancy exists between the unit rate and the extended total amount, the unit rate shall be taken as correct and the total amount adjusted accordingly.

4.2 Unless otherwise stipulated in the Conditions of Contract, the rates and prices entered by the Bidder shall be fixed and firm and shall not be subject to adjustment during the performance of the Contract.

4.3 All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date twenty eight (28) days prior to the deadline for submission of Bids shall be included in the rates and prices and the total Bid Price submitted by a Bidder.

Additional/reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed/deducted as per provisions of the Conditions of Contract.

4.4 The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Schedule of Prices, and where no items are provided in the Schedule of Prices for any work required to be executed by the Contractor on EPC/Turnkey basis under single responsibility for the completion of the Works and to make the structure operationally complete, the cost of such item(s) shall be deemed to be distributed among the rates and prices entered for the related items of the Works and no separate payment will be made by the Employer for those items executed by the Contractor.

The rates, prices and amounts shall be entered against each item in the Schedule of Prices. Where a Bidder fails to quote a price of any item of the Schedule of Prices, the Employer will consider that the price of that item is included among other items and the Contractor will be obligated

to furnish that item at no extra cost to the Employer, if awarded the Contract.

- 4.5 The Bidder shall be deemed to have obtained all information as to port clearance facilities and charges, loading and unloading facilities and charges, storage facilities and charges, transportation facilities and charges, congestion and/or other conditions to be expected at Karachi Port and or any other seaport of Pakistan and all requirements related thereto.

The Contractor shall be responsible to make complete arrangements for the transportation of the Plant to the Site. The Bidder shall be deemed to have included all clearing, forwarding and other incidental costs in this regard in his Bid. The Contractor will have the option to use either Karachi Port or any other seaport of Pakistan.

- 4.6 The Contractor shall provide all parts of the Works to be completed in every respect for commercial operation. Notwithstanding that any details, accessories, etc. required for the complete installation and satisfactory operation of the Plant, are not specifically mentioned in the Schedule of Prices, Specifications including Bid Drawings, such details shall be considered as included in the Contract Price. All charges for the supply of goods, materials, accessories or work not specifically mentioned herein but necessary for the completion and operation of the Works shall be deemed to have been included in the quoted prices.
- 4.7 All costs in connection with inspection and witnessing of Factory Acceptance Tests within and out side Pakistan as per provisions of Sub-Clause 20.6 of Particular Conditions of Contract shall be borne by the Contractor and shall be deemed to have been included in the quoted prices.

All costs in connection with the holding of meetings shall be borne by the Contractor.

The rates in the Schedule of Prices shall also include Contractor's cost for providing Performance Security and other Bank Guarantees required for performance of the Contract.

**PREAMBLE TO CONDITIONS OF CONTRACT**

**PREAMBLE TO CONDITIONS OF CONTRACT**

<b>Commencement Date</b>	Sub-Clause 1.1.1.(i) The date for commencement of the Works is the date of issuance of the Project Manager/Engineer’s Written Order to Commence which shall be issued within 14 days of signing of Contract Agreement and also site possession has been delivered.
<b>Defect Liability Period</b>	Sub-Clause 1.1.11 The Defect Liability Period is 180 days after the date certified in the Taking-Over Certificate but subject to extension as provided under Sub-Clause 30.4.  The defects at site considering structural stability, physical appearance and precautionary measures shall be identified by the Employer’s Representative.
<b>The Employer</b>	Sub-Clause 1.1.12. The Employer is Customs Academy of Pakistan
<b>The Project Manager/Engineer Incharge</b>	Sub-Clause 1.1.15. The Engineer Incharge is <i>[M/s Atif Nazar (Pvt.) Ltd. ....</i> , ..... .....or any competent person/firm/authority appointed by the Employer, and notified to the Contractor.
<b>Time for Completion</b>	Sub-Clause 1.1.35. The Time for Completion for whole of the Works is .....days reckoned from the Commencement Date for the project. Separate date if different part/section of the projects are desired to be completed at different periods.
<b>Warranty Period</b>	Sub-Clause 1.1.40. The Warranty Period is 1years for (goods/equipment)
<b>Engineer’s Duties &amp; Authorities</b>	Sub-Clause 2.1 The duties & authorities of the Project Manager/Engineer are specified in Particular Conditions of Contract.  Sub-Clause 2.6 (i) The Contractor shall notify to the Project Manager/Engineer within ten (10) days, if he requires any confirmation. (ii) Project Manager/Engineer shall confirm the decision/instruction within ten (10) days of the requirement.
<b>Confirmation in Writing</b>	

**Ruling Language** Sub-Clause 5.1.  
The version in English language (ruling language) shall prevail.

**Day to Day Communications** Sub-Clause 5.2.  
The language for day to day communication is English.

**Programme to be Furnished** Sub-Clause 12.1.  
The Programme must be submitted in the form of Bar-Chart with critical path/activities for individual activities and overall Project.

**Employer's Equipment** Sub-Clause 14.4.  
There will be no Employer's Equipment available for use by the Contractor.

**Working Hours** Sub-Clause 18.3.  
The normal working hours on the Site are to conform to the applicable labour laws and the existing customs of Pakistan.

**Time for Completion** Sub-Clause 25.1  
Period of Completion is as stated under Sub-Clause 1.1.35 hereof.  
180 Days

**Earlier Completion** Sub-Clause 26.3  
(i) Amount of Bonus per day Deleted  
(ii) Max. Amount of Bonus Deleted

**Delay in Completion** Sub-Clause 27.1.  
Failure of the Contractor to meet the Time for Completion entitles the Employer to deduct from the Contract Price, the liquidated damages  
@ 0.05 % percent of the Contract Price as stated in Letter of Acceptance, excluding Provisional Sums for each and every day, including holidays, of delay or part thereof; but

to a Price as stated in Letter of Acceptance, excluding maximum Provisional Sums. limit of 10 % of the Contract

**Prolonged Delay** Sub-Clause 27.2.

Maximum amount recoverable from the Contractor by the Employer shall be 10% of Contract Price as stated in the Letter of Acceptance, excluding Provisional Sum.

**Terms of Payment** Sub-Clause 33.1.

In addition to the provisions under Clause 33, the terms of payment shall be as stated in Sub-Clause 33.1 of Particular Conditions of Contract.

**Payment in** Sub-Clause 35.1.

**Foreign Currencies** Payment will only be made in local currency

Sub-Clause 43.1.

**Insurance of Works**

The amount of insurance shall be for full replacement value of the Works. For the deductibles, if any, the Contractor shall submit an undertaking that he shall indemnify and keep indemnified the Employer for the amount of deductibles provided in the insurance policy.

Sub-Clause 43.1.(a)

The additional risks to be insured are as stated in Sub-Clause 43.1(a) of the Particular Conditions of Contract.

**Third  
Party  
Liability**

Sub-Clause 43.3.

The amount of insurance against third party liability taken out by the Contractor shall not be less than Pak Rs. .... per occurrence with number of occurrences unlimited.

**Payment  
on  
Termination  
for Employer's  
Default**

Sub-Clause 46.3.

The additional amount payable by the Employer on termination shall not exceed the actual cost of work executed.

**Labour,  
Materials  
and  
Transport**

Sub-Clause 47.1.

The Contract shall be subject to price adjustment. The method of calculating adjustments for change in costs shall be: *[The user may extract the formula:*

- i. From Sub-Clause 10.1 of PCC of PEC Civil Works Bidding Documents.*
- ii. with reference to PEC Documents "Standard Guidelines and Formula for Price Adjustment".*
- iii. From Sub-Clause 15.2 of GCC of PEC Bidding Documents for Supply of Goods.]*

**Notices  
to  
Project  
Manager/Engineer**

Sub-Clause 49.2.

The address of the Employer for notices is the same as given in Sub-Clause 1.1.12 here above.

The address of the Project Manager/Engineer for notices is the same as given in Sub-Clause 1.1.15 here above.

**Applicable Law** Sub-Clause 51.1.

The Contract in all respects be read and construed and shall operate as a Pakistani Contract in conformity with the Laws of Islamic Republic of Pakistan.

**Procedural**

**Law for Arbitration**

Sub-Clause 51.2. The procedural law for arbitration shall be the Rules of Pakistan Arbitration Act 1940 as amended.

**Language** Sub-Clause 51.3.

**and**  
**Place** The language of arbitration is English.

**of**  
**Arbitration** The place of arbitration is Karachi, Islamic Republic of Pakistan.

## **GENERAL CONDITIONS OF CONTRACT**

## **Notes on the Conditions of Contract**

The Conditions of Contract comprise two parts:

- (a) **General Conditions of Contract**
- (b) **Particular Conditions of Contract**

Over the years, a number of “model” General Conditions of Contract have evolved. The one used in these Standard Bidding Documents was prepared by the International Federation of Consulting Engineers (Federation Internationale des Ingenieurs-Conseils, or FIDIC), and is commonly known as the FIDIC Conditions of Contract. (The used version is the 1987 edition, reprinted in 1988 with editorial amendments.)

The FIDIC Conditions of Contract have been prepared for an admeasurement (unit price or unit rate) type of contract, and cannot be used without major modifications for other types of contract, such as lump sum, turnkey, or target cost contracts.

The standard text of the General Conditions of Contract chosen must be retained intact to facilitate its reading and interpretation by Bidders and its review by the Employer. Any amendments and additions to the General Conditions, specific to the contract in hand, should be introduced in the Particular Conditions of Contract.

The use of standard conditions of contract for all electrical/mechanical Works will ensure English Mediumness of coverage, better balance of rights or obligations between Employer and Contractor, general acceptability of its provisions, and savings in time and cost for bid preparation and review, leading to more economic prices.

The FIDIC Conditions of Contract are copyrighted and may not be copied, faxed, or reproduced. Without taking any responsibility of its being accurate, Pakistan Engineering Council with prior consent of FIDIC Secretariat, has reproduced herein the FIDIC General Conditions of Contract for reference purpose only which cannot be used by the users for preparing their bidding documents. The bidding document may include a purchased copy, the cost of which can be retrieved as part of the selling price of the bidding document. Alternatively, the FIDIC Conditions of Contract can be referred to in the bidding documents, and the Bidders are advised to obtain copies directly from FIDIC.\*

\* Add the following text if the bidding documents, as issued, do not include a copy: “Copies of the FIDIC Conditions of Contract can be obtained from:

FIDIC Secretariat

P.O. Box 86

1000 Lausanne 12  
Switzerland  
[fidic.pub@fidic.org](mailto:fidic.pub@fidic.org) – [FIDIC.org/bookshop](http://FIDIC.org/bookshop)]

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## **PART-I: GENERAL CONDITIONS OF CONTRACT**

### **Definitions and Interpretations**

#### **1.1 Definitions**

In the Contract (as hereinafter defined) the following words and expressions shall have the meanings hereby assigned to them:

- 1.1.1** "Commencement Date" means whichever the latest is of:
- i) the date specified in the Preamble as the date for commencement of the Works or the date when the Contractor receives,
  - ii) such payment in advance of the commencement of the Works as may be specified in the terms of payment, or
  - iii) notice of the issue of any import license necessary for commencing performance of the Contract, or
  - iv) notice that any legal requirements necessary for the Contract to enter into force have been fulfilled, or
  - v) notice that any necessary financial or administrative requirements specified in Part II as conditions precedent to commencement have been fulfilled.
- 1.1.2** "Conditions" means the Preamble to and these Conditions of Contract, Parts I and II.
- 1.1.3** "Contract" means the agreement between the Employer and the Contractor for the execution of the Works incorporating the Conditions, Specification, Employer's Drawings and Contractor's Drawings, priced and completed Schedules, Tender, Letter of Acceptance and such further documents as may be expressly incorporated by the Letter of Acceptance.
- 1.1.4** "Contract Agreement" means the documents recording the terms of the Contract between the Employer and the Contractor.
- 1.1.5** "Contract Price" means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution of the Works.
- 1.1.6** "Contractor" means the person whose tender has been accepted by the Employer and the legal successors in title to the Contractor but not (except with the consent of the Employer) any assignee of the Contractor.
- 1.1.7** "Contractor's Drawings" means all drawings, samples, patterns, models

and operation and maintenance manuals to be submitted by the Contractor in accordance with Clause 6.

- 1.1.8 "Contractor's Equipment" means all appliances or things of whatsoever nature required for the purposes of the Works but does not include Plant.
- 1.1.9 "Contractor's Risks" means the risks defined in Sub-Clause 37.3.
- 1.1.10 "Defects Liability Certificate" means the certificate to be issued by the Engineer to the Contractor in accordance with Sub-Clause 30.11.
- 1.1.11 "Defects Liability Period" means one year or the period stated in Part II following taking over, during which the Contractor is responsible for making good defects and damage in accordance with Clause 30.
- 1.1.12 "Employer" means the person named as such in the Preamble and the legal successors in title to the Employer but not (except with the consent of the Contractor) any assignee of the Employer.
- 1.1.13 "Employer's Drawings" means all the drawings and information provided by the Employer or the Engineer to the Contractor under the Contract.
- 1.1.14 "Employer's Risks" means those risks defined in Sub-Clause 37.2.
- 1.1.15 "Engineer" means the person appointed by the Employer to act as Engineer for the purposes of the Contract and designated as such in the Preamble.
- 1.1.16 "Engineer's Representative" means any representative of the Engineer appointed from time to time by the Engineer under Sub-Clause 2.2.
- 1.1.17 "Final Certificate of Payment", means the certificate to be issued by the Engineer to the Employer in accordance with Sub-Clause 33.10.
- 1.1.18 "Force Majeure" has the meaning assigned to it under Sub-Clause 44.1.
- 1.1.19 "Foreign Currency" means a currency of a country other than that in which Plant is to be installed.
- 1.1.20 "Gross Misconduct" means any act or omission of the Contractor in violation of the most elementary rules of diligence which a conscientious contractor in the same position and under the same circumstances would have followed.
- 1.1.21 "Letter of Acceptance" means the formal acceptance by the Employer of the Tender incorporating any adjustments or variations to the Tender agreed between the Employer and the Contractor.
- 1.1.22 "Performance Security" means the security to be provided by the

Contractor in accordance with Sub-clause 10.1. for the due performance of the Contract.

- 1.1.23** "Plant" means machinery, apparatus, materials and all things to be provided under the Contract for incorporation in the Works.
- 1.1.24** "Programme" means the Programme to be submitted by the Contractor in accordance with Sub-Clause 12.1 and any approved revision thereto.
- 1.1.25** "Provisional Sum" means a sum, described as such for the execution of work or for the supply of goods or services, to be used in accordance with Sub-Clause 36.1.
- 1.1.26** "Risks Transfer Date" means the date when the risk of loss of or damage to the Works passes from the Contractor to the Employer in accordance with Sub-Clause 39.1.
- 1.1.27** "Schedule of Prices" means the completed and priced Schedule of Prices, or any part or individual schedule thereof, submitted by the Contractor with his Tender and forming a part of the Contract documents.
- 1.1.28** "Section" means a part of the Works specifically identified as such as in the Contract.
- 1.1.29** "Site" means the place or places, provided or made available by the Employer where work is to be done by the Contractor or to which Plant is to be delivered, together with so much of the area surrounding the same as the Contractor shall with the consent of the Employer use in connection with the Works otherwise than merely for the purposes of access.
- 1.1.30** "Specification" means the specification of the Works included in the Contract and any modification thereof made in accordance with Clause 31.
- 1.1.31** "Subcontractor" means any person (other than the Contractor) named in the Contract for any part of the Works, or any person to whom any part of the Contract has been subcontracted with the consent of the Engineer, and the Subcontractor's legal successors in title but not any assignee of the Subcontractor.
- 1.1.32** "Taking-Over Certificate" means the certificate to be given by the Engineer to the Contractor in accordance with Clause 29.
- 1.1.33** "Tender" means the Contractor's priced offer to the Employer for the Execution of the Works.
- 1.1.34** "Tests on Completion" means the tests specified in the Contract or otherwise agreed by the Engineer and the Contractor to be performed before the Works are taken over by the Employer.

**1.1.35** "Time for Completion" means the time stated in the Preamble for completing the Works or any Section thereof and passing the Tests on Completion calculated from the Commencement Date unless extended in accordance with Clause 26.

**1.1.36** "Variation Order" means any written order, identified as such, issued to the Contractor by the Engineer under Sub-Clause 31.1.

**1.1.37** "Works" means all Plant to be provided and work to be done by the Contractor under the Contract.

## **1.2 Headings and Titles**

The headings and titles in these Conditions shall not be deemed part thereof or be taken into consideration in the interpretation or construction of the Contract.

## **1.3 Interpretation**

Words importing persons or parties shall include firms and corporations and any organization having legal capacity.

Words importing the singular only also include the plural and vice versa where the context requires.

## **1.4 Written Communications**

Wherever in the contract provision is made for a communication to be "written" or "in writing" this means any hand-written, type-written or printed communication, including telex, cable and facsimile transmission.

## **1.5 Notices, Consents and Approvals**

Wherever in the Contract provision is made for the giving of notice, consent or approval by any person, such consent or approval shall not be unreasonably withheld. Unless otherwise specified, such notice, consent or approval shall be in writing and the word "notify" shall be construed accordingly.

## **1.6 Costs, Overhead Charges and Profit**

Whenever by these Conditions the Contractor is entitled to be paid cost, such cost shall be properly incurred and shall include any overhead charges properly allocable thereto but not profit unless so stated. Any profit entitlement shall be added to cost at the percentage stated in the Preamble.

## **1.7 Periods**

In these Conditions "days" means calendar day and "year" means 365 days.

## **Engineer & Engineer's Responsibilities**

### **2.1 Engineer's Duties**

The Engineer shall carry out the duties specified in the Contract.

If the Engineer is required, under the terms of his appointment by the Employer, to obtain the specific approval of the Employer before carrying out any of these duties, full particulars of such requirements shall be set out in Part II.

Except as expressly stated in the Contract the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.

### **2.2 Engineer's Representative**

The Engineer's Representative shall be appointed by and be responsible to the Engineer and shall only carry out such duties and exercise such authority as may be delegated to him by the Engineer under Sub-Clause 2.3.

### **2.3 Engineer's Power to Delegate**

The Engineer may from time to time delegate to the Engineer's Representative any of the duties vested in the Engineer and may at any time revoke such delegation.

Any such delegation or revocation shall be in writing and shall not take effect until a copy thereof has been delivered to the Contractor and the Employer.

Any decision, instruction or approval given by the Engineer's Representative to the Contractor in accordance with such delegation shall have the same effect as though it had been given by the Engineer. However:

(a) any failure of the Engineer's Representative to disapprove any Plant or workmanship shall not prejudice the right of the Engineer to disapprove such Plant or workmanship and to give instructions for the rectification thereof.

(b) if the Contractor questions any decision or instruction of the Engineer's Representative he may refer the matter to the Engineer who shall confirm, reverse or vary such decision or instruction.

### **2.4 Engineer to Act Impartially**

Wherever under the Contract the Engineer is required to exercise his discretion by:

- (a) giving his decision, opinion or consent, or
- (b) expressing his satisfaction or approval, or
- (c) determining value, or
- (d) otherwise taking action which may affect the rights and obligations of the Employer or the Contractor,

He shall exercise such discretion impartially within the terms of the Contract and having regard to all the circumstances.

## **2.5 Engineer's Decisions and Instructions**

The Contractor shall proceed with the decisions and instructions given by the Engineer in accordance with these Conditions.

## **2.6 Confirmation in Writing**

The Contractor may require the Engineer to confirm in writing any decision or instruction of the Engineer which is not in writing. The Contractor shall notify the Engineer of such requirement without undue delay. Such a decision or instruction shall not be effective until written confirmation thereof has been received by the Contractor.

## **2.7 Disputing Engineer's Decisions and Instructions**

If the Contractor disputes or questions any decision or instruction under Sub-Clause 2.5 or a written confirmation under Sub-Clause 2.6, he shall give notice to the Engineer within twenty eight (28) days after receipt thereof, giving his reasons.

The Engineer shall within a further period of twenty eight (28) days by notice to the Contractor and the Employer with reasons, confirm, reverse or vary such decision or instruction.

If either party disagrees with the action taken by the Engineer, or if the Engineer fails to reply to the Contractor's notice within the stipulated twenty eight (28) days, and the matter cannot be settled amicably that party shall be at liberty, subject to Sub-Clause 50.1, to refer the matter to arbitration in accordance with the Contract.

## **2.8 Replacement of Engineer**

The Employer shall not appoint any person to act in replacement of the Engineer without the consent of the Contractor.

### **Assignment and Subcontracting**

#### **3.1 Assignment**

The Contractor shall not assign the Contract or any part of his obligations under the Contract. A charge in favour of the Contractor's bankers of any monies due under the Contract shall not be considered an assignment.

#### **3.2 Subcontracting**

The Contractor shall not subcontract the whole of the Works.

Except where otherwise provided by the Contract, the Contractor shall not subcontract any part of the Works without the prior consent of the Engineer.

The Contractor shall however, not require such consent for purchases of materials or to place contracts for minor details or for any part of the Works of which the manufacturer or supplier is named in the Contract.

The Contractor shall be responsible for the acts, defaults and neglects of any Subcontractor, his agents or employees as fully as if they were the acts, defaults or neglects of the Contractor, his agents or employees.

### **Contract Documents**

#### **5.1 Ruling Language**

Where versions of the Contract are prepared in different languages, the version which is to prevail shall be specified in the Preamble. The language of such version is referred to as the ruling language.

#### **5.2 Day to Day Communications**

The language for day to day communications is stated in the Preamble.

#### **5.3 Priority of Contract Documents**

Unless otherwise provided in the Contract, the priority of the Contract documents shall be as follows:

1. The Letter of Acceptance
2. The Preamble
3. The Conditions of Contract, Part II
4. The Conditions of Contract, Part I

5. Any other documents forming part of the Contract.

#### **5.4 Documents Mutually Explanatory**

Subject to Sub-Clause 5.3, the Contract documents shall be taken as mutually explanatory. Any ambiguities or discrepancies shall be resolved by the Engineer, who shall then instruct the Contractor thereon.

If the Contractor considers that compliance with such instructions will result in any cost which the Contractor could not reasonably have anticipated, he shall forthwith inform the Engineer with full supporting details. The Engineer shall then, if he approves, certify such costs as may be reasonable, together with profit where appropriate, which shall be added to the Contract Price.

If on the other hand compliance with such instructions results in lower costs for the Contractor than he had reason to anticipate, the Engineer shall certify a deduction from the Contract Price allowing for profit where appropriate.

#### **6.1 Contractor's Drawings**

The Contractor shall submit to the Engineer for approval:

- (a) within the time given in the Contract or in the Programme such drawings, samples, models or information as may be called for therein, and in the numbers therein required, and
- (b) during the progress of the Works, such drawings of the general arrangement and details of the Works as specified in the Contract or as the Engineer may require.

The Engineer shall signify his approval or disapproval thereof. If he fails to do so within the time given in the Contract or the Programme or if no time limit is specified, within twenty eight (28) days of receipt, they shall be deemed to be approved.

Approved drawings, samples and models shall be signed or otherwise identified by the Engineer.

The Contractor shall supply additional copies of approved drawings in the form and numbers stated in the Contract.

#### **6.2 Consequences of Disapproval of Contractor's Drawings**

Any Contractor's Drawings which the Engineer disapproves shall be forthwith modified to meet the requirements of the Engineer and shall be re-submitted.

### **6.3 Approved Contractor's Drawings**

Approved Contractor's Drawings shall not be departed from except as provided in Clause 31.

### **6.4 Inspection of Contractor's Drawings**

The Engineer shall have the right at all reasonable times to inspect, at Contractor's premises, all Contractor's Drawings of any part of the Works.

### **6.5 Erection Information**

The Contractor shall provide, within the times stated in the Contract or in the Programme, drawings showing how the Plant is to be affixed and any other information required for:

- (a) preparing suitable foundations or other means of support;
- (b) providing suitable access on the Site for the Plant and any necessary equipment to the place where the Plant is to be erected; and
- (c) Making necessary connections to the Plant.

### **6.6 Operation and Maintenance Manuals**

Before the Works are taken over in accordance with Clause 29 the Contractor shall supply operation and maintenance manuals together with drawings of the Works as built. These shall be in such detail as will enable the Employer to operate, maintain, adjust and repair all parts of the Works.

Unless otherwise stated in Part II the manuals and drawings shall be in the ruling language, and in such form and numbers as stated in the Contract.

Unless otherwise agreed, the Works shall not be considered to be completed for the purposes of taking over until such manuals and drawings have been supplied to the Employer.

### **6.7 Employer's Use of Contractor's Drawings**

Contractor's Drawings may be used by the Employer for no other purpose than completing, operating, maintaining, adjusting and repairing the Works.

### **6.8 Contractor's Use of Employer's Drawings**

The Employer's Drawings, Specification and other information submitted by the Employer or the Engineer to the Contractor shall remain the property of the Employer. These shall not, without the consent of the Employer, be used, copied or communicated to a third party by the Contractor unless necessary for the purposes of the Contract.

#### **6.9 Manufacturing Drawings**

Unless otherwise specified in Part II, the Contractor shall not be required to disclose to the Employer or the Engineer the Contractor's confidential manufacturing drawings, designs, know-how or manufacturing practices, processes or operations.

#### **7.1 Errors in Contractor's Drawings**

The Contractor shall be responsible for any errors or omissions in the Contractor's Drawings unless they are due to incorrect Employer's Drawings or other written information supplied by the Employer or the Engineer. Approval by the Engineer of the Contractor's Drawings shall not relieve the Contractor from any responsibility under this Sub-Clause.

The Contractor shall bear any costs he may incur as a result of delay in providing Contractor's Drawings and other information or as a result of errors or omissions therein, for which the Contractor is responsible.

The Contractor shall at his own cost carry out any alterations or remedial work necessitated by such errors or omissions for which he is responsible and modify the Contractor's Drawings and such other information accordingly.

The performance of his obligations under this Clause shall be in full satisfaction of the Contractor's liability under this Clause but shall not relieve him of his liability under Sub-Clause 27.1.

#### **7.2 Errors by Employer or Engineer**

The Employer shall be responsible for the Employer's Drawings and for other written information supplied by the Employer or the Engineer and for the details of special work specified by either of them. If such Employer's Drawings, information or details are incorrect and necessitate alterations of the work, the Employer shall pay the Contractor the cost of the alterations together with profit as certified by the Engineer.

#### **Obligations of the Contractor**

#### **8.1 General Obligations**

The Contractor shall, in accordance with the Contract, with due care and diligence, design, manufacture, deliver to Site, erect, test and commission

the Plant and carry out the Works within the Time for Completion. The Contractor shall also provide all necessary Contractor's Equipment, superintendence, labour and, except as stated in Part II, all necessary facilities therefor.

**8.2** SettingOut

The Contractor shall set out the Works in relation to original points, lines and levels of reference given by the Engineer in writing and provide all necessary instruments, appliances and labour for such purposes.

If, at any time during the execution of the Works, any error appears in the positions, levels, dimensions or alignment of the Works, the Contractor shall rectify the error.

The Contractor shall bear the cost of rectifying the error, unless the error results from incorrect information supplied in writing by the Employer, the Engineer or from default by another contractor, in which case the cost together with profit shall be borne by the Employer.

The checking of any setting-out by the Engineer shall not relieve the Contractor of his responsibility for the accuracy thereof.

**9.1** **Contract Agreement**

The Contractor shall, if called upon so to do, execute a Contract Agreement recording all the terms of the Contract, to be prepared by and completed at the cost of the Employer in the form annexed hereto.

**10.1** **Performance Security**

If Part II requires the Contractor to obtain a Performance Security, he shall obtain the same in the sum required, within twenty eight (28) days after the receipt of the Letter of Acceptance. The Performance Security shall be provided by a person and in a form approved by the Employer. The cost of complying with the requirements of this Clause shall be borne by the Contractor.

**10.2** **Period of Validity**

The Performance Security shall be valid until the Contractor has executed, completed and remedied defects in the Works in accordance with the Contract. No claim shall be made against the Performance Security after the issue of the Defects Liability Certificate and the Performance Security shall be returned to the Contractor within fourteen (14) days of the issue of the Defects Liability Certificate.

**10.3** **Claims under Performance Security**

Whether or not the Performance Security is stated by its terms to be payable on the demand of the Employer the Employer shall not make a

claim under the Performance Security unless one of the following conditions is satisfied:

(a) the Contractor is in breach of the Contract and fails to remedy the breach within forty two (42) days after receiving written notice from the Employer requiring him so to do. The notice shall state the intention to claim under the Performance Security, the amount claimed and the breach relied upon, or

(b) the Employer and the Contractor have agreed in writing that the amount demanded is payable to the Employer, and the amount has not been paid within forty two (42) days thereafter, or

(c) the Employer has obtained an award in arbitration under Clause 50 and the amount awarded has not been paid within forty two (42) days after the award, or

(d) the Contractor has gone into liquidation or is bankrupt.

In every case the Employer shall, when making the claim, send a copy to the Contractor.

### **11.1 Site Data**

The Tender shall be deemed to have been based on such data on climatic, hydrological and general conditions on the Site and for the operation of the Works as the Employer or the Engineer has made available to the Contractor for the purposes of the Tender.

The Contractor shall be responsible for his own interpretation of such data.

### **11.2 Sufficiency of Contract Price**

The Contractor shall be deemed to have satisfied himself on and taken account of in his Tender:

(a) all the conditions and circumstances affecting the Contract Price,

(b) the possibility of carrying out the Works as described in the Contract,

(c) the general circumstances at the Site (if access has been made available to him) and

(d) the general labour position at the Site.

The Contractor shall not be responsible for the accuracy of information given in writing by the Employer or the Engineer but shall be responsible for his interpretation of information received from whatever source.

### **11.3 Physical Obstructions and Conditions**

If during the execution of the Works on Site the Contractor encounters physical obstructions or conditions of the kind stipulated in Sub-Clause 26.1.c) the Contractor shall be entitled to recover the additional cost incurred in consequence.

The Engineer shall certify and there shall be added to the Contract Price the additional cost of:

- (a) complying with any instruction which the Engineer, after due consultation with the Employer and the Contractor, issues to the Contractor in connection therewith, and
- (b) any necessary measures which the Contractor may take in the absence of specific instructions from the Engineer.

#### **12.1 Programme to be furnished**

The Contractor shall submit to the Engineer for his approval the Programme which shall contain the following:

- (a) the order in which the Contractor proposes to carry out the Works (including design, manufacture, delivery to Site, erection, testing and commissioning),
- (b) the times when submission and approval of the Contractor's Drawing are required,
- (c) the times by which the Contractor requires the Employer:
  - (i) to furnish any Employer's Drawings,
  - (ii) to provide access to the Site,
  - (iii) to have completed the necessary civil engineering work (including foundations for the Plant) and
  - (iv) to have obtained any import licenses, consents, way leaves and approvals necessary for the purpose of the Works.

The Contractor shall submit the Programme in the form stated in the Preamble within twenty eight (28) days after the Commencement Date.

The approval by the Engineer of the Programme shall not relieve the Contractor or the Employer from any obligation under the Contract.

#### **12.2 Alteration to Programme**

No material alteration to the Programme shall be made without the approval of the Engineer.

#### **12.3 Revision of Programme**

If the progress of the Works does not conform to the Programme, the Engineer may instruct the Contractor to revise the Programme.

If such modifications are required for reasons for which the Contractor is not responsible, the cost of preparing the revised Programme shall be certified by the Engineer and added to the Contract Price.

### **13.1 Contractor's Representative**

The Contractor shall employ one or more competent representatives to superintend the carrying out of the Works on Site. They shall be fluent in the language for day to day communications. Their names shall be communicated in writing to the Engineer before work on Site begins.

Any instruction or notice which the Engineer gives to the Contractor's representative shall be deemed to have been given to the Contractor.

### **13.2 Objection to Contractor's Employees**

The Contractor shall, upon the Engineer's written instruction, remove from the Works any person employed by him in the execution of the Works, who misconducts himself or is incompetent or negligent.

### **14.1 Contractor's Equipment**

Except to the extent specified in Part II, the Contractor shall provide all Contractor's Equipment necessary to complete the Works.

All Contractor's Equipment shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works. The Contractor shall not remove from the Site any such equipment, except:

- (a) when it is no longer required for the completion of the Works, or
- (b) when the Engineer has given his consent.

### **14.2 Safety Precautions**

The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over provide:

- (a) fencing, lighting, guarding and watching of the Works, and
- (b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of owners and occupiers

of adjacent property, the public and others.

**14.3 Electricity Water and Gas**

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details are given in the Preamble. The Contractor shall pay the Employer a fair price for such use. The Contractor shall at his own cost provide any apparatus necessary for such use.

**14.4 Employer's Equipment**

The Employer shall, if the Contractor so requests for the execution of the Works, operate any available equipment of which details are given in the Preamble. The Contractor shall pay the Employer a fair price for such use.

The Employer shall during such operation retain control of and be responsible for the safe working of the equipment.

**14.5 Clearance of Site**

The Contractor shall from time to time during the progress of the Works clear away and remove all surplus materials and rubbish. On completion of the Works the Contractor shall remove all Contractor's Equipment and leave the whole of the Site and the Works clean and in a workmanlike condition, to the satisfaction of the Engineer.

**14.6 Opportunities for Other Contractors**

The Contractor shall, in accordance with the Engineer's instructions, afford to other contractors engaged by the Employer to work on the Site and persons lawfully upon the Site all reasonable opportunities for carrying out their work provided that the same shall not obstruct or disturb the progress of the Works. The Contractor shall also afford such opportunities to the employees of the Employer.

If the Contractor, on the written request of the Engineer, makes available any Contractor's Equipment or provides any other service, the Employer shall pay the Contractor accordingly. The amount to be paid shall be certified by the Engineer and added to the Contract Price.

**14.7 Authority for Access**

No persons other than the employees of the Contractor and his Subcontractors shall be allowed on the Site except with the consent of the Engineer.

Facilities to inspect the Works shall at all times be afforded by the Contractor to the Engineer and his representative, the Employer's representatives, authorities and officials.

**14.8 Information for Import Permits and Licenses**

The Contractor shall submit to the Employer in good time such details of all Plant and Contractor's Equipment as will enable the Employer to obtain all necessary import permits or licenses.

**15.1 Compliance with Statutes, Regulations**

The Contractor shall, in all matters arising in the performance of the Contract, comply in all respects with, give all notices and pay all fees required by the provisions of any national or state statute, ordinance or other law or any regulation or bye-law of any duly constituted authority.

**15.2 Compliance with Laws**

The Contractor shall comply with the laws of the country of manufacture concerning the manufacture of the Plant, and the laws of the country where the Plant is to be erected so far as such laws concern the manufacture, erection and operation of the Works.

**16.1 Patent Rights**

The Contractor shall indemnify the Employer against all claims of infringement of any patent, registered design, copyright, trade mark or trade name or other intellectual property right provided that all of following conditions are satisfied:

- (a) The claim or proceedings arise out of the design, construction, manufacture or use of Works or any Plant supplied by the Contractor.
- (b) The right was protected at the date of the Contract in the Contractor's country or the country in which the Plant is to be manufactured or erected.
- (c) The infringement or allegation of infringement was not caused by any use of the Works otherwise than for purpose indicated by or reasonably to be inferred from date Specification.
- (d) The infringement or allegation of infringement was not caused by the use of any Plant in association or combination with any plant not supplied by the Contractor, unless such association or combination was disclosed to the Contractor prior to the due of the Tender.
- (e) The infringement of or allegation of infringement was not caused by the Contractor following the design or instructions of the Employer or the Engineer.

## **16.2 Claims in respect of Patent Right**

The Contractor shall be promptly notified of any claim under this Clause made against the Employer. The Contractor may at his own cost conduct negotiations for the settlement of such claim, and any litigation that may arise there from.

The Employer shall not make any admission which might be prejudicial to the Contractor unless the Contractor has failed to take over the conduct of the negotiations or litigation within a reasonable time after having been so requested.

The Contractor may not, however, conduct such negotiations or litigation before he has given the Employer such reasonable security as the Employer may require. The security shall be for an amount which is an assessment of the compensation, damages, expenses and costs for which the Employer may become liable and which are the subject of the indemnity under Sub-Clause 16.1.

The Employer shall, at the request of the Contractor, provide all available assistance for the purpose of contesting any such claim or action, and shall be repaid all reasonable costs incurred in so doing.

## **16.3 Employer's Warranty for Patent Rights**

If any matter for which the Contractor is not liable to indemnify the Employer under Sub-Clause 16.1 causes the infringement or allegation of infringement by the Contractor of any patent, registered design, trade mark, copyright or other intellectual property right, the Employer shall indemnify the Contractor against all claims damages, expenses and costs which the Contractor may incur in relation thereto. The provisions of Sub-Clause 16.2 shall apply mutatis mutandis.

## **Obligations of the Employer**

### **17.1 Access to and Possession of the Site**

The Employer shall in reasonable time grant the Contractor access to and possession of the Site, which may, however, not be exclusive to the Contractor.

The Employer shall to the extent stated in the Specification provide means of access for the delivery of all Plant and Contractor's Equipment to the Site.

### **17.2 Assistance with Local Regulations**

The Employer shall assist the Contractor in ascertaining the nature and extent of any laws, regulations, orders or bye-laws, and customs in the country where the Plant is to be erected, which may affect the Contractor in the performance of his obligations under the Contract. The Employer

shall if so requested procure for the Contractor copies thereof and information relating thereto at the Contractor's cost.

**17.3 Civil Works on Site**

Any building, structure, foundation or means of access on the Site to be provided by the Employer shall be in a condition suitable for the reception, movement, installation and maintenance of the Works within the time or times indicated in the Programme.

**17.4 Consents and Way leaves**

The Employer shall in due time obtain or grant all consents including permits-to-work, way leaves and approvals required for the Works.

**17.5 Import Permits and Licenses**

The Employer shall obtain all import permits or licenses required for any part of the Plant or Works in reasonable time having regard to the time for delivery of the Plant and completion of the Works.

**Labour**

**18.1 Engagement of Labour**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all labour and for their payment, housing feeding and transport.

**18.2 Returns of Labour**

The Contractor shall submit detailed returns showing the supervisory staff and the numbers of the several classes of labour from time to time employed by the Contractor and Subcontractors on the Site. The returns shall be submitted in such form and at such intervals as the Engineer may prescribe.

**18.3 Working Hours**

On the Site, the Contractor shall observe the normal working hours stated in the Preamble. The Employer shall allow the Contractor to carry out work on the Site continuously during such working hours.

The Engineer may after consulting the Employer and the Contractor, direct that work shall be done at other times. The extra cost, together with profit, shall be added to the Contract Price unless it has become necessary for the completion of the Works within the Time for Completion, and this is due to the default of the Contractor.

#### **18.4 Restriction on Working Hours**

No work shall be carried out on the Site outside normal working hours or on the locally recognized days of rest, unless:

- (a) the Contract so provides, or
- (b) the work is unavoidable or necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer, or
- (c) the Engineer gives his consent.

#### **Workmanship and Materials**

##### **19.1 Manner of Execution**

All Plant to be supplied shall be manufactured and all work to be done shall be executed in the manner set out in the Contract.

Where the manner of manufacture and execution is not set out in the Contract, the work shall be executed in a proper and workmanlike manner in accordance with recognized good practice.

##### **19.2 Covering up Work**

The Contractor shall give the Engineer full opportunity to examine, measure and test any work on Site which is about to be covered up or put out of view.

The Contractor shall give due notice to the Engineer whenever such work is ready for examination, measurement or testing.

The Engineer shall then, unless he notifies the Contractor that he considers it unnecessary, without unreasonable delay carry out the examination, measurement or testing.

##### **19.3 Uncovering Work**

If so instructed by the Engineer, the Contractor shall expose any parts of the Works. The Contractor shall reinstate and make good such parts to the Engineer's satisfaction.

If any parts of the Works have been covered up or put out of view by the Contractor after complying with Sub-Clause 19.2 and are found to be in accordance with the Contract the cost incurred by the Contractor in complying with the Engineer's instructions including profit shall be certified by the Engineer and added to the Contract Price.

### **20.1 Independent Inspection**

The Engineer may, if so provided in the Contract or with the Contractor's consent, delegate inspection and testing of Plant to an independent inspector. Any such delegation shall be effected in the manner required by Sub-Clause 2.3 and for this purpose such independent inspector shall be considered as an Engineer's Representative. Notice of such appointment (being not less than 14 days) shall be given by the Engineer to the Contractor.

### **20.2 Inspection and Testing During Manufacture**

The Engineer shall be entitled during manufacture to inspect, examine and test the materials and workmanship and check the progress of manufacture of all Plant to be supplied under the Contract. This shall take place on the Contractor's premises during working hours. If Plant is being manufactured on other premises, the Contractor shall obtain permission for the Engineer to carry out such inspection, examination and testing on those premises.

No such inspection, examination or testing shall release the Contractor from any obligation under the Contract.

### **20.3 Dates for Inspection and Testing**

The Contractor shall agree with the Engineer the time and place for the testing of any Plant as provided in the Contract. The Engineer shall give the Contractor 24 hours notice of his intention to attend the tests.

If the Engineer does not attend on the date agreed, the Contractor may, unless the Engineer instructs the Contractor not to do so, proceed with the tests, which shall be deemed to have been made in the Engineer's presence.

The Contractor shall forthwith forward to the Engineer duly certified copies of the test results. If the Engineer has not attended the test, he shall accept the validity of the test readings.

### **20.4 Facilities for Testing**

Where the Contract provides for tests on the premises of the Contractor or of any Sub- Contractor, the Contractor shall provide such assistance, labour materials, electricity, fuel, stores, apparatus and instruments as may be necessary to carry out the test efficiently.

### **20.5 Certificate of Testing**

When Plant has passed the tests referred to in this Clause, the Engineer shall furnish to the Contractor a certificate or endorse the Contractor's test certificate to that effect.

### **21.1 Rejection**

If, as a result of the inspection, examination or testing referred to in Clause 20, the Engineer decides that any Plant is defective or otherwise not in accordance with the Contract, he may reject such Plant and shall notify the Contractor thereof immediately. The notice shall state the Engineer's objections with reasons. The Engineer shall not reject any Plant for minor defects which do not affect the commercial operation of such Plant.

The Contractor shall then with all speed make good the defect or ensure that any rejected Plant complies with the Contract.

If the Engineer requires such Plant to be retested, the tests shall be repeated under the same terms and conditions. All costs incurred by the Employer by the repetition of the tests shall be deducted from the Contract Price.

### **22.1 Permission to Deliver**

The Contractor shall apply in writing to the Engineer for permission to deliver any Plant or Contractor's equipment to the Site. No Plant or Contractor's Equipment may be delivered to the Site without the Engineer's written permission.

The Contractor shall be responsible for the reception on Site of the Plant and Contractor's Equipment.

## **Suspension of Works, Delivery or Erection**

### **23.1 Order to Suspend**

The Engineer may at any time instruct the Contractor to:

- (a) suspend progress of the Works, or
- (b) suspend delivery of Plant or Contractor's Equipment which is ready for delivery to the Site at the time for delivery specified in the Programme, or if no time is specified, at the time appropriate for it to be delivered, or
- (c) suspend the erection of Plant which has been delivered to the Site.

When the Contractor is prevented from delivering or erecting Plant in accordance with the Programme the Engineer shall be deemed to have

instructed a suspension except when such prevention is caused by the Contractor's default.

The Contractor shall during suspension protect and secure the Works or Plant affected at the Contractor's works or elsewhere or at the Site, as the case may be, against any deterioration, loss or damage.

#### **24.1 Cost of Suspension**

The additional cost incurred by the Contractor in protection, securing and insuring the Works or Plant and in following the Engineer's instructions under Sub-Clause 23.1 and in resumption of the work, shall be added to the Contract Price.

The Contractor shall not be entitled to be paid any additional costs if such suspension is necessary by reason of a default on the part of the Contractor.

The Contractor shall not be entitled to additional costs unless he notifies the Engineer of his intention to make such claim, within twenty eight (28) days after receipt of the order to suspend progress or delivery or of the date of deemed suspension under Sub- Clause 23.1.

#### **24.2 Payment in Event of Suspension**

The Contractor shall be entitled to payment for Plant which has not been delivered to Site if the work on Plant or delivery of Plant has been suspended for more than twenty eight (28) days. After twenty eight (28) days of suspension, the Contractor shall be entitled to payment of the value of such Plant as at the date of suspension.

A certificate of payment shall be issued on condition that:

- (a) the Contractor has marked the Plant as the Employer's property in accordance with the Engineer's instructions, and
- (b) the suspension is not due to the Contractor's default.

#### **24.3 Prolonged Suspension**

If suspension under Sub-Clause 23.1. has continued for more than eighty four (84) days, and the suspension is not due to the Contractor's default, the Contractor may by notice to the Engineer require permission to proceed within twenty eight (28) days.

If permission is not granted within that time, the Contractor may treat the suspension as an omission under Clause 31 of the Section it affects, or if the suspension affects the whole of the Works, terminate the Contract and the provisions of Clause 46 shall apply.

#### **24.4 Resumption of Work**

If the Contractor chooses not to treat prolonged suspension as an omission or termination under Sub-Clause 24.3, the Employer shall upon the request of the Contractor, take over the responsibility for protection, storage, security and insurance of the suspended Works and the risk of loss or damage thereto shall thereupon pass to the Employer.

After receipt of permission or an order to proceed, the Contractor, shall after due notice to the Engineer, examine the Works and the Plant affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant that may have occurred during the suspension. Cost properly incurred by the Contractor which would not have been incurred but for the suspension shall be added to the Contract Price together with profit.

The Contractor shall not be entitled to payment for costs incurred in making good any deterioration, defect or loss caused by faulty workmanship or materials or by the Contractor's failure to take the measures specified in Sub-Clause 23.1.

If the Employer has taken over risk and responsibility for the suspended Works under this Sub-Clause, risk and responsibility shall revert to the Contractor fourteen (14) days after receipt of the permission or order to proceed.

## **Completion**

### **25.1 Time for Completion**

The Works shall be completed and shall have passed the Tests on Completion within the Time for Completion

### **26.1 Extension of Time for Completion**

The Contractor may claim an extension of the Time for Completion if he is or will be delayed in completing the Works by any of the following causes:

- (a) extra or additional work ordered in writing under Clause 31,
- (b) exceptional adverse weather conditions,
- (c) physical obstructions or conditions which could not reasonably have been foreseen by the Contractor,
- (d) Employer's or Engineer's instructions, otherwise than by reason of the Contractor's default,
- (e) the failure of the Employer to fulfil any of his obligations under the Contract,
- (f) delay by any other contractor engaged by the Employer,
- (g) any suspension of the Works under Clause 23, except when due to

- the Contractor's default,
- (h) any industrial dispute,
- (i) the Employer's Risks, or
- (j) Force Majeure.

The Contractor shall give to the Engineer notice of his intention to make a claim for an extension of time within fourteen (14) days of the circumstances for such a claim becoming known to the Contractor. The notice shall be followed as soon as possible by the claim with full supporting details.

The Engineer shall, after due consultation with the Employer and the Contractor, grant the Contractor from time to time, either prospectively or retrospectively, such extension of Time for Completions as may be justified. The Engineer shall notify the Employer and the Contractor accordingly.

The Contractor shall be entitled to such extension whether the delay occurs before or after the Time for Completion.

## **26.2 Delays by Subcontractors**

The Contractor shall be entitled to claim an extension of time if delay on the part of a Subcontractor is due to a cause mentioned in Clause 26.1 and such delay prevents the Contractor from meeting the Time for Completion.

## **26.3 Earlier Completion**

The Employer may require completion of the Works or part thereof earlier than the Time for Completion, on the following conditions:

- (a) The Employer and the Contractor shall first agree the extra sum to be paid for each day by which the Contractor completes the Works or part thereof earlier than the Time for Completion.
- (b) The Contractor shall not become liable under Sub-Clause 27.1 for any failure to complete the Works or the part thereof by the earlier time.

## **27.1 Delay in Completion**

If the Contractor fails to complete the Works within the Time for Completion, the Employer shall be entitled to a reduction in the Contract Price unless it can be reasonably concluded from circumstance that the Employer will suffer no loss.

The Employer shall within a reasonable time give the Contractor notice of his intention to claim a reduction.

The reduction shall be the percentage per day stated in the Preamble of that part of the Contract Price which is attributable to such part of the Works as cannot in consequence of the failure be put to the intended use. The reduction shall be computed for each day between the Time for Completion and the actual date of completion.

The reduction shall in no case exceed the maximum percentage of the Contract Price of such part stated in the Preamble.

Except as provided in Sub-Clause 27.2, such reduction shall be to the exclusion of any other remedy of the Employer in respect of the Contractor's failure to complete within the Time for Completion.

## **27.2 Prolonged Delay**

If the Employer has become entitled to the maximum reduction under Sub-Clause 27.1 for any part of the Works, he may by notice require the Contractor to complete. Such notice shall fix a final time for completion which shall be reasonable.

If the Contractor fails to complete within such time, and this is not due to a cause for which the Employer or some other contractor employed by him is responsible, the Employer may by further notice to the Contractor either:

- (a) require the Contractor to complete, or
- (b) may himself complete at the Contractor's cost provided that he does so in a reasonable manner, or
- (c) terminate the Contract.

If the Employer terminates the Contract, he shall be entitled to recover from the Contractor any loss he has suffered up to the maximum amount stated in the Preamble. If no maximum amount is stated, the Employer shall not be entitled to recover more than that part of the Contract Price which is attributable to that part of the Works which cannot by reason of the Contractor's failure be put to the intended use.

The Employer shall give credit for the value of any part of the Works which he retains.

## **Tests on Completion**

### **28.1 Notice of Tests**

The Employer shall give to the Engineer twenty one (21) days' notice of the date after which he will be ready to make the Tests on Completion (the Tests). Unless otherwise agreed, the Tests shall take place within

fourteen (14) days after the said date on such day or days as the Engineer shall notify the Contractor.

**28.2 Time for Tests**

If the Engineer fails to appoint a time after having been asked to do so, or does not attend at the time and place appointed, the Contractor shall be entitled to proceed with the Test in his absence. The Tests shall then be deemed to have been made in the presence of the Engineer and the results of the Tests shall be accepted as accurate.

**28.3 Delayed Tests**

If the Tests are being unduly delayed by the Contractor the Engineer may by notice require the Contractor to make the Tests within twenty one (21) days after the receipt of such notice. The Contractor shall make the Tests on such days within that period as the Contractor may fix and of which he shall give notice to the Engineer.

If the Contractor fails to make the Tests within twenty one (21) days the Engineer may himself proceed with the Tests. All Tests so made by the Engineer shall be at the risk and cost of the Contractor and the cost thereof shall be deducted from the Contract Price. The tests shall then be deemed to have been made in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

**28.4 Facilities for Tests on Completion**

Except where otherwise specified, the Employer shall provide free of charge such labour, materials, electricity, fuel, water, stores, apparatus and feedstock as may be reasonably required by the Contractor to carry out the Tests.

**28.5 Retesting**

If the Works or any Section fails to pass the Tests, the Engineer or the Contractor may require such Tests to be repeated on the same terms and conditions. All costs to which the Employer may be put by the repetition of the Tests under this Sub-Clause or under Sub-Clause 30.7 shall be deducted from the Contract Price.

**28.6 Disagreement as to Result of Tests**

If the Engineer and the Contractor disagree on the interpretation of the Test results, each shall give a statement of his views to the other within fourteen(14) days after such disagreement arises. The statement shall be accompanied by all relevant evidence.

**28.7 Consequences of Failure to Pass Tests on Completion**

If the Works or any Section fails to pass the Tests on the repetition thereof under Sub- Clause 28.5, the Engineer, after due consultation with the Employer and the Contractor, shall be entitled to:

- (a) order one further repetition of the Tests under the conditions of Sub-Clause 28.5, or
- (b) reject the Works or Section in which event the Employer shall have the same remedies against the Contractor as are provided under Sub-Clause 30.5 (c), or
- (c) issue a Taking-Over Certificate, if the Employer so wishes, notwithstanding that the Works are not complete. The Contract Price shall then be reduced by such amount as may be agreed by the Employer and the Contractor or, failing agreement, as may be determined by arbitration.

**28.8 Use by the Employer**

In considering the results of Tests carried out under Sub-Clauses 29.3, 29.4 and 30.7, the Engineer shall make allowances for the effect of any use of the Works by the Employer on the Certificate to the performance or other characteristics of the Works.

**28.9 Test Certificate**

As soon as the Works or any Section thereof has passed the Tests, the Engineer shall issue a Certificate to the Contractor and the Employer to that effect.

**Taking Over**

**29.1 Taking Over**

The Works shall be taken over by the Employer when they have been completed in accordance with the Contract, except in minor respects that do not affect the use of the Works for their intended purpose, have passed the Tests on Completion and a Taking- Over Certificate has been issued or deemed to have been issued in accordance with Sub-Clause 29.2.

**29.2 Taking-Over Certificate**

The Contractor may apply by notice to the Engineer for a Taking-Over Certificate not earlier than fourteen (14) days before the Works will in the Contractor's opinion be complete and ready for taking over under Sub-Clause 29.1.

The Engineer shall within twenty eight (28) days after the receipt of the Contractor's application either:

- (a) issue the Taking-Over Certificate to the Contractor with a copy to the

Employer stating the date on which the Works were complete and ready for taking over, or

- (b) reject the application giving his reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued.

If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of twenty eight (28) days he shall be deemed to have issued the Taking-Over Certificate on the last day of that period.

If the Works are divided by the Contract into Sections the Contractor shall be entitled to apply for separate Taking-Over Certificate for each such Section.

### **29.3 Use before Taking Over**

The Employer shall not use any part of the Works unless a Taking-Over Certificate has been issued in respect thereof.

If nevertheless the Employer uses any part of the Works, that part which is used shall be deemed to have been taken over at the date of such use. The Engineer shall on request of the Contractor issue a Taking-Over Certificate accordingly. If the Employer uses any part of the Works before taking over the Contractor shall be given the earliest opportunity of taking such steps as may be necessary to carry out the Tests on Completion.

The provisions of Sub-Clause 27.1 shall not apply to any part of the Works while being so used by the Employer. Clause 30 shall apply as if the part had been taken over on the date it was taken into use.

### **29.4 Interference with Tests on Completion**

If the Contractor is prevented from carrying out the Tests on Completion by a cause for which the Employer or the Engineer or other contractors employed by the Employer are responsible, the Employer shall be deemed to have taken over the Works on the date when the Tests on Completion would have been completed but for such prevention. The Engineer shall issue a Taking-Over Certificate accordingly.

The Works shall not be deemed to have been taken over if they are not substantially in accordance with the Contract.

If the Works are taken over under this Clause the Contractor shall nevertheless carry out the Tests on Completion during the Defects

Liability Period. The Engineer shall require the Tests on Completion to be carried out by fourteen (14) days' notice and in accordance with the relevant provisions of Clause 28.

Any additional costs to which the Contractor may be put in making the Tests on Completion during the Defects Liability Period, shall be added to the Contract Price.

### **Defects after Taking Over**

#### **30.1 Defects Liability Period**

Where any part of the Works is taken over separately from the Works the Defects Liability Period for that part shall commence on the date it was taken over.

#### **30.2 Making Good Defects**

The Contractor shall, subject to Sub-Clause 30.9, be responsible of making good any defect in or damage to any part of the Works which may appear or occur during the Defects Liability Period and which arises from, either:

- (a) any defective materials, workmanship or design, or
- (b) any act or omission of the Contractor during the Defects Liability Period.

The Contractor shall make good the Defects or damage as soon as practicable and at his own cost.

#### **30.3 Notice of Defects**

If any such defect appears or damage occurs, the Employer or the Engineer shall forthwith notify the Contractor thereof.

#### **30.4 Extension of Defects Liability Period**

The provision of this Clause shall apply to all replacements or renewals carried out by the Contractor as if the replacements and renewals had been taken over on the date they were completed.

The Defects Liability Period for the Works shall be extended by a period equal to the period during which the Works cannot be used by reason of a defect or damage. If only part of the Works cannot be used by reason of a defect, the Defect Liability Period shall be extended only for that part.

In neither case shall the Defects Liability Period be extended by more than one year.

When erection or delivery of Plant has been suspended under Sub-Clause 23.1, the Contractor's obligations under this Clause shall not apply to any defects occurring more than three years after it would have been delivered but for the suspension or such period as may be stated in Part II.

### **30.5 Failure to Remedy Defects**

If the Contractor fails to remedy a defect or damage within a reasonable time, the Employer may fix a final time for remedying the defect or damage.

If the Contractor fails to do so, the Employer may:

- (a) carry out the work himself or by others at the Contractor's risk and cost, provided that he does so in a reasonable manner. The costs properly incurred by the Employer in remedying the defect or damage shall be deducted from the Contract Price, but the Contractor shall have no responsibility for such work, or
- (b) require the Contractor to grant the Employer a reasonable reduction in the Contract Price to be agreed or fixed by arbitration under Clause 50, or
- (c) if the defect or damage is such that the Employer has been deprived of substantially the whole of the benefit of the Works or a part thereof, he may terminate the Contract in respect of such parts of the Works as cannot be put to the intended use. The Employer shall to the exclusion of any remedy under Clause 45 be entitled to recover all sums paid in respect of such parts of the Works together with the cost of dismantling the same, clearing the Site and returning Plant to the Contractor or otherwise disposing of it in accordance with the Contractor's instructions.

### **30.6 Removal of Defective Work**

If the defect or damage is such that repairs cannot be expeditiously carried out on the Site, the Contractor may with the consent of the Engineer or the Employer remove from the Site for the purposes of repair any part of the Works which is defective or damaged.

### **30.7 Further Tests on Completion**

If the replacements or renewals are such that they may affect the performance of the Works the Employer may request that Tests on Completion be repeated to the extent necessary. The request shall be made by notice within twenty eight (28) days after the replacement or renewal. The Tests shall be carried out in accordance with Clause 28.

### **30.8 Right of Access**

Until the Final Certificate of Payment has been issued, the Contractor shall have the right of access to all parts of the Works and to records of the working and performance of the Works.

Such right of access shall be during the Employer's normal working hours at the Contractor's risk and cost. Access shall also be granted to any duly authorized representative of the Contractor whose name has been communicated in writing to the Engineer.

Subject to the Engineer's approval, the Contractor may also at his own risk and cost make any tests which he considers desirable.

### **30.9 Defects in Employer's and Engineer's Designs**

The Contractor shall not be liable for any defects resulting from designs furnished or specified by the Employer or the Engineer.

### **30.10 Contractor to Search**

The Contractor shall, if required by the Engineer in writing, search for the cause of any defect, under the direction of the Engineer. Unless the defect is one for which the Contractor is liable under this Clause, the cost of the work carried out by the Contractor in searching for the cause of the defect shall be added to the Contract Price.

### **30.11 Defects Liability Certificate**

When the Defects Liability Period for the Works or any part thereof has expired and the Contractor has fulfilled all his obligations under the Contract for defects in the Works or that part, the Engineer shall issue within twenty eight (28) days to the Employer and the Contractor a Defects Liability Certificate to that effect.

### **30.12 Exclusive Remedies**

Except in the case of Gross Misconduct, the Employer's remedies under this Clause shall be in place of and to the exclusion of any other remedy in relation to defects whatsoever.

## **Variations**

### **31.1 Engineer's Right to Vary**

The Engineer may by Variation Order to the Contractor at any time before the Works are taken over, instruct the Contractor to alter, amend, omit, add to or otherwise vary any part of the Works.

The Contractor shall not vary or alter any of the Works, except in accordance with a Variation Order from the Engineer. The Contractor may, however, at any time propose variations of the Works to the Engineer.

### **31.2 Variation Order Procedure**

Prior to any Variation Order under Sub-Clause 31.1 the Engineer shall notify the Contractor of the nature and form of such variation.

As soon as possible after having received such notice, the Contractor shall submit to the Engineer:

- (a) a description of work, if any, to be performed and a programme for its execution, and
- (b) the Contractor's proposals for any necessary modifications to the Programme according to Sub-Clause 26.1 or to any of the Contractor's obligations under the Contract, and
- (c) the Contractor's proposals for adjustment to the Contract Price.

Following the receipt of the Contractor's submission the Engineer shall, after due consultation with the Employer and the Contractor, decide as soon as possible whether or not the variation shall be carried out.

If the Engineer decides that the variation shall be carried out, he shall issue a Variation Order clearly identified as such in accordance with the Contractor's submission or as modified by agreement. If the Engineer and the Contractor are unable to agree the adjustment of the Contract Price, the provisions of Sub-Clause 31.3 shall apply.

### **31.3 Disagreement on Adjustment of the Contract Price**

If the Contractor and the Engineer are unable to agree on the adjustment of the Contract Price, the adjustment shall be determined in accordance with the rates specified in the Schedule of Prices.

If the rates contained in the Schedule of Price are not directly applicable to the specific work in question, suitable rates shall be established by the Engineer reflecting the level of pricing in the Schedule of Prices.

Where rates are not contained in the said Schedule, the amount shall be such as is in all the circumstances reasonable. Due account shall be taken

of any over-or under- recovery of overheads by the Contractor in consequence of the variation.

The Contractor shall also be entitled to be paid:

- (a) the cost of any partial execution of the Works rendered useless by any such variation,
- (b) the cost of making necessary alterations to Plant already manufactured or in the course of manufacture or of any work done that has to be altered in consequence of such a variation,
- (c) any additional costs incurred by the Contractor by the disruption of the progress of the Works as detailed in the Programme, and
- (d) the net effect of the Contractor's finance costs, including interest, caused by the variation.

The Engineer shall on this basis determine the rates or prices to enable on-account payment to be included in certificates of payment.

#### **31.4 Contractor to Proceed**

On receipt of a Variation Order, the Contractor shall forthwith proceed to carry out the variation and be bound to these Conditions in so doing as if such variation was stated in the Contract.

The work shall not be delayed pending the granting of an extension of the Time for Completion or an adjustment to the Contract Price under Sub-Clause 31.3.

#### **31.5 Records of Costs**

In any case where the Contractor is instructed to proceed with variation prior to the determination of the adjustment to the Contract Price in respect thereof the Contractor shall keep records of the cost of undertaking the variation and of time expended thereon. Such records shall be open to inspection by the Engineer at all reasonable times.

### **Ownership of Plant**

#### **32.1 Ownership of Plant**

Plant to be supplied pursuant to the Contract shall become the property of the Employer at whichever is the earlier of the following times:

- (a) when Plant is delivered to Site, or
- (b) when by virtue of Sub-Clause 24.2 the Contractor becomes entitled to payment of the value of the Plant.

### **Certificates and Payment**

### **33.1 Terms of Payment**

The terms of payment shall be as stated in the Preamble.

### **33.2 Method of Application**

Unless otherwise specified in Part II applications by the Contractor for payment shall be made to the Engineer as follows:

- (a) in respect of the progress of the Works accompanied by such evidence of the value of the work done as the Engineer may require, and
- (b) in respect of Plant shipped and en route to the Site identifying the Plant concerned and accompanied by such evidence of shipment and of payment of freight and insurance and by such other documents as the Engineer may require, and
- (c) for additional payment in accordance with Clause 34.

Any other application for payment shall state the amounts claimed and the detailed particulars in respect of which the application is made.

### **33.3 Issue of Certificate of Payment**

Within fourteen (14) days after receiving an application for payment which the Contractor was entitled to make the Engineer shall issue a Certificate of Payment to the Employer showing the amount due, with a copy to the Contractor.

A certificate of payment, other than the Final Certificate of Payment, shall not be withheld on account of:

- (a) defects of a minor character which are not such as to affect the use of the Works, or
- (b) any part of the payment applied for being disputed. In such case a certificate of payment for the undisputed amount shall be issued.

### **33.4 Corrections to Certificates of Payment**

The Engineer may in any certificate of payment make any correction or modification that should properly be made in respect of any previous certificate.

### **33.5 Payment**

Unless otherwise specified in Part II, the Employer shall pay the amount certified within twenty eight (28) days from the date of issue of each certificate of payment to the Contractor at his principal place of business.

### **33.6 Delayed Payment**

If payment of any sum payable under Sub-Clause 33.5 is delayed, the Contractor shall be entitled to receive interest on the amount unpaid during the period of delay. Unless otherwise stated in Part II the interest shall be at the annual rate three percentage points above the discount rate of the central bank in the Contractor's country. The Contractor shall be entitled to such payment without formal notice and without prejudice to any other right or remedy.

### **33.7 Remedies on Failure to Certify or Make Payment**

The Contractor shall be entitled to stop the Works by giving fourteen (14) days notice to the Engineer and the Employer, if either:

- (a) the Engineer fails to issue a certificate of payment upon proper application by the Contractor, or
- (b) the Employer fails to make any payment as provided in this Clause. The cost to the Contractor together with profit occasioned by the stoppage and the subsequent resumption of work, shall be added to the Contract Price.

The Contractor shall also be entitled to terminate the Contract by giving twenty eight (28) days notice to the Engineer and the Employer in any case where the Engineer has failed to issue a certificate of payment upon proper application by the Contractor.

### **33.8 Payment by Measurement**

For any part of the Works which is to be paid according to quantity supplied or work done, the provisions for measurement shall be stated in Part II.

### **33.9 Application for Final Certificate of Payment**

The Contractor shall make application to the Engineer for the Final Certificate of Payment within twenty eight (28) days after the issue of the Defect Liability Certificate, or if more than one, the last Defect Liability Certificate.

The application for the Final Certificate of Payment shall be accompanied by a final account prepared by the Contractor. The final account shall give full details of the value of all Plant supplied and work done under the Contract together with:

- (a) such additions to or deductions from the Contract Price as have been agreed, and
- (b) all claims for additional payment to which the Contractor may

consider himself entitled.

**33.10 Issue of Final Certificate of Payment**

The Engineer shall issue to the Employer with a copy to the Contractor, the Final Certificate of Payment within 28 days after receiving an application in accordance with Sub-Clause 33.9.

If the Contractor has not applied for a Final Certificate of Payment within the time specified in Sub-Clause 33.9 the Engineer shall request the Contractor to do so within a further period of 28 days. If the Contractor fails to make such an application, the Engineer shall issue the Final Certificate of Payment for such amount as he deems correct.

**33.11 Final Certificate of Payment Conclusive**

A Final Certificate of Payment shall be conclusive evidence of the value of the Works, that the Works are in accordance with the Contract and that the Contractor has performed all his obligations under the Contract.

Payment of the amount certified in the Final Certificate of Payment shall be conclusive evidence that the Employer has performed all his obligations under the Contract.

A Final Certificate of Payment or payment shall not be conclusive:

- (a) to the extent that fraud or dishonesty relates to or affects any matter dealt with in the certificate, or
- (b) if any arbitration or court proceedings under the Contract have been commenced by either party before the expiry of 84 days after the issue of the Final Certificate of Payment.

**Claims**

**34.1 Procedure**

In any case where under these Conditions there are circumstances which the Contractor considers entitle him to claim additional payment, the Contractor shall:

- (a) if he intends to make any claim for additional payment give to the Engineer notice of his intention to make such claim within twenty eight (28) days after the said circumstances became known to the Contractor stating the reasons for his claim, and
- (b) as soon as reasonably practical after the date of such notice submit to the Engineer full and detailed particulars of his claim but not later

than one hundred and eighty two (182) days after such notice unless otherwise agreed by the Engineer. In any event such particulars shall be submitted no later than the application for the Final Certificate of Payment. The Contractor shall thereafter promptly submit such further particulars as the Engineer may reasonably require to assess the validity of the claim.

**34.2 Assessment**

When the Engineer has received full and detailed particulars of the Contractor's claim in accordance with Sub-Clause 34.1 and such further particulars as he may reasonably have required he shall after due consultation with the Employer and the Contractor determine whether the Contractor is entitled to additional payment and notify the parties accordingly.

The Engineer may reject any claim for additional payment which does not comply with the requirements of Sub-Clause 34.1.

**Foreign Currency and Rates of Exchange**

**35.1 Payment in Foreign Currencies**

Arrangements for payment in foreign currencies shall be as stated in the Preamble.

**35.2 Currency Restrictions**

The Employer shall reimburse the Contractor for any loss arising from:

- (a) currency restrictions, and
- (b) restrictions on the transfer of currency in which the Contractor is to be paid which are imposed by the government or authorized agency of the government of the country from which any payments under the Contract are to be made.

This Sub-Clause only applies to restrictions imposed after the date 28 days prior to the latest date for submission of tenders for the Works.

**35.3 Rates of Exchange**

Where the Contract provides for payment in Foreign Currency the rates of exchange between the currencies shall be fixed for the purpose of the Contract and shall be as stated in the Preamble.

If such rates of exchange are not stated in the Preamble the rates to be used shall be those quoted by the central bank of the country whose currency is to be sold 28 days or the nearest day thereto prior to the latest date for submission of tenders for the Works.

## **Provisional Sums**

### **36.1 Use of Provisional Sums**

A Provisional Sum shall only be used, in whole or in part in accordance with the Engineer's instructions.

The total sum paid to the Contractor shall include only such amounts in respect of work, supplies or services to which such Provisional Sums relate as the Engineer shall have instructed.

### **36.2 Ordering Work against Provisional Sums**

In respect of every Provisional Sum the Engineer may after due consultation with the Employer and the Contractor order:

- (a) work to be executed, including goods, materials or services to be supplied by the Contractor. The value of such work executed, determined in accordance with Clause 31, shall be paid to the Contractor in accordance with Clause 33, and
- (b) goods and materials to be purchased by the Contractor, for which payment will be made in accordance with Sub-Clause 36.4.

### **36.3 Invoices and Receipts**

The Contractor shall, when required by the Engineer, produce quotations, invoices, vouchers and accounts or receipts in connection with expenditure in respect of Provisional Sums.

### **36.4 Payment against Provisional Sums**

For all work executed or goods, materials or services supplied or purchased by the Contractor under Sub-Clause 36.2(b), there shall be included in the sums paid to the Contractor:

- (a) the actual price paid or due to be paid by the Contractor, and
- (b) in respect of all other charges and profit, a percentage of the actual price paid or due to be paid. Such percentage shall be as stated in the Preamble.

## **Risk and Responsibility**

### **37.1 Allocation of Risk and Responsibility**

The Risks of loss of or damage to physical property and of death and personal injury which arise in consequence of the performance of the Contract shall be allocated between the Employer and the Contractor as follows:

- (a) the Employer: the Employer's Risks as specified in Sub-Clause 37.2
- (b) the Contractor: the Contractor's Risks as specified in Sub-Clause 37.3.

### **37.2 Employer's Risks**

The Employer's Risks are:

- (a) war and hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, revolution, insurrection, military or usurped power or civil war insofar as it relates to the country in which the Works are located or countries through which plant must be transported,
- (c) ionizing radiation or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosives or other hazardous properties of any explosive nuclear assembly or nuclear components thereof,
- (d) pressure waves caused by aircraft travelling at sonic or supersonic speed,
- (e) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors,
- (f) use or occupation of the Works or any part thereof by the Employer,
- (g) fault, error, defect or omission in the design of any part of the Works by the Engineer, Employer or those for whom the Employer is responsible,
- (h) the use or occupation of the Site by the Works or any part thereof, or for the purposes of the Contract; or interference, whether temporary or permanent with any right of way, light, air or water or with any easement, way leaves or right of a similar nature which is the inevitable result of the construction of the Works in accordance with the Contract,
- (i) the right of the Employer to construct the Works or any part thereof on, over, under, in or through any land,
- (j) damage (other than that resulting from the Contractor's method of construction) which is the inevitable result of the construction of the Works in accordance with the Contract,

- (k) the act, neglect or omission or breach of contract or of statutory duty of the Engineer, the Employer or other contractors engaged by the Employer or of their respective employees or agents, and all risks which an experienced contractor could not have foreseen or, if foreseeable, against which measures to prevent loss, damage or injury from occurring could not reasonably have been taken by such contractor.

### **37.3 Contractor's Risks**

The Contractor's Risks are all risks other than those identified as the Employer's Risks.

## **Care of the Works and Passing of Risk**

### **38.1 Contractor's Responsibility for the Care of the Works**

The Contractor shall be responsible for the care of the Works or any Section thereof from the Commencement until the Risk Transfer Date applicable thereto under Sub- Clause 38.2.

The Contractor shall also be responsible for the care of any part of the Works upon which any outstanding work is being performed by the Contractor during the Defects Liability Period until completion of such outstanding work.

### **38.2 Risk Transfer Date**

The Risk Transfer Date in relation to the Works or a Section thereof is the earliest of either:

- (a) the date of issue of the Taking-Over Certificate, or
- (b) the date when the Engineer is deemed to have issued the Taking Certificate or the Works are deemed to have been taken over in accordance with Clause 29, or
- (c) the date of expiry of the notice of termination when the Contract is terminated by the Employer or the Contractor in accordance with these Conditions.

### **39.1 Passing of Risk of Loss of or Damage to the Works**

The risk of loss of or damage to the Works or any Section thereof shall pass from the Contractor to the Employer on the Risk Transfer Date applicable thereto.

### **39.2 Loss or Damage Before Risk Transfer Date**

Loss of or damage to the Works or any Section thereof occurring before the Risk Transfer Date shall:

- (a) to the extent caused by any of the Contractor's Risks, be made good forthwith by the Contractor at his own cost, and
- (b) to the extent caused by any of the Employer's Risks, be made good by the Contractor at the Employer's expense if so required by the Engineer within twenty eight (28) days after the occurrence of the loss or damage. The price for making good such loss and damage shall be in all circumstances reasonable and shall be agreed by the Employer and the Contractor, or in the absence of agreement, shall be fixed by arbitration under Clause 50.

**39.3 Loss or Damage After Risk Transfer Date**

After the Risk Transfer Date, the Contractor's liability in respect of loss of or damage to any part of the Works shall, except in the case of Gross Misconduct, be limited:

- (a) to the fulfillment of the Contractor's obligations under Clause 30 in respect of defects therein, and
- (b) to making good forthwith loss or damage caused by the Contractor during the Defects Liability Period.

**Damage to Property and Injury to Persons**

**40.1 Contractor's Liability**

Except as provided under Sub-Clause 41.1, the Contractor shall be liable for and shall indemnify the Employer against all losses, expenses and claims in respect of any loss of or damage to physical property (other than the Works), death or personal injury occurring before the issue of the last Defects Liability Certificate to the extent caused by:

- (a) defective design, material or workmanship of the Contractor, or
- (b) negligence or breach of statutory duty of the Contractor, his Subcontractors or their respective employees and agents.

**40.2 Employer's Liability**

The Employer shall be liable for and shall indemnify the Contractor against all losses, expenses or claims in respect of loss of or damage to any physical property or of death or personal injury whenever occurring, to the extent caused by any of the Employer's Risks.

**41.1 Accidents**

The Contractor shall be liable for and shall indemnify the Employer against all losses, expenses or claims arising in connection with the death of or injury to any person employed by the Contractor or his Subcontractors for the purposes of the Works, unless caused by any acts or defaults of the Engineer, the Employer, or other contractors engaged by

the Employer or by their respective employees or agents. In the latter cases the Employer shall be liable for and shall indemnify the Contractor against all losses, expenses and claims arising in connection therewith.

## **Limitations of Liability**

### **42.1 Liability for Indirect or Consequential Damage**

Neither party shall be liable to the other for any loss of profit, loss of use, loss of production, loss of contracts or for any other indirect or consequential damage that may be suffered by the other, except:

- (a) as expressly provided in Clause 27, and
- (b) those provisions of these Conditions whereby the Contractor is expressly entitled to receive profit.

### **42.2 Maximum Liability**

The liability of the Contractor to the Employer under these Conditions shall in no case exceed the sum stated in the Preamble or, if no such sum is stated, the Contract Price.

### **42.3 Liability after Expiration of Defects Liability Period**

The Contractor shall have no liability to the Employer for any loss of or damage to the Employer's physical property which occurs after the expiration of the Defects Liability Period unless caused by Gross Misconduct of the Contractor.

### **42.4 Exclusive Remedies**

The Employer and the Contractor intend that their respective rights, obligations and liabilities as provided for in these Conditions shall alone govern their rights under the Contract and in relation to the Works.

Accordingly, the remedies provided under the contract in respect of or in consequence of:

- (a) any breach of contract, or
- (b) any negligent act or omission, or
- (c) death or personal injury, or
- (d) loss or damage to any property

are, save in the case of Gross Misconduct, to be to the exclusion of any other remedy that either may have against the other under the law governing the Contract or otherwise.

#### **42.5 Mitigation of Loss of Damage**

In all cases the party claiming a breach of Contract or a right to be indemnified in accordance with the Contract shall be obliged to take all reasonable measures to mitigate loss or damage which has occurred or may occur.

#### **42.6 Foreseen Damage**

Where either the Employer or the Contractor is liable in damages to the other these shall not exceed the damage which the party in default could reasonably have foreseen at the date of the Contract.

### **Insurance**

#### **43.1 The Works**

The Contractor shall insure the Works in the joint names of the Contractor and the Employer to their full replacement value with deductible limits not exceeding those stated in the Preamble.

- (a) from the Commencement Date until the Risk Transfer Date against any loss or damage caused by any of the Contractor's Risks and any other risks specified in the Preamble, and
- (b) during the Defects Liability period against any loss or damage which is caused either:
  - (i) by the Contractor in completing any outstanding work or complying with his obligations under Clause 30, or
  - (ii) by any of the Contractor's Risks which occurred prior to the Risks Transfer Date.

#### **43.2 Contractor's Equipment**

The Contractor shall insure Contractor's Equipment for its full replacement value whilst in transit to the Site, from commencement of loading until completion of unloading at the Site and while on the Site against all loss or damage caused by any of the Contractor's Risks.

#### **43.3 Third Party Liability**

The Contractor shall insure against liability to third parties for any death or personal injury and loss of or damage to any physical property arising out of the performance of the Contract and occurring before the issue of the last Defects Liability Certificate.

Such insurance shall be effected before the Contractor begins any work on the Site. The insurance shall be for not less than the amount specified in the Preamble.

**43.4 Employees**

The Contractor shall insure and maintain insurance against his liability under Sub- Clause 41.1.

**43.5 General Requirements of Insurance Policies**

The Contractor shall:

- (a) whenever required by the Employer produce the policies or certificates of any insurance which he is required to effect under the Contract together with receipts for the premiums,
- (b) effect all insurances for which he is responsible with an insurer and in terms approved by the Employer,
- (c) make no material alterations to the terms of any insurance without the Employer's approval. If an insurer makes any material alteration to the terms the Contractor shall forthwith notify the Employer, and
- (d) in all respect comply with any conditions stipulated in the insurance policies which he is required to place under the Contract.

**43.6 Permitted Exclusions from Insurance Policies**

The insurance cover affected by the Contractor may exclude any of the following:

- (a) the cost of making good any part of the Works which is defective or otherwise does not comply with the Contract provided that it does not exclude the cost of making good any loss or damage to any other part of the Works attributable to such defect or non-compliance,
- (b) indirect or consequential loss of damage including any reductions in the Contract Price for delay,
- (c) wear and tear, shortages and theft, or
- (d) risks relating to vehicles for which third party or other insurance is required by law.

**43.7 Remedies on the Contractor's Failure to Insure**

If the Contractor fails to produce evidence of insurance cover as stated in Sub-Clause

43.5 (a) then the Employer may effect and keep in force such insurance. Premiums paid by the Employer for this purpose shall be deducted from the Contract Price.

### **43.8 Amounts not Recovered**

Any amounts not recovered from the insurers shall be borne by the Employer or Contractor in accordance with their responsibilities under Clause 37.

## **Force Majeure**

### **44.1 Definition of Force Majeure**

Force Majeure means any circumstances beyond the control of the parties, including but not limited to:

- (a) war and other hostilities, (whether war be declared or not), invasion, act of foreign enemies, mobilization, requisition or embargo,
- (b) ionizing radiation or contamination by radio-activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosives, or other hazardous properties of any explosive nuclear assembly or nuclear components thereof,
- (c) rebellion, revolution, insurrection, military or usurped power and civil war,
- (d) riot, commotion or disorder, except where solely restricted to employees of the Contractor.

### **44.2 Effect of Force Majeure**

Neither party shall be considered to be in default or in breach of his obligations under the Contract to the extent that performance of such obligations is prevented by any circumstances of Force Majeure which arise after the date of the Letter of Acceptance or the date when the Contract becomes effective, whichever is the earlier.

### **44.3 Notice of Occurrence**

If either party considers that any circumstances of Force Majeure have occurred which may affect performance of his obligations he shall promptly notify the other party and the Engineer thereof.

### **44.4 Performance to Continue**

Upon the occurrence of any circumstances of Force Majeure the Contractor shall endeavor to continue to perform his obligations under the Contract so far as reasonably practicable. The Contractor shall notify the Engineer of the steps he proposes to take including any reasonable alternative means for performance which is not prevented by Force

Majeure. The Contractor shall not take any such steps unless directed so to do by the Engineer.

**44.5 Additional Costs caused by Force Majeure**

If the Contractor incurs additional costs in complying with the Engineer's directions under Sub-Clause 44.4, the amount thereof shall be certified by the Engineer and added to the Contract Price.

**44.6 Damage Caused by Force Majeure**

If in consequence of Force Majeure the Works shall suffer loss or damage the Contractor shall be entitled to have the value of the work done, without regard to the loss or damage that has occurred, included in a Certificate of Payment.

**44.7 Termination in Consequence of Force Majeure**

If circumstances of Force Majeure have occurred and shall continue for a period of one hundred and eighty two (182) days then, notwithstanding that the Contractor may by reason thereof have been granted an extension of Time for Completion of the Works, either party shall be entitled to serve upon the other twenty eight (28) days' notice to terminate the Contract. If at the expiry of the period of twenty eight (28) days Force Majeure shall still continue the Contract shall terminate.

**44.8 Payment on Termination for Force Majeure**

If the Contract is terminated under Sub-Clause 44.7 the Contractor shall be paid the value of the work done.

The contractor shall also be entitled to receive:

- (a) the amounts payable in respect of any preliminary items so far as the work or service comprised therein has been carried out and a proper proportion of any such item in which the work or service comprised has only been partially carried out,
- (b) the cost of materials or goods ordered for the Works or for use in connection with the Works which have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery. Such materials or goods shall become the property of and be at the risk of the Employer when paid for by the Employer and the Contractor shall place the same at the Employer's disposal,
- (c) the amount of any other expenditure which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the whole of the Works,
- (d) the reasonable cost of removal of Contractor's Equipment from the Site and the return thereof to the Contractor's works in his country

- or to any other destination at no greater cost, and
- (e) the reasonable cost of repatriation of the Contractor's staff and workmen employed wholly in connection with the Works at the date of such termination.

#### **44.9 Release from Performance**

If circumstances of Force Majeure occur and in consequence thereof under the law governing the Contract the parties are released from further performance of the Contract, the sum payable by the Employer to the Contractor shall be the same as that which would have been payable under Sub-Clause 44.8 if the Contract had been terminated under Sub-Clause 44.7.

#### **44.10 Force Majeure Affecting Engineer's Duties**

The provisions of Clause 44 shall also apply in circumstances where the Engineer is prevented from performing any of his duties under the Contract by reason of Force Majeure.

### **Default**

#### **45.1 Notice of Default**

If the Contractor is not executing the Works in accordance with the Contract or is neglecting to perform his obligations thereunder so as seriously to affect the carrying out of the Works, the Engineer may give notice to the Contractor requiring him to make good such failure or neglect.

#### **45.2 Contractor's Default**

If the Contractor:

- (a) has failed to comply within a reasonable time with a notice under Sub-Clause 45.1, or
- (b) assigns the Contract or subcontracts the whole of the Works without the Employer's written consent, or
- (c) becomes bankrupt or insolvent, has a receiving order made against him or compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors or goes into liquidation.

The Employer may, after having given seven (7) days notice to the Contractor, terminate the Contract and expel the Contractor from the Site.

Any such expulsion and termination shall be without prejudice to any other rights or powers of the Employer, the Engineer or the Contractor under the Contract.

The Employer may upon such termination complete the Works himself or by any other contractor.

#### **45.3 Valuation at Date of Termination**

The Engineer shall, as soon as possible after such termination, certify the value of the Works and all sums then due to the Contractor as at the date of termination in accordance with Clause 33.

#### **45.4 Payment after Termination**

The Employer shall not be liable to make any further payments to the Contractor until the Works have been completed. When the Works are so complete, the Employers shall be entitled to recover from the Contractor the extra costs, if any, of completing the Works after allowing for any sum due to the Contractor under Sub-Clause 45.3. If there is no such extra cost the Employer shall pay any balance due to the Contractor.

#### **45.5 Effect on Liability for Delay**

The Contractor's liability under Clause 27 shall immediately cease when the Employer expels him from the Site without prejudice to any liability thereunder that may have already occurred.

#### **46.1 Employer's Default**

The Contractor may, by giving fourteen (14) days notice to the Employer and the Engineer, terminate the Contract if the Employer:

- (a) fails to pay the Contractor the amount due under any certificate of the Engineer within twenty eight (28) days after the amount became payable, or
- (b) interferes with or obstructs the issue of any certificate of the Engineer, or
- (c) becomes bankrupt or insolvent, has a receiving order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors or goes into liquidation, or goes into liquidation, or

- (d) consistently fails to meet his contractual obligations, or
- (e) appoints, a person to act with or in replacement of the Engineer without the Contractor's consent.

Any such termination shall be without prejudice to any other rights of the Contractor under the Contract.

#### **46.2 Removal of Contractor's Equipment**

On such termination, the Contractor shall be entitled to remove immediately all Contractor's Equipment which is on the Site.

#### **46.3 Payment on Termination for Employer's Default**

In the event of such termination the Employer shall pay the Contractor an amount calculated in accordance with Sub-Clause 44.8.

The Employer shall pay in addition the amount of any loss or damage, including loss of profit which the Contractor may have suffered in consequence of termination. The additional amount shall, however, not exceed the limit specified in the Preamble.

### **Change in Cost and Legislation**

#### **47.1 Labour, Materials and Transport**

Where the Contract Price is to be adjusted for changes in the cost of labour, materials, transport or other costs of execution of the Works, the method for calculating such adjustment shall be specified in the Preamble.

When calculating the adjustment no account shall be taken of any increased cost which results from the Contractor's default or negligence.

#### **47.2 Statutory and Other Regulations**

The Contract Price shall be adjusted to take account of any increase or decrease in cost resulting from changes in legislation of the country where the Site is located or in its generally accepted interpretation.

Legislation means any law, order, regulation or bye-law having the force of law, which affects the Contractor in the performance of his obligations under the Contract, made after the date 28 days prior to the latest date for submission of tenders for the Works.

The Engineer shall certify the amount of the resulting increase or decrease in cost, which shall be added to or deducted from the Contract Price.

## **Customs**

### **48.1 Customs and Import Duties**

Unless otherwise stated in Part II the Employer shall pay all customs, import duties and taxes in consequence of the importation of Plant. If the Contractor is required to pay such customs, import duties and taxes, the Employer shall reimburse the amount thereof.

### **48.2 Clearance through Customs**

The Employer shall assist the Contractor in obtaining clearance through the customs of all Plant and Contractor's Equipment and in procuring any necessary government consent to the re-export of Contractor's Equipment when it is removed from the Site.

## **Notices**

### **49.1 Notices to Contractor**

All certificates, notices or written orders to be given to the Contractor by the Employer or the Engineer under these Conditions shall be sent by airmail post, cable, telex or facsimile transmission to or left at the Contractor's principal place of business or such other address as the Contractor shall nominate for that purpose, or may be handed over to the Contractor's representative.

### **49.2 Notice to Employer and Engineer**

Any notice to be given to the Employer or to the Engineer under these Conditions shall be sent by airmail post, cable, telex or facsimile transmission to or left at the respective addresses nominated for that purpose in the Preamble, or handed over to the Engineer's or the Employer's representative authorized to receive it.

### **49.3 Minutes of Meetings**

Instructions or notices to the Contractor and notices from the Contractor to the Engineer or the Employer recorded in a minute or protocol signed by the authorized representatives of the giver and recipient of such notice or instruction shall be valid notice or instruction for the purposes of the Contract.

## **Disputes and Arbitration**

### **50.1 Disputes concerning Engineer's Decisions**

If either party is dissatisfied with a decision or instruction of the Engineer as confirmed, reversed or varied in accordance with Clause 2 he may refer the matter to arbitration pursuant to Sub-Clause 50.2.

Unless the dissatisfied party has notified the other party and the Engineer within fifty six (56) days of such decision or instruction of his intention to refer the matter to arbitration, he shall be deemed to have accepted the decision as final.

Reference to arbitration shall not relieve the Contractor of his obligation to proceed with the Works in accordance with the Engineer's decision or instruction, nor relieve the Employer of any of his obligations under the Contract.

The Contractor shall in any such arbitration be at liberty to rely on reasons additional to the reasons stated in the notice given under Sub-Clause 2.7.

## **50.2 Arbitration**

If at any time any question, dispute or difference shall arise between the Employer and the Contractor in connection with or arising out of the Contract or the carrying out of the Works either party shall be entitled to refer the matter to be finally settled by arbitration in accordance with the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with those Rules, or by arbitration in accordance with such other rules as are specified in Part II.

The Arbitrators(s) shall have full power to open up, review and revise:

- (a) any decision or instruction of the Engineer referred to arbitration pursuant to Sub-Clause 50.1, and
- (b) any certificate of the Engineer related to the dispute.

## **50.3 Works to Continue**

Performance of the Contract shall continue during arbitration proceedings unless the Employer shall order suspension. If any such suspension is ordered the reasonable costs incurred by the Contractor and occasioned thereby shall be added to the Contract Price.

No payments due or payable by the Employer shall be withheld on account of pending reference to arbitration.

## **50.4 Time Limit for Arbitration**

Formal notice of arbitration must be given to the other party, and where required to the appropriate arbitration body, no later than eighty four (84) days after the issue of the Final Certificate of Payment

## **Law and Procedure**

### **51.1 Applicable Law**

The law which is to apply to the Contract and under which the Contract is to be construed is stated in the Preamble.

**51.2 Procedural Law**

The law governing the procedure and administration of any arbitration instituted pursuant to Clause 50 is stated in the Preamble.

**51.3 Language**

The language and place of the arbitration are stated in the Preamble.

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## EDITORIAL AMENDMENTS

Following publication of the Third Edition of the Conditions of Contract for Electrical and Mechanical Works in 1987, a number of editorial amendments were agreed by FIDIC. The amendments have been incorporated during reprinting and the list below clarifies the differences between this copy and the original document.

Page 1 inserted: Commencement date	The following additional text has been inserted: Sub-Clause 1.1.1.(i) The date for commencement of the Works is _____
Page 2	Sub-Clause 36.4(b) was previously Sub-Clause 36.4 The word 'Sums' following ' shall be' has been deleted.
Page 8	Sub-Clause 2.7. The missing letter 'D' has been inserted in 'Disputing' (margin note.)
Page 33	Sub-Clause 44.8(b). The word 'Contractor' on the last line was previously 'Contract'.
Page 35	Sub-Clause 49.3. The word 'or' between 'minute' and 'protocol' was previously 'of'.
Index, page (i)	The words 'Adverse physical conditions and artificial obstructions' have been deleted.
Index, page (v)	The word 'adverse' has been deleted after 'Physical conditions'. Contract Agreement The word 'Agreement' in the title has been capitalized.
Line 4	Inverted commas have been inserted after 'Employer'.
Line 6	Inverted commas have been inserted before the word 'the' and deleted before the word 'Contractor'.
Line 7	The comma following the word 'executed' has been deleted.
Line 15	Inverted commas have been inserted before the word 'the' and deleted after the word 'the'.
Item 4, line 2	The word 'defects' was previously 'defect'.
Item 4, line 3	The words 'become' was previously 'be come'.
Item 5, line 1	The words 'and statutes or constitutions' have been inserted after the word 'laws'.
Item 5, line 2	The words 'by their duly authorized signatories' have been inserted after the word 'hereof'.

Item 5

The remaining text of the original document has been deleted and is replaced by:

'Binding Signatures(s) on behalf of the Employer\_\_\_\_\_ , and  
'Binding Signatures(s) on behalf of the Contractor\_\_\_\_\_

**PARTICULAR CONDITIONS OF  
CONTRACT**

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## **PART-II: PARTICULAR CONDITIONS OF CONTRACT**

These Conditions of Particular Application Part-II are additions, deletions and amendment to General Conditions of Contract Part-I. Clause Nos., if similar as of Part-I are amendments therein otherwise these are additional clauses or sub-clauses thereto.

This Contract is a single responsibility EPC/Turnkey Contract for all the purposes. Any mentions or descriptions and intents in this Contract Agreement which are contrary to the spirit of EPC/Turnkey Contract shall be ignored.

### **1.1 Definitions**

The text of Sub-Clause 1.1.1 is deleted and substituted by the following:

“Commencement Date” means the date specified in the Preamble to Conditions of Contract. The text of Sub-Clause 1.1.2 is deleted and substituted by the following:

“Conditions” means the Preamble to Conditions of Contract, General Conditions of Contract (GCC) and Particular Conditions of Contract (PCC).

### **Sub-Clause 1.1.3**

At the end of Sub-Clause, the following is added:

“Any subsequent document mutually agreed and signed by the Employer and the Contractor, shall be the part of the Contract.”

### **Sub-Clause 1.1.5**

The text of Sub-Clause 1.1.5 is deleted and substituted by the following:

“Contract Price” means the sum stated in the Letter of Acceptance as payable to the Contractor for the design, execution and completion of the Works subject to such additions thereto or deductions there from as may be made under the provisions hereinafter contained and remedying of any defects therein in accordance with the provisions of the Contract”.

### **Sub-Clause 1.1.11**

The Defects Liability Period is the period mentioned in the Preamble to Conditions of Contract.

### **Sub-Clause 1.1.15**

The following is added at the beginning of this Sub-Clause:

“For the purpose of this EPC/Turnkey Contract, based on two party agreement, the term Engineer is construed as Project Manager/Engineer. The Project Manager is a Person appointed by the Employer to act on behalf of the Employer for the purpose of the Contract whereas the Engineer has the same meaning as defined in GCC Sub-Clause 1.1.15.”

The following is added at the end of the Sub-Clause:

“or any other competent person appointed by the Employer as his replacement.”

Sub-Clause 1.1.16

The term “Engineer’s Representative” is replaced with the term “Project Manager/Engineer’s Representative”.

Sub-Clause 1.1.23

The following paragraph is added:

The word ‘Good’ is synonymous with the word “Plant”.

The text of **Sub-Clause 1.1.27** is deleted and substituted by the following:

“Schedule of Prices” means the completed and priced Schedule of Prices, or any part or individual schedule thereof, submitted by the Contractor with his Bid or revised and mutually agreed and forming a part of the Contract Documents.

Add the following at the end of Sub-Clause 1.1.33:

The word “Tender” is synonymous with the word “Bid” and the word ‘Tender Documents’ with “Bidding Documents” including technical bid is also part of it.

The following new Sub-Clauses 1.1.38 to 1.1.49 are added:

**1.1.38**      **“Month”** means calendar month according to Gregorian calendar.

**1.1.39**      **“Operation and Maintenance Manuals”** has the meaning described in Sub-Clause 6.6.”

**1.1.40** **“Warranty Certificate”** means the certificate against specified goods/equipment, for the period mentioned in the Preamble to Conditions of Contract, to be issued by the Contractor that the goods/equipment supplied under the Contract are new, unused and incorporate all recent improvements in design and materials unless provided otherwise in the Contract and that the Contractor will be responsible for making good or replacing any defective goods/equipment during the Warranty Period specified in the Preamble to Conditions of Contract which should commence after expiry of Defect Liability Period.

Sub-Clause 1.1.41

The word ‘Part II’ wherever appearing in FIDIC Conditions of Contract is synonymous with the words “Particular Conditions of Contract”.

Sub-Clause 1.1.42

The words ‘Local Goods’ is synonymous with the words “Indigenous Goods” and the word ‘Installation’ with “Erection”.

Sub-Clause 1.1.43

“EPC/Turnkey Basis” means where the Contractor takes total responsibility for design and execution of the project with little involvement of the Employer. Under the usual arrangements of turnkey projects the contractor carries out all the Engineering, Procurement and Construction (EPC) providing a fully equipped facility ready for operation.

Total responsibility of the Contractor include; but not limited to; design, supply, installation and commissioning of all mechanical and electrical equipment, civil and other works necessary for the completion and commercial operation of the Plant and shall include all such items of Plant and equipment or work, whether mentioned in the Specifications, Bid drawings, Schedule of Prices or not, which are required to make the Plant operationally complete in accordance with the guarantees prescribed under the Contract

Sub-Clause 1.1.44

“Constructional Plant” means all appliances or things of whatsoever nature (other than Temporary Works) required for execution and completion of the Works and the remedying of any defects therein but does not include Plant, materials or other things intended to form or forming part of Permanent Works. The word ‘Constructional Plant’ is synonymous with “Contractor’s Equipment”.

Sub-Clause 1.1.45

“Contractor’s Agent” means the person for the time being or from time to time appointed by the Contractor pursuant to the provisions of Clause 13. The word “Contractor’s Agent” is synonymous with “Contractor’s Representative”.

Sub-Clause 1.1.46

“Performance Tests” means tests intended to demonstrate the attainment of guaranteed contract performance to be conducted in accordance with the requirement of the Specifications.

Sub-Clause 1.1.47

“Reliability Test” means such test or tests as are provided for in the Contract, or as may be agreed upon, which shall be successfully completed as a pre-requisite to Taking Over.

Sub-Clause 1.1.48

“Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required in or about the execution and completion of the Works and the remedying of any defects therein.

Sub-Clause 1.1.49

“Permanent Works” means the permanent works to be executed (including Plant) in accordance with the Contract.

#### Sub-Clause 1.6 Costs, Overhead Charges and Profit

The last sentence “Any profit\_\_\_\_\_stated in the Preamble” is deleted and substituted by the following:

“Any profit entitlement shall be added to cost at the percentage stated in the Bid and agreed in the Contract Agreement.”

#### Sub-Clause 2.1 Project Manager/Engineer’s Duties

The text of Sub-Clause 2.1 is deleted and substituted by the following:

“The Project Manager/Engineer shall carry out the duties specified in the Contract.

The Project Manager/Engineer may exercise the authority attributable to the Project Manager/Engineer as specified in or necessarily to be implied from the Contract. The Project Manager/Engineer is required to obtain the specific approval of the Employer before carrying out his duties in accordance with the following Clauses of General Conditions of Contract (GCC):

- (a) approval of Subcontractor under Sub-Clause 4.1,
- (b) certifying additional sums under Sub-Clause 5.4,
- (c) certifying additional costs under Sub-Clauses 11.3 & 12.3,
- (d) certifying any cost under Sub-Clause 14.6,
- (e) approval of extension of time under Clause 26,
- (f) issuing a Taking-Over Certificate under Sub-Clause 29,
- (g) issuing a Defects Liability Certificate under Sub-Clause 30.11,
- (h) issuing a Variation Order under Clause 31,
- (i) fixing rates or prices under Clauses 31 and 34,
- (j) certifying additional costs under Sub-Clause 44.5 and
- (k) certifying additional costs under Sub-Clause 47.2;

Except for such variations pursuant to Sub-Clause 31.1 of the GCC which may be necessary in an emergency affecting safety of life, the Works or of adjoining property.

Except as expressly stated in the Contract, the Project Manager/Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.”

#### Sub-Clause 2.6 Confirmation in Writing

- (i) In line 3 after the words “undue delay” the following is added:  
“but not after the number of days mentioned in the Preamble to Conditions of Contract from the instruction or decision”.

- (ii) At the end of Sub-Clause 2.6, the following is added:

“The Project Manager/Engineer shall confirm or otherwise within the period mentioned in the Preamble to Conditions of Contract from the receipt of requirement(s) from the Contractor”.

#### Sub-Clause 2.8 Replacement of Project Manager/Engineer

The text of Sub-Clause 2.8 is deleted in its entirety and substituted by the following:

“If the Employer intends to replace the Project Manager/Engineer, the Employer shall, not less than fourteen (14) days before the intended date of replacement, give notice to the Contractor, of the name, address and relevant experience of the intended replacement Project Manager/Engineer. The Employer shall not replace the Project Manager/Engineer with a person against whom the Contractor raises reasonable objection by notice to the Employer, with supporting particulars.”

The following new Sub-Clause 2.9 is added:

#### “Sub-Clause 2.9 Project Manager/Engineer Not Liable

Approval, reviews and inspection by the Project Manager/Engineer of any part of the Works does not relieve the Contractor from his sole responsibility and liability for the supply of remaining materials and equipment for the Works and parts thereof and complete the remaining erection works and testing and commissioning in accordance with the Contract and neither the Project Manager/Engineer's authority to act nor any decision made by him in good faith as provided for under this Contract whether to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Project Manager/Engineer to the Contractor, any Subcontractor, any of their representatives or employees or any other person performing any of the Works. However the Contractor shall be compensated if any loss/damage is occurred due to the decision of the Project Manager/Engineer.”

The following new Sub-Clause 4.2 is added:

#### “Sub-Clause 4.2 No Contractual Relation between Subcontractor and the Employer

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the Employer.”

#### Sub-Clause 5.3 Priority of Contract Documents

The text of Sub-Clause 5.3 is deleted and substituted by the following:

“Unless otherwise provided in the Contract, the priority of the Contract Documents shall be as follows:

1. The Contract Agreement (if completed)
2. The Letter of Acceptance
3. The completed Letters of Technical and Price Bids
4. Preamble to Conditions of Contract
5. The Particular Conditions of Contract
6. The General Conditions of Contract
7. The priced Schedule of Prices
8. The completed Schedules to Bid (A to L)

9. The Specifications
10. The Drawings
11. Any other document forming part of the Contract.

In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by drawing(s) of a later date regardless of scale. All drawings and specifications shall be interpreted in conformity with the Contract Agreement and these conditions.”

#### Sub-Clause 5.4 Documents Mutually Explanatory

The text appearing in the last line after the words “the Contract Price” is deleted and the following text is added:

“The Technical Specifications are taken to be correct, but complete accuracy is not guaranteed. Any error or ambiguity must be reported to the Employer and the Project Manager/Engineer before starting the work affected. In the event of any dispute arising as to the true intended meaning of Technical Specification, the Project Manager/Engineer shall interpret the same and his interpretation shall be accepted as final and binding upon all parties concerned, except to the extent provided for in the Arbitration provisions hereof.”

#### Sub-Clause 6.2 Consequences of Disapproval of Contractor's Drawings

Full stop in the last line is deleted and the following words are added at the end of the Sub-Clause: “for the approval of the Project Manager/Engineer. However, the Contractor shall not be entitled for time extension on this account”.

#### Sub-Clause 6.6. Operation and Maintenance Manuals

Paras 2 & 3 are deleted and the following text is added at the end of Para 1 of Sub-Clause:

“The Operation and Maintenance Manuals shall include full instructions for the operation, servicing and maintenance of the Plant, not only during the period of the Contractor's liability but more particularly during its operating life.

The directions shall be set out simply, clearly and systematically. This may be divided into two volumes if desirable, one for operation and the second for servicing and maintenance (in sub- volumes for major items of Plant).

The operational data shall include a complete physical and functional description of the Plant (in sub-volumes for major items of Plant) and step-by-step procedures for inspection, checking and adjustments for proper operation of the Plant.

The maintenance data shall include complete instructions for routine checks, servicing, maintenance and repair of all parts and for dismantling, handling and re-assembly of all equipment, sub-assemblies and all separate components. The maintenance data shall also include where possible parts catalogues. The lists shall

provide all necessary information for identifying the parts and for re-ordering the parts including name of part, part number and catalogue references where applicable, name of manufacturer, size, capacity and other characteristics.

General arrangements, single line diagrams and detailed drawings shall be provided for ready reference in the operation and maintenance instructions.

The manuals shall be printed on ISO paper size A4 (210x297 mm) with offset or equivalent printing strongly bound in a durable stiff cover bearing the title in approved legend. Drawings shall be folded or reduced to 297 mm height. All volumes shall bear on the spine an approved shortened version of the title.

The Contractor shall submit three (3) draft copies for approval of the Project Manager/Engineer prior to producing finished volumes.

The Contractor shall provide seven (7) copies of the approved Operation and Maintenance Manuals prior to Taking Over by the Employer. Supplementary Operation and Maintenance Manual shall be provided by the Contractor, if required, to incorporate changes resulting from experience during the operation and maintenance period. The work shall not be considered to be completed for the purpose of taking over until such manual and drawings have been supplied to the Employer.”

#### Sub-Clause 6.9 Manufacturing Drawings

The words “Unless otherwise specified in Part-II” are deleted and the following is added at the end of Sub-Clause:

“However, the Contractor is required to disclose to the Project Manager/Engineer or the Employer any confidential information necessary to justify the reliability, the efficiency and the operation and maintenance of the Plant supplied by him.”

The following new Sub-Clauses 6.10 and 6.11 are added:

#### Sub-Clause 6.10 “As-Built” Drawings

The Contractor shall furnish to the Project Manager/Engineer six (6) copies and one (1) reproducible of approved quality of all “As-Built” drawings within the period mentioned in the Preamble to Conditions of Contract. All drawings shall also be provided in an electronic form (CD).

#### Sub-Clause 6.11 Shop Drawings

The Contractor shall submit to the Project Manager/Engineer for review three (3) copies of all shop and site erection work drawings in 1:4 scale seeking approval of the Project Manager/Engineer.

Review and approval by the Project Manager/Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and that the Project Manager/Engineer’s review or

approval shall not relieve the Contractor of any of his responsibilities under the Contract.”

#### Sub-Clause 8.1 General Obligations

The text of Sub-Clause 8.1 is deleted and substituted by the following:

- “(a) The Contractor shall commence the work on the date specified in the Preamble to Conditions of Contract and shall proceed with the same with due expedition and without delay.
- (b) The Contractor shall, in accordance with the Contract, with due care and diligence, complete the Works and test and commission the Plant and carry out the Works within the Time for Completion. The Contractor shall also provide all necessary Contractor's Equipment, superintendence, labour and except as stated herein below, all necessary facilities therefor.

The Employer will permit use of the Erection and Testing Equipment and Maintenance Tools as given in the Preamble to Conditions of Contract.

The above facilities shall be provided at no cost to the Contractor but he shall procure at his cost all required consumable materials and any other items necessary for the proper execution of the Works. These shall be properly used and maintained by the Contractor and returned to the Employer upon handing over of the Works in good condition, fair wear and tear excepted. In case of any damage, loss or theft, the items shall be replaced by the Contractor at his own cost.”

#### Sub-Clause 10.1 Performance Security

The text of Sub-Clause 10.1 is deleted and substituted by the following:

“The Contractor shall provide a Performance Security in the prescribed Form annexed to these Documents. The said Security shall be furnished by the Contractor within twenty eight (28) days after the receipt of Letter of Acceptance. The Performance Security shall be of an amount equal to 5 percent of the Contract Price in the currency (ies) of the Contract in the form of Bank Guarantee from any Scheduled Bank of Pakistan or from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank of Pakistan or from any Insurance Company enlisted in Category AA with PACRA or JCR.

The performance security shall be valid for twenty eight (28) days beyond defect liability period and the amount shall be reduced to 5% during defects liability period.

The cost of complying with the requirements of this Sub-Clause shall be borne by the Contractor”.

#### Sub-Clause 10.3 Claims under Performance Security

Sub-Clause 10.3 is deleted in its entirety. The following new Sub Clause 10.4 is added:

Sub-Clause 10.4 Performance Security Binding on Variations and Changes

“The Performance Security shall be binding irrespective of variations and changes in the quantities of the Works or extensions in completion time of the Works, which are granted or agreed upon under the provisions of the Contract.”

Sub-Clause 11.1 Site Data

The following paragraphs are added at the end of Sub-Clause:

“The Contractor shall satisfy himself as to the nature of the ground, the hydrological and climatic conditions, the form and nature of the Site, the quantities and nature of the Work and materials necessary for the completion of the Works, and the means of access to the Site, the accommodation he may require and in general shall himself obtain all necessary information as to risks, contingencies, and other circumstances which may influence or affect his Bid.

The Employer does not guarantee the correctness of any data/information/drawings either verbal and/or written provided herein nor any interpretations, deductions or conclusions relative to conditions at Site. The Contractor must form his own opinion of the character of the work and of the materials to be excavated etc. He must make his own interpretations, and satisfy himself by his own investigations and research regarding all conditions affecting the work to be done. The Contractor must assume all responsibility for deductions and conclusions as to the nature or conditions of the materials to be excavated and of doing other work affected by the geology at the Site.”

Sub-Clause 12.1 Programme to be Furnished

- (1) The text of Sub-Clause 12.1(a) is deleted and substituted by the following:  
“(a) the order in which the Contractor proposes to carry out the Works (including preliminaries, required material ordering, delivery to Site, construction, erection and rectifications work, testing, commissioning of the Plant including design and construction of associated civil works and taking-over by the Employer). The programme on critical activity based format and resource planning schedule shall be prepared. The programme shall also include the following:
  - (i) Employment of local and expatriate labour of various categories;
  - (ii) Local material procurement; and
  - (iii) Material imports, if any.”
- (2) The text of Sub-Clause 12.1(c) is deleted and substituted by the following: “(c) The Contractor requires the Employer:
  - (i) to furnish any Employer’s Drawings;

- (ii) to provide access to the Site;
  - (iii) to have completed the civil engineering works; and
  - (iv) to have obtained consents, way leaves and approvals necessary for the purpose of the Works.”
- (3) The second last sentence of Sub-Clause 12.1 is deleted and substituted by the following:

“The programme is to be furnished by the Contractor within twenty eight (28) days from the date of receipt of Letter of Acceptance. Rs.....per day as delay damages shall be deducted for delay beyond this period. “The Project Manager/Engineer” proposed changes/modifications may also be incorporated and revised program shall be submitted within fifteen (15) days.”

The following new Sub-Clauses 12.4 and 12.5 are added:

**Sub-Clause 12.4 Monthly Progress Report**

During the period of the Contract, the Contractor shall submit six (6) sets of monthly progress report to the Project Manager/Engineer not later than the 8th day of each month including:

- (i) a construction schedule indicating the progress achieved during the preceding month;
- (ii) description of all work carried out since the last report;
- (iii) description of the work planned for the next forty-two (42) days sufficiently detailed to enable the Project Manager/Engineer to determine his programme of inspection and testing;
- (iv) summary of daily job record for the preceding month;
- (v) colour digital photographs to illustrate progress.

**Sub-Clause 12.5 Daily Job Record**

“During the period of the Contract, the Contractor shall keep a daily record of the work progress, which shall be made available to the Project Manager/Engineer as and when requested.

The daily record shall include particulars of weather conditions, number of men working in different categories, deliveries of materials, quantity, location and assignment of equipment.”

**Sub-Clause 13.1 Contractor's Representative**

At the end of the Sub-Clause, the following is added:

“The Contractor's Representative shall be a competent and skilled person approved by the Project Manager/Engineer (which approval may at any time be withdrawn). He shall be present on the Site during all working hours and shall not be transferred from the Site without the consent of the Project Manager/Engineer. The Contractor's Representative shall be a registered professional engineer as defined in the Pakistan Engineering Council Act 1975 (V of 1976).”

The following new Sub-Clauses 13.3 and 13.4 are added:

Sub-Clause 13.3 Language Ability of Superintending Staff of Contractor

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of the English language.

Sub-Clause 13.4 Employment of Local Personnel

"The Contractor shall, to the extent practicable and reasonable, employ staff and labour from sources within Pakistan."

Sub-Clause 14.1 Contractor's Equipment

Replace the word "or" at the end of Sub-paragraph (a) by "and" and insert the following at the end of Sub-paragraph (b):

"which shall not be unreasonably withheld."

Sub-Clause 14.2 Safety Precautions

At the end of the Sub-Clause, the following is added:

"In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the safety requirements of the Government of Pakistan with such modifications thereto as the Project Manager/Engineer may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Project Manager/Engineer may determine to be reasonably necessary for such purpose.

The Contractor shall make, maintain, and submit reports to the Project Manager/Engineer concerning safety, health and welfare of persons and damage to property as the Project Manager/Engineer may from time to time prescribe."

Sub-Clause 14.3 Electricity, Water and Gas

The text of Sub-Clause 14.3 is deleted and substituted by the following:

"The Contractor shall be responsible for making his own arrangements for the adequate supply of electricity, water and gas required for the effective performance of his obligations under the Contract. Subject to the aforesaid, the Contractor shall be entitled to use for the purposes of the Works such supplies and services as may be available on the Site. The Contractor shall, before the commencement of the work at Site, seek the approval of the Project Manager/Engineer as to his detailed requirements of electricity, water and gas for the entire Contract period. The Contractor shall pay the Employer at the rates/cost incurred by the Employer. The

Contractor shall at his own cost provide any apparatus necessary for such use". The contractor will bear the cost of distribution network for electricity, potable water, telephone, gas and their consumption by his own personnel for the purpose of the work."

Sub-Clause 14.4 Employer's Equipment

The text of Sub-Clause 14.4 is deleted and substituted by the following:

"The Employer shall, if the Contractor so requests for the execution of the works, operate any available equipment of which details are given in the Preamble to Conditions of Contract. The Contractor shall pay the Employer a mutually agreed price for such use.

The Employer shall during such operation retain control of and be responsible for the safe working of the equipment."

Sub-Clause 14.8 Information for Import Permits & Licenses

The text of Sub-Clause 14.8 is deleted and substituted by the following:

"The Contractor shall submit to the Employer in good time such details of all Plant and Contractor's Equipment to be imported into Pakistan and identify as to what assistance of the Employer is required for obtaining by the Contractor of all necessary import permits or licenses".

Sub-Clause 15.2 Compliance with Laws

The text of Sub-Clause 15.2 is deleted and substituted by the following:

"The Contractor shall comply with the Laws of country of manufacture and the Laws of Pakistan where the Plant is to be erected".

The following new Sub-Clauses 16.4 and 16.5 are added:

Sub-Clause 16.4 Photographs of Works and Advertisement Prohibited

Except with the prior written authorization of the Employer the Contractor shall not exhibit or permit to be exhibited any photographs or advertisement on the Works. Any authorized exhibition shall be immediately removed if the Employer so requires.

Sub-Clause 16.5 Training of Employer's/Consultant's Staff

The Contractor shall provide such facilities for the training of such numbers of Pakistani engineers, engineering students, apprentices and trade apprentices on such sections of the Works at the Site or on the Contractor's premises or Contractor selected plant manufacturer's premises and factories, or wherever else work is in hand, as specified or directed by the Project Manager/Engineer. The Employer shall direct what sums by way of wages and allowances are to be paid by the Contractor to

such persons and shall reimburse the Contractor for such sums as are so directed to be paid and are paid. The Contractor shall also provide medical expenses or medical insurance and travelling expenses for trainees if required by the Employer which shall be reimbursed by the Employer.

The language of training at the above stated premises shall be English and Urdu.”

#### Sub-Clause 17.4 Consents and Way Leaves

The text of Sub-Clause 17.4 is deleted and substituted by the following:

“The Employer shall issue permissions, letters, certificates and provide such other assistance to the Contractor for his obtaining permits-to-work, way leaves and approvals from any other department/authority and right of way from private owners, if required. The Contractor will bear the cost of logistics, fees, etc. for such activities. The Employer, will reimburse the Contractor only the payments made by him in respect of any land compensation for obtaining such way leaves, required for the Works.”

#### Sub-Clause 17.5 – Import Permits and Licenses

The word “Employer” is deleted and substituted by the word “Contractor” and the following is added at the end of Sub-Clause 17.5:

“The Employer will provide assistance for this purpose.”

#### Sub-Clause 18.1 – Engagement of Labour

At the end of the Clause the following is added:

“in accordance with the regulations, orders and requirements of the Government of Pakistan”. The following new Sub-Clauses 18.5 to 18.16 are added:

#### Sub-Clause 18.5 Employment of Persons in the Service of Others

The Contractor shall not recruit or attempt to recruit his staff and labour from amongst the persons in the service of the Employer or the Project Manager/Engineer and vice-versa, unless mutually agreed between the Employer/Project Manager/Engineer and the Contractor.

#### Sub-Clause 18.6 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such importation, sale gift, barter or disposal by his Subcontractors, agents, employees or labour.

Sub-Clause 18.7 Arms and Ammunition

The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

Sub-Clause 18.8 Festivals and Religious Customs

The Contractor shall in all dealings with his staff and labour have due regard to all recognized festivals, days of rest and religious or other customs.

Sub-Clause 18.9 Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful riotous or disorderly conduct by or amongst his staff and labour and for the preservation of peace and protection of persons and property in the neighborhood of the Works against the same.

Sub-Clause 18.10 Records of Safety and Health

The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Project Manager/Engineer may from time to time prescribe.

Sub-Clause 18.11 Reporting of Accidents

The Contractor shall report to the Project Manager/Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition to appropriate action required under the law, notify the Project Manager/Engineer immediately by the quickest available means.

Sub-Clause 18.12 Compliance by Subcontractors

The Contractor shall be responsible for compliance by his Subcontractors of the foregoing provisions.

Sub-Clause 18.13 Housing for Labour

Save insofar as the Contract otherwise provides, the Contractor shall provide and maintain such housing accommodation and amenities as he may consider necessary for all his supervisory staff and labour, employed for the purposes of or in connection with the Contract including all fencing, electricity supply, sanitation, cookhouses, fire prevention, water supply and other requirements in connection with such housing accommodation or amenities. On completion of the Contract, these facilities shall be handed over to the Employer or if the Employer so desires, the temporary camps or housing provided by the Contractor shall be removed and the Site reinstated to its original condition, all to the approval of the Project Manager/Engineer.

Sub-Clause 18.14 Epidemics

In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities, for purpose of dealing with and overcoming the same.

Sub-Clause 18.15 Supply of Water

The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site, to the satisfaction of the Project Manager/Engineer or his representative, adequate supply of drinking and other water for the use of his staff and labour.

Sub-Clause 18.16 Compliance by Subcontractors

The Contractor shall be responsible for compliance by his Subcontractors of the foregoing provisions.”

Sub-Clause 19.1 Manner of Execution

The following is added at the end of Sub-Clause:

“The Contractor shall submit for approval of the Project Manager/Engineer, his detailed method statement(s) for the execution of such items of work as may be desired by the Project Manager/Engineer. Approval of such method statement(s) shall neither relieve the Contractor of his responsibilities under the Contract nor form any basis for claiming additional costs.”

Sub-Clause 19.3 Uncovering Work

The following is added at the end of second paragraph of Sub-Clause 19.3: “In any other case, all costs shall be borne by the Contractor.”

The following new Sub-Clause 19.4 is added:

Sub-Clause 19.4 Use of Pakistani Materials

“The Contractor shall so far as may be consistent with the Contract make the maximum use of materials, supplies and equipment indigenous to or produced in Pakistan and services available in Pakistan or operated in Pakistan provided such materials, supplies, equipment and services shall be of required standard.”

The following new Sub-Clause 20.6 is added:

Sub-Clause 20.6 Witnessing of Factory Acceptance Tests (as applicable):

Factory acceptance tests shall be witnessed by the personnel (one each) of the Employer and the Project Manager/Engineer. All costs in connection with witnessing of the factory acceptance tests by the Employer and the Project Manager/Engineer shall be borne by the Contractor. These shall include the costs of air travel (economy class) from Pakistan to place of inspection/testing and back, hotel accommodation/boarding/lodging (as per actual), inland transportation and daily allowance @ US Dollars ..... per day per person for inspection/testing to be conducted outside Pakistan and Rs. ....per day per person [besides other costs of travelling and lodging etc. (as above)] for inspection/testing to be conducted inside Pakistan for each visit of every person to witness these tests.

#### Sub-Clause 24.1 Cost of Suspension

At the end of the second paragraph after the word “Contractor” the following is added:

“or for the proper execution or for the safety of the Works or Plant unless such necessity results from any act or default of the Project Manager/Engineer or the Employer or in consequence of any of the Employer's Risks under Sub-Clause 37.2.”

#### Sub-Clause 24.4 Resumption of Work

First paragraph of Sub-Clause 24.4 is deleted and substituted by the following:

“If the Contractor chooses not to treat prolonged suspension as an omission or termination under Sub-Clause 24.3, the Employer shall, upon the request of the Contractor, take over the responsibility for protection, storage, security and insurance of the suspended Works and of the Plant which has been delivered to the Site and which is affected by suspension and the risk of loss or damage thereto shall thereupon pass to the Employer”.

#### Sub-Clause 25.1 Time for Completion

The text of Sub-Clause 25.1 is deleted and substituted by the following:

“The Works at the place of the project mentioned in the Preamble to Conditions of Contract shall be completed tested and commissioned within the period mentioned in the Preamble to Conditions of Contract.”

#### Sub-Clause 26.1 Extension of Time for Completion

Sub-Clause 26.1(h) is deleted.

#### Sub-Clause 26.3 Earlier Completion

- (i) At the end of Sub-Clause 26.3(a) the following text is added and Clause is re- designated as 26.3.

“The extra sum to be paid to the Contractor for Completion of Works prior to the date of Completion established under Sub-Clause 25.1 shall be computed on the basis of the sums mentioned in the Preamble to Conditions of Contract.”

(ii) Sub-Clause 26.3 (b) is deleted.

The following new Sub-Clause 26.4 is added:

Sub-Clause 26.4 Rate of Progress

“If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any Section is at any time, in the opinion of the Project Manager/Engineer, too slow to comply with the Time for Completion, the Project Manager/Engineer shall so notify the Contractor who shall thereupon take such steps as are necessary, subject to the consent of the Project Manager/Engineer, to expedite progress so as to comply with the Time for Completion. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Project Manager/Engineer under this Clause, the Contractor considers that it is necessary to do any work at night or on locally recognized days of rest, he shall be entitled to seek the consent of the Project Manager/Engineer so to do. Provided that if any steps, taken by the Contractor in meeting his obligations under this Sub- Clause, involve the Employer in additional supervision costs, such costs shall, after due consultation with the Employer and the Contractor, be determined by the Project Manager/Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any moneys due or to become due to the Contractor and the Project Manager/Engineer shall notify the Contractor accordingly, with a copy to the Employer.”

Sub-Clause 27.1 Delay in Completion

The text of Sub-Clause 27.1 is deleted and substituted by the following:

“If the Contractor fails to deliver the Works, or any part thereof, within the time stated in Sub- Clause 25.1, or fails to complete the whole of the Work, or, if applicable, any Section within the relevant time prescribed by Sub-Clause 25.1, then the Contractor shall pay to the Employer the relevant sum stated herein below as liquidated damages for such default (which sum shall be the only moneys due from the Contractor for such default) for every day or part of a day which shall elapse between the relevant time for Delivery or Time for Completion and the actual date of delivery at site or the date stated in a Taking-Over Certificate of the whole of the Works or the relevant Section, as the case may be, subject to the applicable limit stated herein below.

The Employer may deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

The liquidated damages for each day of delay and the maximum amount of liquidated damages shall be the amounts mentioned in the Preamble to Conditions of Contract.”

Sub-Clause 28.7 Consequences of Failure to Pass Tests on Completion

The words “by arbitration” appearing at the end of the Sub-Clause 28.7(c) are deleted and substituted by the words “by the Project Manager/Engineer”.

Sub-Clause 30.4 Extension of Defects Liability Period

At the end of 4th paragraph of Sub-Clause the following is added: “or a mutually agreed period.”

Sub-Clause 30.5 Failure to Remedy Defects

In first line after the words “reasonable time” the following is added: “fixed by the Project Manager/Engineer”.

The following new Sub-Clause 30.13 is added:

Sub-Clause 30.13 Unfulfilled Obligations

“After the Defects Liability Certificate has been issued, the Contractor and the Employer shall remain liable for the fulfillment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force.”

Sub-Clause 31.1 Project Manager/Engineer's Right to Vary

The following is added at the end of second paragraph:

“No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with Clause 31. Provided that whether the issue of an instruction to vary the Works is necessitated by some default of or breach of Contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor”.

Sub-Clause 31.5 Records of Costs

The word “Engineer” in 4th line of Sub-Clause is deleted and substituted by “Project Manager/Engineer/Employer”.

The following new Sub-Clauses 31.6 and 31.7 are added:

Sub-Clause 31.6 Day work under Variation Order

A Variation Order may provide that work done pursuant thereto shall be executed as Day work, if applicable in the opinion of the Project Manager/Engineer. In such case the Contractor shall be paid for such work under the conditions and the rates and prices set out in the Day Work Schedule.

#### Sub-Clause 31.7 Value Engineering

The Contractor may, at any time, submit to the Project Manager/Engineer a written proposal which in the Contractor's opinion will reduce the cost of constructing, maintaining or operating the works, or improve the efficiency or value to the Employer of the completed Works or otherwise be of benefit to the Employer. Any such proposal shall be prepared at the cost of the Contractor. However Employer is not bound to accept such proposal."

#### Sub-Clause 33.1 Terms of Payment

The text of Sub-Clause 33.1 is deleted and substituted by the following:

"The EPC/Turnkey Contract shall be payable for the following items: *[Text and number of items given here below are as way of example which may be increased or decreased as per type of the project]*.

The Interim Payment Certificate will be released by the Project Manager / Engineer Incharge within twenty one (21) days of the date of submission of each certificate on basis of actual measurement basis.

Five percent (5%) of the total or partial amount upon successful completion of defects liability period by the Project Manager / Project Engineer (with the approval of the Employer), within Twenty one (21) days after receipt of invoice.

#### **Grand Summary of Bid Prices**

Grand Summary will include total price of each schedule.

The mobilization advance will be deducted in four equal installments whereas the rate of recovery can be increased by the employer at any time.

Secured Advance

(Employer may opt either "Secured Advance on Materials" if applicable shall be given after the Contractor has provided indemnity bond for secured advance as per standard format.

#### **Advance Payment Security**

The Contractor will submit advance payment security for all advance payments in the form of Bank Guarantee issued by a Scheduled Bank of Pakistan or from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan in favor of the Employer valid for a period twenty eight (28) days beyond issue of taking over certificate."

The following new Sub-Clauses 33.1.1 to 33.1.5 are added:

#### **Sub-Clause 33.1.1 Retention of Payment**

Retention money shall be deducted at the rate of 5% from each running bill of the contractor. The rate of recovery can be increased as following condition. 50% retention money shall be released after and handing taking over & balance 50% after successful completion of defect liability period. "If at any time any payment would fall due for Works or part of Works and, if there shall be any defect in part of such Works in respect of which such payment is proposed, the Employer may retain the

whole or any part of such payment. Any sum retained by the Employer pursuant to the provisions of this Clause shall be paid to the Contractor after the said defect is removed.”

Sub-Clause 33.1.2 Payment Where Taking-Over Certificate Issued for Section or Part of Works

“If any section or part of the Works shall be taken-over separately under Clause 29 (Taking-Over) hereof, the payments herein provided for on or after Taking-Over shall be made in respect of the section or part taken-over and reference to the price shall mean such part of the price as shall, in the absence of agreement, be apportioned thereto by the Project Manager/Engineer.”

Sub-Clause 33.1.3 Extra Payment

No extra payment in respect of overtime, additional materials, or special conditions or hardship shall be claimed by the Contractor unless otherwise provided in the Contract or such payments have been previously authorized in writing by the Project Manager/Engineer or the Employer.

Sub-Clause 33.1.4 Breakdown of Lump Sum Items

For the purposes of statements to be submitted in accordance with Sub-Clause 33.1 hereof, the Contractor shall submit to the Project Manager/Engineer, within twenty eight (28) days after the receipt of the Letter of Acceptance, a breakdown for each of the lump sum items contained in the Bid. Such breakdowns shall be subject to the approval of the Project Manager/Engineer.”

Sub-Clause 33.2 Method of Application

The following paragraphs are added:

“The Contractor shall submit to the Employer/Project Manager/Engineer six (6) copies of the Application for Certificate of Payment (invoices) each signed by the Contractor and in such form as the Employer/Project Manager/Engineer may from time to time prescribe.

The Employer/Project Manager/Engineer shall examine such invoices within the times stated in Sub-Clauses 33.3 and 33.5. After such time each invoice will be deemed to have been accepted. If the invoice amount is not accepted by the Employer/Project Manager/Engineer, the disputed amount which is retained, shall be communicated, giving the reasons in writing, to the Contractor within the same time. If the objections of the Employer/Project Manager/Engineer are not acceptable to the Contractor he will justify his claims with necessary documentation and include left over amounts / items in the next invoice. However, the portions of such invoices accepted by the Employer/Project Manager/Engineer shall be paid as per Sub-Clause 33.5.”

Sub-Clause 33.5 Payment

The text of Sub-Clause 33.5 is deleted and substituted by the following:

“The amount due to the Contractor under any Interim Payment Certificate issued by the Project Manager/Engineer pursuant to this Clause, or to any other term of the Contract, shall, subject to Clause 27, be paid by the Employer to the Contractor within seven(07) days of submission of Interim payment certificate, Furthermore, 50% amount of Interim payment certificate will be released on submission and remaining will be released after verification of Project Manager/Engineer. In case of Final Certificate (referred to in Sub-Clause 33.10) within fourteen (14) days after submission of Final Payment Certificate.

Deduction shall be made from the net amounts payable to the Contractor of any sum(s) in accordance with the prevalent Federal and/or Provincial laws, provided that no such deduction shall be made from those payments in respect of which the Contractor has obtained exemption under the Law.”

#### Sub-Clause 33.6 Delayed Payment

The text of Sub-Clause 33.6 is deleted and substituted by the following:

“In the event of the failure of the Employer to make payment within the times stated in Sub-Clause 33.5, the Employer shall pay to the Contractor compensation at the rate of KIBOR + 2 percent for local currency per annum upon all local currency sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to Contractor's entitlement under Sub-Clause 46.1.”

#### Sub-Clause 33.8 Payment by Measurement

The work shall be measured for the units mentioned in the Schedule of Prices according to the Contract as determined by the Project Manager/Engineer from approved drawings, Specifications and Contract Documents.

#### Sub-Clause 33.11 Issue of Final Certificate of Payment

The following paragraph is added at the end:

“The final certificate of payment is also subject to the production of “As-Built Drawings” by the Contractor as per Sub-Clause 6.10 of particular Conditions of Contract.

The following Sub-Clauses 33.12 and 33.13 are added:

#### Sub-Clause 33.12 Withholding of Payment

If the Works or any parts thereof are not being carried out to the Project Manager/Engineer's satisfaction and in order to protect the Employer from loss on account of:

- (a) defective work not rectified
- (b) guarantees not met
- (c) claims filed against the Contractor

- (d) failure of the Contractor to make payments due for Plant procured or labour employed by him
- (e) damage to any other contractor employed by the Employer
- (f) Contractor's non-compliance with the Contract
- (g) any Government dues recoverable from the Contractor if notified by the Government

The Project Manager/Engineer may notify withholding of such payments or part thereof as may, in his opinion, be related to the aforesaid reasons/grounds. When the reasons/grounds for withholding the payment are removed by the Contractor, the Project Manager/Engineer shall upon being satisfied to that effect issue Certificate of Payment in respect of withheld amounts.

#### Sub-Clause 33.13 Payment Schedule

Within fourteen(14) days after receipt of the Letter of Acceptance, the Contractor shall submit a proposed payment schedule indicating the estimated payment throughout the currency of the Contract. This schedule shall be in a format satisfactory to the Employer and the Project Manager/Engineer, shall be consistent with the Program of Works, the advance, progress and final payment provisions included herein, and shall be in sufficient detail to permit preparation of cash flow projections for use by the Employer.”

#### Sub-Clause 35.2 Currency Restrictions

The text of Sub-Clause 35.2 is deleted and substituted by the following:

“Any required foreign currency transactions shall be met by the Contractor at his cost from his own resources.”

#### Sub-Clause 35.3 Rates of Exchange

The text of Sub-Clause 35.3 is deleted and substituted by the following:

“Any import, if required and approved by the Employer shall also be paid in local currency with exchange rate for the period as notified by the State Bank of Pakistan[*The Employer may change it*].”

#### Sub-Clause 36.4 Payment Against Provisional Sums

The text of Sub-Clause 36.4 is deleted and substituted by the following:

“Provisional Sums, if any will be expended on the direction of the Project Manager/Engineer through Variation Orders which would be valued in accordance with the provisions of Clause 31 Conditions of Contract.”

#### Sub-Clause 37.2 Employer's Risks

The text of Sub-Clause 37.2 is deleted and substituted by the following: “The Employer's Risks are:

- (a) (Insofar as they relate to Pakistan) war and hostilities (whether war be declared or not), invasion, act of foreign enemies;

- (b) (Insofar as they relate to Pakistan) rebellion, revolution, insurrection, military or usurped power or civilwar;
- (c) ionizing radiation or contamination by radioactivity from any nuclear fuel, radio-active toxic explosives or other hazardous properties of any explosive nuclear assembly or nuclear components thereof;
- (d) pressure waves caused by aircraft travelling at sonic or supersonic speed;
- (e) (Insofar as they relate to Pakistan) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors.
- (f) use or occupation of the Work or any part thereof by the Employer;
- (g) fault, error, defect or omission in the design of any part of the Works by the Project Manager/Engineer, Employer or those for whom the Employer is responsible for which the Contractor has disclaimed responsibility in writing within a reasonable time after the receipt of such design;
- (h) the use or occupation of the Site by the Works or any part thereof, or for the purposes of the Contract: or interference, whether temporary or permanent with any right of way, light, air or water or with any easement, way leaves or right of a similar nature which is the inevitable result of the construction of the Works in accordance with the Contract;
- (i) the right of the Employer to construct the Works or any part thereof on, over, under, in or through any land;
- (j) damage (other than that resulting from the Contractor's method of construction) which is the inevitable result of the construction of the Works in accordance with the Contract; and
- (k) the act, neglect or omission or breach of contract or of statutory duty of the Project Manager/Engineer, the Employer or other contractors engaged by the Employer or of their respective employees or agents.”

Sub-Clause 39.2 Loss or Damage Before Risk Transfer Date

The words “by arbitration under Clause 50” are deleted and substituted “by the Project Manager/Engineer”.

The following new Sub-Clause 39.4 is added:

“Sub-Clause 39.4 Duty to Minimize Delay

Each Party shall at all times use all reasonable endeavors to minimize any delay in the Performance of the Contract as a result of Risks.

The Contractor shall give notice to the Employer and vice versa the Employer shall give notice to the Contractor in case of foreseeable delay by the Risks.”

Sub-Clause 40.2 Employer's Liability

The text of Sub-Clause 40.2 from the words “death or personal injury” to the end of the Sub- Clause, is deleted and substituted by the following:

“..... (other than the Works) or of death or personal injury to the extent caused by those of the Employer's Risks listed in paragraphs (f), (g), (h), (i), (j), and (k) of Sub-Clause 37.2 but not otherwise.”

#### Sub-Clause 42.2 Maximum Liability

The words “the sum stated in the Preamble to Conditions of Contract or if no such sum is stated” appearing in 2nd line of Sub-Clause are deleted.

#### Sub-Clause 42.6 Foreseen Damages

Sub-Clause 42.6 is deleted in its entirety.

#### Sub-Clause 43.1(a) The Works (Insurance)

The other risks to be insured are:

- (i) Fire, smokes, explosion, falling objects, earthquake, perils of the sea, tempest, impact by aircraft or land vehicle, aircraft and other aerial devices or articles dropped therefrom, lightning, strike, riot, civil commotion, escape of water, inundation, rain, snow, landslides, flood, act of God, vandalism or malicious damage, windstorm or hail storm.
- (ii) Collision, upset, overturn, derailment, stranding or sinking of an automobile or any conveyance of a common carrier by land, water or air in which the Plant or any part thereof is being carried including overland transportation in Pakistan from port of entry to the Site.
- (iii) Theft, burglary or attempted theft or burglary.
- (iv) Any loss or damage during pre-erection storage.
- (v) Faults in construction and erection, lack of skill, lack of experience, negligence, malicious act.
- (vi) any other sudden and unforeseen event such as loss or damage due to collapse etc. on site, transport of items to be erected.
- (vii) Actions of the Employer in the operation of plant or part thereof on behalf of the Contractor.

The following further Sub-Clauses are 43.1.1, 43.1.2 and 43.1.3 are added:

#### Sub-Clause 43.1.1 Marine Insurance of Plant

- (1) The Contractor shall in the joint names of the Contractor and the Employer, obtain Marine Cargo All Risks Insurance to cover loss or damage to the Plant or part thereof during transport.

- (2) The insurance for each consignment of Plant or part thereof shall attach from the time the Plant or part thereof leave the warehouse or place of storage and terminate after ninety (90) days on its completion of unloading at the Site or until insurance survey whichever occurs first. Upon arrival of each consignment at the Site, the Contractor shall, immediately arrange insurance survey by the insurance company.
- (3) The sum insured for imported Plant or part thereof shall be for its full replacement value at the Site i.e. 100 % CIF value at the Site for each consignment of the Plant or part thereof plus not less than 30 % of CIF value at the Site to cover any additional costs resulting from loss or damage thereof.
- (4) The Insurance Policy for imported Plant etc. shall be on "All Risks" basis and shall not be limited to the attachment/endorsement of following clauses:
  - (a) Institute Cargo Clauses (A)
  - (b) Institute War Clauses (Cargo)
  - (c) Institute Strikes Clauses (Cargo)
  - (d) Institute Cargo Clauses (Air) excluding sending by Post
  - (e) Institute War Clauses (Air Cargo) excluding sending by Post.
  - (f) Institute Strikes Clauses (Air Cargo)
  - (g) Special Replacement Clauses (Air)
  - (h) Institute Theft, Pilferage and Non-delivery Clauses

Sub-Clause 43.1.2 Erection/Construction All Risks Insurance

- (1) The Contractor shall insure the Works or part thereof in the joint names of the Contractor and the Employer.
  - (a) from the date following the completion of the first unloading at the Site of the Plant or part thereof and other materials (to be used for construction or erection) and from commencement of Works at Site until the Risk Transfer Date against any loss or damage caused by any of the Contractor's risks and any other risks specified in Sub-Clause 43.1.(a) above and
  - (b) during the Defects Liability Period against any loss or damage which is caused either:
    - (i) by the Contractor in completing any outstanding work or complying with his obligations under Clause 30, or
    - (ii) by any of the Contractor's risks and any other risks specified in Sub- Clause 43.1(a) above, which occurred prior to the Risk Transfer Date.
- (2) The sum insured shall be the full replacement value at the Site, which includes:

- (a) (i) FOB value of imported Plant to be erected
- (a) (ii) Ex-factory value of Indigenous Plant to be erected, if any
- (b) freight and insurance including local transport
- (c) customs duties and taxes etc.
- (d) cost of erection
- (e) cost of civil engineering work including escalation
- (f) clearance of debris, maximum @ 5 % of minimum amount of Third Party Liability Insurance

Plus 30% to cover any additional costs resulting from loss or damage thereof.

Sub-Clause 43.1.3 General

Should a loss be sustained, the Contractor shall replace or repair any loss or damage at his own cost and complete the Works in accordance with the Contract as soon as possible after occurrence of such loss or damages, without waiting for the settlement of the insurance claim.”

Sub-Clause 43.2 Contractor's Equipment

The text of Sub-Clause 43.2 is deleted and substituted by the following:

“The Contractor shall insure the Contractor's Equipment for its full replacement value while on the

Site against all loss or damage caused by any of the Contractor's Risks. ”Sub-Clause 43.7

Remedies on the Contractor’s Failure to Insure

In 3rd line after the word, “purpose”, the expression “and reasonable costs including the man- hours costs of Employer’s Personnel” is added.

The following new Sub-Clauses 43.9 to 43.12 are added:

Sub-Clause 43.9 Currency of Insurance

All policies of Insurance of the Plant shall provide for payment of indemnity to be made in such amounts as will allow making good of loss of or damage to the whole or any part of the Works.

Sub-Clause 43.10 Contractor to Notify

It shall be the responsibility of the Contractor to notify the insurance company of any changes in nature and extent of the Works and to ensure the adequacy of the insurance coverage at all times in accordance with the provisions of the Contract.

Sub-Clause 43.11 Procurement of Insurance Policies

The Contractor shall procure and submit the insurance cover under this Clause within a

period of twenty eight (28) days from the date of receipt of Letter of Acceptance from the Employer.

Sub-Clause 43.12 Insurance Company

The policies of marine insurance and all other insurances with respect to Contractor's operations in Pakistan shall be effected with any of the insurance company acceptable to the Employer operating in Pakistan with financial strength rating of AA approved by Pakistan Credit Rating Agency (PACRA) or JCR including National Insurance Corporation (NIC) of Pakistan."

Sub-Clause 44.6 Damage Caused by Force Majeure

At the end of the Sub-Clause 44.6 the following is added:

"However the Contractor shall put up his claim to the Employer / Project Manager/Engineer with full details and justification."

Sub-Clause 44.8 Payment on Termination for Force Majeure

Text in sub-Para (c) is deleted and Paras(d) and (e) are re-numbered as (c) and (d). **Sub-Clause 44.10 Force Majeure Affecting Project Manager/Engineer's Duties** Sub-Clause 44.10 is deleted in its entirety.

Sub-Clause 45.2 Contractor's Default

The following paragraph is added at the end of Sub-Clause 45.2.

"The Employer or such other contractor may use for such completion any Contractor's Equipment which is upon the Site as he or they may think proper, and the Employer shall pay the Contractor a reasonable compensation for such use".

Sub-Clause 45.4 Payment after Termination

The text of Sub-Clause 45.4 is deleted and substituted by the following:

"The Employer shall not be liable to make any further payments to the Contractor until the Works have been completed. When the Works are so complete, the Project Manager/Engineer shall certify the total cost of such completion of Works.

The Employer may recover the extra cost of such completion, as certified by the Project Manager/Engineer, from any sums otherwise due and payable to the Contractor and/or by disposing of the Contractor's Equipment and stores taken over by the Employer under this Clause or as otherwise provided by law. If there is no such extra cost the Employer shall pay any balance due to the Contractor."

The following new Sub-Clause 45.6 is added:

Sub-Clause 45.6 Integrity Pact

If the Contractor, or any of his Subcontractors, agents or servants is found to have violated or involved in violation of the Integrity Pact signed by the Contractor as Schedule-J to his Bid, then the Employer shall be entitled to:

- (a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by the Contractor or any of his Subcontractors, agents or servants;
- (b) terminate the Contract; and
- (c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agents or servants.

The termination under Sub-Para (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clauses 45.2 to 45.5 and the payment under Sub-Clause 45.4 shall be made after having deducted the amounts due to the Employer under Sub-Paras (a) and (c) of this Sub- Clause.

#### Sub-Clause 46.1 Employer's Default

The comma and the word "or" at the end of paragraph (d) of Sub-Clause 46.1 are deleted and substituted by period (.) Paragraph (e) of Sub-Clause 46.1 is deleted.

#### Sub-Clause 46.3 Payment on Termination for Employer's Default

The words "including loss of profit" in the second paragraph of Sub-Clause 46.3 are deleted.

#### Sub-Clause 47.1 Labour, Materials and Transport

(The user may extract the formula:

- i. from Clause 70.1 of PCC of PEC Civil Works Bidding Documents.
- ii. with reference to PEC Documents "Standard Guidelines and Formula for Price Adjustment".
- iii. from Clause 15.2 of GCC of PEC Bidding Documents for Supply of Goods and Services.)

#### Sub-Clause 48.1 Local Taxation-Custom and Import Duties

The rates and prices quoted by the Contractor in the Schedule of Prices shall be deemed to have included (i) business taxes, income tax, super tax, customs, import duties and other taxes on income, and (ii) fees charged for services provided under this Contract. The taxation is leviable as per income tax ordinance 2001 issued by FBR Government of Pakistan including adjustment in prices as per clause 47.

The following Sub-Clause 48.3 is added:

#### Sub-Clause 48.3 Port Charges and Port Congestion

"The Contractor shall be deemed to have obtained all the information regarding facilities and charges, in respect of port clearance, loading and unloading,

storage, transportation, congestion and confirmed the requirements thereof at his own responsibility and all such costs and charges are deemed to be included in the rates and prices of the Schedule of Prices.”

#### Sub-Clause 49.1 Notices to Contractor

The following paragraph is added at the end of Sub-Clause 49.1:

“For the purposes of Sub-Clause 49.1, the Contractor shall, immediately after receipt of Letter of Acceptance, intimate in writing to the Employer and the Project Manager/Engineer by registered post, the address of his principal place of business or any change in such address during the period of the Contract.”

#### Sub-Clause 50 Disputes & Arbitration

Clause 50 is deleted and in its place the following Sub-Clauses 50.1 to 50.5 are inserted:

“50.1 If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with, or arising out of, the Contract or the execution of the Works, whether during the execution of the Works or after their completion and whether before or after repudiation or other termination of the Contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the Project Manager/Engineer, the matter in dispute shall, in the first place, be referred in writing to the Project Manager/Engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this Clause. No later than the fifty sixth (56) day after the day on which he received such reference, the Project Manager/Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state that it is made pursuant to this Clause.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Work with all due diligence, and the Contractor and the Employer shall give effect forthwith to every such decision of the Project Manager/Engineer unless and until the same shall be revised, as hereinafter provided in an amicable settlement or in an arbitral award.

In any case where the Conditions of Contract provide that the decision of the Project Manager/Engineer is to be final and conclusive, such decision shall not be referable to arbitration under this Clause nor shall the same be questioned in any other form of proceedings whatsoever.

50.2 If either the Employer or the Contractor be dissatisfied with a decision of the Project Manager/Engineer or if the Project Manager/Engineer fails to give notice of his decision on or before the fifty sixth (56) day after the day on which he received the reference, then either the Employer or the Contractor may, on or before the twenty eighth (28) day after the day on which the said

period of fifty six (56) days expired, as the case may be, give notice to the other party to commence arbitration, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence arbitration, as hereinafter provided, as to such dispute and, subject to Sub- Clause 50.5, no arbitration in respect thereof may be commenced unless such notice is given.

If the Project Manager/Engineer has given notice of his decision as to a matter in dispute to the Employer and the Contractor and no notification of intention to commence arbitration as to such dispute has been given by either the Employer or the Contractor on or before the twenty eighth (28) day after the day on which the parties received notice as to such decision from the Project Manager/Engineer the said decision shall become final and binding upon the Employer and the Contractor.

50.3 Where notice of intention to commence arbitration as to a dispute has been given in accordance with Sub-Clause 50.2, arbitration of such dispute shall not be commenced unless an attempt has first been made by the parties to settle such dispute amicably through mutual negotiation within ninety (90) days from the date of notification of Project Manager/Engineer's decision.

50.4 Any dispute in respect of which:

- (a) the decision, if any, of the Project Manager/Engineer has not become final and binding pursuant to Sub-Clause 50.1 and
- (b) amicable settlement has not been started/reached within the period stated in Sub-Clause 50.3 shall be finally settled, unless otherwise specified in the Contract, under the Rules of Pakistan Arbitration Act, 1940 (Act No. X of 1940) and Rules made thereunder as amended, by one or more arbitrators appointed under such Rules.

The said arbitrator(s) shall have full power to open up, review and revise any decision, opinion, instruction, determination, certificate or valuation of the Project Manager/Engineer for the purpose of obtaining said decision pursuant to Sub-Clause 50.1. No such decision shall disqualify the Project Manager/Engineer from being called as a witness and giving evidence before the arbitrator(s) on any matter whatsoever relevant to the dispute.

The venue of arbitration proceedings shall be the place in Pakistan as mentioned in the Preamble to Conditions of Contract.

50.5 Where neither the Employer nor the Contractor has given notice of intention to commence arbitration of a dispute within the period stated in Sub-Clause 50.1 or 50.2 and the related decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration in accordance with Sub-Clause 50.4. The provisions of Sub-Clauses 50.1 to 50.2 shall not apply to any such reference."

## **Additional Conditions**

### **52. Liens**

Each contractor, for himself and for any persons directly or indirectly responsible to him, and for his or their material, equipment and employees, and for all other persons performing any labor or furnishing any labor or material for any/or all of the Work covered by his Contract, will be required to release or waive, to the full extent permitted by law, all mechanical and other liens, for or on account of the Work done or equipment and material furnished hereunder and the improvements or structures herein same may be incorporated, and the land to which they are appurtenant shall at all times be free and clear of all such liens.

### **53.1 Payment of Income Tax, Etc.**

The Contractor shall be responsible for the payment, if any is required, of all Pakistani Income Tax, Super Tax, and other taxes on income arising out of the Contract, and the rates and prices stated in the priced Schedule of Prices shall be deemed to cover all such taxes.

### **53.2 Personnel, Taxes and Duties**

The Contractor or his personnel shall pay all personal income tax or other taxes due in Pakistan, if any, for the personnel employed by the Contractor for implementing the work or any other activity required by the Contract. The Contractor shall obtain, at his own cost, work permits from competent authorities to enable any foreign personnel to work in Pakistan. The Contractor shall be responsible for all formalities in connection with passports, obtaining visas, police permits, and expenses for customs duties, if any, related to personal goods of foreign personnel employed on the Project. However, the Employer will, if requested, assist the Contractor in obtaining visas and work permits.

### **53.3 Income Taxes Provisions in Subcontracts**

Provisions to the like effect as those contained in this Clause shall be incorporated in Subcontracts.

### **54. Liability of the Contractor**

The Contractor or his Subcontractors or assigns shall follow strictly, all relevant labour laws including the Workmen's Compensation Act and the Employer shall be fully indemnified for all claims, damages etc. arising out of any dispute between the Contractor, his Subcontractors or permitted assigns and the labour employed by them.

**55. Joint and Several Liability**

If the Contractor is a joint venture of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfilment of the terms of the Contract and shall designate one of such persons to act as leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.

**56. Details to be Confidential**

The Contractor shall treat the details of the Contract as private and confidential, save in so far as may be necessary for the purposes thereof, and shall not publish or disclose the same or any particulars thereof in any trade or technical paper or elsewhere without the prior consent in writing of the Employer or the Project Manager/Engineer. If any dispute arises as to the necessity of any publication or disclosure for the purpose of the Contract, the same shall be referred to the decision of the Project Manager/Engineer whose award shall be final.

## **STANDARD FORMS**

## **STANDARD FORMS**

Standard Forms include the following:

- Form of Bid Security (Bank Guarantee)
- Form of Contract Agreement
- Form of Performance Security (Bank Guarantee)
- Form of Bank Guarantee for Advance Payment
- Indemnity Bond For Secured Advance
- Curriculum Vitae Format

**FORM OF BID SECURITY**  
(Bank Guarantee)

Guarantee No. \_\_\_\_\_  
Executed on \_\_\_\_\_  
Expiry date \_\_\_\_\_

Name of Guarantor (Bank) with address: \_\_\_\_\_

Name of Principal (Bidder) with address: \_\_\_\_\_

Penal Sum of Security (express in words and figures): \_\_\_\_\_

Bid Reference No. \_\_\_\_\_ Date of Bid Opening \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal, we the Guarantor above-named are held and firmly bound unto the

\_\_\_\_\_, (hereinafter called the "Employer") in the sum stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the \_\_\_\_\_ accompanying Bid numbered \_\_\_\_\_ dated \_\_\_\_\_ as above for \_\_\_\_\_ (Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering the said Bid that the Principal furnishes a Bid Security in the above said sum to the Employer, conditioned as under:

- (1) that the Bid Security shall remain valid for a period 28 days beyond the period of validity of the Bid,
- (2) that in the event of;
  - (a) the Principal withdraws his Bid during the period of validity of Bid, or
  - (b) the Principal does not accept the correction of his Bid Price, pursuant to Sub-Clause 24.2 of Instructions to Bidders, or
  - (c) failure of the successful Bidder to
    - (i) furnish the required Performance Security, in accordance with Clause 34 of Instructions to Bidders, or
    - (ii) sign the proposed Contract Agreement, in accordance with Clause 35 of Instructions to Bidders,

then the entire sum be paid immediately to the said Employer as liquidated damages and not as penalty for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety , as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith pay to the Employer the said sum stated above upon first written demand of the Employer without cavil or argument and without requiring the Employer to prove or to show grounds or reasons for such demand notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Guarantor shall pay without objection the sum stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

	_____ Guarantor (Bank)
Witness:	Signature _____
1. _____	Name _____
_____	Title _____
Corporate Secretary (Seal)	
2. _____	_____
_____	_____
(Name, Title & Address)	Corporate Guarantor (Seal)

## FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the “Agreement”) made on the day of \_\_\_\_\_(month) 20\_\_\_\_\_ between \_\_\_\_\_  
(hereafter called the “Employer”) of the one part  
and \_\_\_\_\_(hereafter called the “Contractor”) of the other part.

WHEREAS the Employer is desirous that certain Works, viz. \_\_\_\_\_ should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnesseth as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents after incorporating addenda, if any except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement, viz:
  - (a) The Contract Agreement
  - (b) The Letter of Acceptance
  - (c) The completed Form of Bid
  - (d) The Preamble to Conditions of Contract
  - (e) The Particular Conditions of Contract
  - (f) The General Conditions of Contract
  - (g) The priced Schedule of Prices
  - (h) The completed Schedules to Bid (A to L)
  - (i) The Specifications
  - (j) The Drawings
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and 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 as per provisions of the Contract, 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 on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor

\_\_\_\_\_  
(Seal)

Signature of Employer

\_\_\_\_\_  
(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

\_\_\_\_\_  
(Name, Title and Address)

Witness:

\_\_\_\_\_  
(Name, title and Address)

**FORM OF PERFORMANCE SECURITY**  
(Bank Guarantee)

Guarantee No. \_\_\_\_\_  
Executed on \_\_\_\_\_  
Expiry date \_\_\_\_\_

Name of Guarantor (Bank) with address: \_\_\_\_\_

Name of Principal (Contractor) with address: \_\_\_\_\_

Penal Sum of Security (express in words and figures) \_\_\_\_\_

Letter of Acceptance No. \_\_\_\_\_ Dated \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the

\_\_\_\_\_ (hereinafter called the "Employer") in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for (Name of Contract) for the \_\_\_\_\_ (Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 30, Defects after Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, \_\_\_\_\_ (the Guarantor), waiving all objections and deficiencies under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to

the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

\_\_\_\_\_  
Guarantor (Bank)

Witness:

1. \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

\_\_\_\_\_  
Corporate Secretary (Seal)

Title \_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

\_\_\_\_\_  
Corporate Guarantor (Seal)

**FORM OF BANK GUARANTEE FOR ADVANCE PAYMENT**

Guarantee No. \_\_\_\_\_  
Executed on \_\_\_\_\_  
Expiry date \_\_\_\_\_

WHEREAS the \_\_\_\_\_ (hereinafter called the Employer) has entered into a Contract for \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (Particulars of Contract), with  
\_\_\_\_\_ (hereinafter called the Contractor).

AND WHEREAS the \_\_\_\_\_ Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of \_\_\_\_\_ (Rs. \_\_\_\_\_) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS the Employer has asked the Contractor to furnish Guarantee to secure advance payment for performance of his obligations under the said Contract.

AND WHEREAS \_\_\_\_\_ (Bank) (hereinafter called the Guarantor) at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW THEREFORE the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails, and commits default in fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, as aforesaid, on the part of the Contractor, shall be given by the Employer to the Guarantor, and on such first written demand payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This guarantee shall come into force as soon as the advance payment has been credited to the account of the Contractor.

This guarantee shall expire not later than \_\_\_\_\_ by which date we must have received any claims by registered letter, telegram, telex or telefax.

It is understood that you will return this Guarantee to us on expiry or after settlement of the total amount to be claimed hereunder.

Witness:

1. \_\_\_\_\_

\_\_\_\_\_

Corporate Secretary  
(Seal)

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

\_\_\_\_\_  
Guarantor (Bank)

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Corporate Guarantor (Seal)

**INDEMNITY BOND FOR SECURED ADVANCE  
AGAINST MATERIALS BROUGHT AT SITE**

(ON RS.100 NONJUDICIAL STAMP PAPER)

This Deed of Indemnity is issued by M/s. \_\_\_\_\_  
\_\_\_\_\_ (Name of the Contractor) in favour  
of M/s. \_\_\_\_\_ (Name of the Employer).

**Whereas** \_\_\_\_\_ (hereinafter called the Employer) has agreed  
to  
pay the Secured Advance against the cost of material through any Bank or like agency  
by any other method by virtue of the terms of the contract existing between the parties.  
The details of the material and their price for which secured advance is being  
sought for the period

\_\_\_\_\_ till consumption of the material is as under :-

1. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.
2. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.
3. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.
4. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.

THEREFORE THIS DEED OF INDEMNITY WITNESSETH AS FOLLOWS:

I/We \_\_\_\_\_ of M/s. \_\_\_\_\_  
do hereby indemnify M/s \_\_\_\_\_ for all losses due to thefts, arson, pilferage, loss  
due to flood and inundation, shortage, deterioration and depreciation etc. through any act  
of Man or God or slump in the Market of any or all the materials financed or paid by the  
Employer on our request for financing payment against material.

I/We \_\_\_\_\_ shall indemnify \_\_\_\_\_ against any  
or all claims, action damages arising out of or resulting to the said material.

I/We \_\_\_\_\_ further declare that we will faithfully abide by the  
above declaration and solemnly affirm that we will not remove, sell, pilferage any of the  
materials against which M/s \_\_\_\_\_ has paid us such a secured advance and will not  
pledge the same with any Bank, Finance Corporation, Firm, Company, Individual or the  
like agency or create any change whereon in any from what so ever.

I/We \_\_\_\_\_ do hereby also declare that in the event of  
my/our infringement of the declaration made above \_\_\_\_\_ will be entitled to forfeit all  
such material and also proceed against me/us according to the relevant clause pertaining  
to breach of contract and further invoke the power or seek any remedies secured of under  
the contract Agreement signed with us or otherwise available under law.

Place \_\_\_\_\_ Dated \_\_\_\_\_

Contractor \_\_\_\_\_

then the entire sum be paid immediately to the said Employer as liquidated damages and not as penalty for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety , as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith pay to the Employer the said sum stated above upon first written demand of the Employer without cavil or argument and without requiring the Employer to prove or to show grounds or reasons for such demand notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Guarantor shall pay without objection the sum stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

\_\_\_\_\_  
Guarantor (Bank)

Witness:  
1. \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Corporate Secretary (Seal)

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Name, Title & Address)

\_\_\_\_\_  
Corporate Guarantor (Seal)

## FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the day of \_\_\_\_\_(month) 20\_\_\_\_between\_\_\_\_\_ (hereafter called the "Employer") of the one part and \_\_\_\_\_(hereafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz.\_\_\_\_should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnesseth as follows:

5. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
6. The following documents after incorporating addenda, if any except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement, viz:
  - (a) The Contract Agreement
  - (b) The Letter of Acceptance
  - (c) The completed Form of Bid
  - (d) The Preamble to Conditions of Contract
  - (e) The Particular Conditions of Contract
  - (f) The General Conditions of Contract
  - (g) The priced Schedule of Prices
  - (h) The completed Schedules to Bid (A to L)
  - (i) The Specifications
  - (j) The Drawings
7. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
8. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, 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 on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor

\_\_\_\_\_  
(Seal)

Signature of Employer

\_\_\_\_\_  
(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

\_\_\_\_\_  
(Name, Title and Address)

Witness:

\_\_\_\_\_  
(Name, title and Address)

**FORM OF PERFORMANCE SECURITY**  
(Bank Guarantee)

Guarantee No. \_\_\_\_\_  
Executed on \_\_\_\_\_  
Expiry date \_\_\_\_\_

Name of Guarantor (Bank) with address: \_\_\_\_\_

Name of Principal (Contractor) with address: \_\_\_\_\_

Penal Sum of Security (express in words and figures) \_\_\_\_\_

Letter of Acceptance No. \_\_\_\_\_ Dated \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the

\_\_\_\_\_ (hereinafter called the "Employer") in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for (Name of Contract) for the \_\_\_\_\_ (Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 30, Defects after Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We,

\_\_\_\_\_ (the Guarantor), waiving all objections and deficiencies under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

\_\_\_\_\_  
Guarantor (Bank)

Witness:

1. \_\_\_\_\_

Signature \_\_\_\_\_

Corporate Secretary (Seal)

Name \_\_\_\_\_

Title \_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

\_\_\_\_\_  
Corporate Guarantor (Seal)

**FORM OF BANK GUARANTEE FOR ADVANCE PAYMENT**

Guarantee No. \_\_\_\_\_

Executed on \_\_\_\_\_

Expiry date \_\_\_\_\_

WHEREAS the \_\_\_\_\_ (hereinafter called the Employer) has entered into a Contract for \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (Particulars of Contract), with  
\_\_\_\_\_ (hereinafter called the Contractor).

AND WHEREAS the \_\_\_\_\_ Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of \_\_\_\_\_ (Rs. \_\_\_\_\_) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS the Employer has asked the Contractor to furnish Guarantee to secure advance payment for performance of his obligations under the said Contract.

AND WHEREAS \_\_\_\_\_  
(Bank)  
(hereinafter called the Guarantor) at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW THEREFORE the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails, and commits default in fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, as aforesaid, on the part of the Contractor, shall be given by the Employer to the Guarantor, and on such first written demand payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This guarantee shall come into force as soon as the advance payment has been credited to the account of the Contractor.

This guarantee shall expire not later than \_\_\_\_\_  
by which date we must have received any claims by registered letter, telegram, telex or telefax.

It is understood that you will return this Guarantee to us on expiry or after settlement of the total amount to be claimed hereunder.

Witness:

1. \_\_\_\_\_

\_\_\_\_\_  
Corporate Secretary  
(Seal)

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

\_\_\_\_\_  
Guarantor (Bank)

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Corporate Guarantor (Seal)

**INDEMNITY BOND FOR SECURED ADVANCE  
AGAINST MATERIALS BROUGHT AT SITE**

(ON RS.100 NONJUDICIAL STAMP PAPER)

This Deed of Indemnity is issued by M/s. \_\_\_\_\_  
\_\_\_\_\_ (Name of the Contractor) in favour  
of M/s. \_\_\_\_\_ (Name of the Employer).

**Whereas** \_\_\_\_\_ (hereinafter called the Employer) has  
agreed to  
pay the Secured Advance against the cost of material through any Bank or like  
agency by any other method by virtue of the terms of the contract existing between  
the parties. The details of the material and their price for which secured  
advance is being sought for the period  
\_\_\_\_\_ till consumption of the material is as  
under :-

1. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.
2. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.
3. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.
4. \_\_\_\_\_ at Rs. \_\_\_\_\_ per \_\_\_\_\_ = Rs.

THEREFORE THIS DEED OF INDEMNITY WITNESSETH AS FOLLOWS:

I/We \_\_\_\_\_ of M/s. \_\_\_\_\_ do hereby indemnify M/s \_\_\_\_\_ for all losses due to thefts, arson, pilferage, loss due to flood and inundation, shortage, deterioration and depreciation etc. through any act of Man or God or slump in the Market of any or all the materials financed or paid by the Employer on our request for financing payment against material.

I/We \_\_\_\_\_ shall indemnify \_\_\_\_\_ against any or all claims, action damages arising out of or resulting to the said material.

I/We \_\_\_\_\_ further declare that we will faithfully abide by the above declaration and solemnly affirm that we will not remove, sell, pilferage any of the materials against which M/s \_\_\_\_\_ has paid us such a secured advance and will not pledge the same with any Bank, Finance Corporation, Firm, Company, Individual or the like agency or create any change whereon in any from what so ever.

I/We \_\_\_\_\_ do hereby also declare that in the event of my/our infringement of the declaration made above, will be entitled to forfeit all such material and also proceed against me/us according to the relevant clause pertaining to breach of contract and further invoke the power or seek any remedies secured of \_\_\_\_\_ under the contract Agreement signed with us or otherwise available under law.

Place \_\_\_\_\_ Dated \_\_\_\_\_

Contractor \_\_\_\_\_

**FORM TECH-6  
(CONTINUED)**

**CURRICULUM VITAE (CV)**

<b>Position Title and No.</b>	{e.g., K-1, TEAM LEADER}
<b>Name of Expert:</b>	{Insert full name}
<b>Date of Birth:</b>	{day/month/year}
<b>Country of Citizenship/Residence</b>	
<b>Nature of Input(Full Time / Intermittent)</b>	

**Education:** {List college/university or other specialized education, giving names of educational institutions, dates attended, degree(s)/diploma(s) obtained}

\_\_\_\_\_  
\_\_\_\_\_

**Employment record relevant to the assignment:** {Starting with present position, list in reverse

order. Please provide dates, name of employing organization, titles of positions held, types of activities performed and location of the assignment, and contact information of previous Procuring Agency's and employing organization(s) who can be contacted for references. Past employment that is not relevant to the assignment does not need to be included.}

Period	Employing organization and your title/position. Contact info for references	Country	Summary of activities performed relevant to the Assignment
{e.g., May 2005-present}	{e.g., Ministry of ....., advisor/Consultant to... For references: Tel...../e-mail.....; Mr. Hbbbb, deputy minister}		

**Membership in Professional Associations and Publications:**

\_\_\_\_\_

**Language Skills (indicate only languages in which you can work):** \_\_\_\_\_

\_\_\_\_\_

**Adequacy for the Assignment:**

<b>Detailed Tasks Assigned on Consultant's Team of Experts:</b>	<b>Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks</b>
<b>{List all deliverables/tasks as in TECH- 5 in which the Expert will be involved}</b>	

**Expert's contact information:** (e-mail ....., phone.....)

**Certification:**

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available, as and when necessary, to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Procuring Agency.

{day/month/year}

---

Name of Expert  
Date

Signature

{day/month/year}

---

Name of authorized  
Date

Signature

Representative of the Consultant  
(the same who signs the Proposal)

**Note:**

- 1) CV of the proposed expert must be signed by that expert else the CV will not be considered for evaluation.
- 2) Attach salary evidence of last three months or any other similar verifiable evidence like tax deduction certificate, etc. with the proposed expert CV else the CV will not be considered for evaluation.
- 3) Attach CNIC, relevant educational documents (Masters or bachelor degree or Diploma, etc.) along with relevant professional registration certificates (PEC certificate for engineers and PCATP certificate for architects) for the proposed expert else the CV will not be considered for evaluation.



**REHABILITATION OF OLD CUSTOM HOUSE**  
**BILL OF QUANTITY**

<b>S. NO.</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>RATE</b>	<b>AMOUNT</b>
1	<u>Annexure A-I</u>			
	MUSEUM	Sft		
	<u>Annexure A-II</u>			
	STAFF ROOM	Sft		
	<u>Annexure A-III</u>			
	FACULTY ROOM	Sft		
	<u>Annexure A-IV</u>			
	PUMP ROOM	Sft		
	<u>Annexure A-V</u>			
	CLASS ROOM	Sft		
	<u>Annexure A-VI</u>			
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	<u>Annexure A-VII</u>			
	ENTRANCE LOBBY	Sft		
	ENTRANCE LOBBY	Sft		
	<u>Annexure A-VIII</u>			
	VIP VISITORS REST ROOMS	Sft		
	<u>Annexure A-IX</u>			
	CONTROL ROOM	Sft		
	<u>Annexure A-X</u>			
	EXECUTIVE DINING	Sft		
	<u>Annexure A-XI</u>			
	AUDITORIUM	Sft		
	<u>Annexure A-XII</u>			
	WASHROOMS-1	Sft		
	WASHROOMS-2	Sft		
	WASHROOMS-3	Sft		
	<u>Annexure A-XIII</u>			
	PANTRY	Sft		
	<u>Annexure A-XIV</u>			
	STORE	Sft		
	STORE	Sft		

**REHABILITATION OF OLD CUSTOM HOUSE**  
**BILL OF QUANTITY**

<b>S. NO.</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>RATE</b>	<b>AMOUNT</b>
	<u>Annexure B-I</u>			
	DG ROOM	Sft		
	<u>Annexure B-II</u>			
	DG CHAMBER	Sft		
	<u>Annexure B-III</u>			
	PA ROOM	Sft		
	<u>Annexure B- IV</u>			
	DINNING ROOM	Sft		
	<u>Annexure B- V</u>			
	CONFERENCE ROOM	Sft		
	<u>Annexure B- VI</u>			
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	CORRIDOR	Sft		
	<u>Annexure B- VII</u>			
	ENTRANCE LOBBY	Sft		
	LOBBY	Sft		
	<u>Annexure B- VIII</u>			
	CLASSROOM	Sft		
	<u>Annexure B- IX</u>			
	TEA ROOM	Sft		
	<u>Annexure B- X</u>			
	ROOM	Sft		
	ROOM	Sft		
	<u>Annexure B- XI</u>			
	COMPUTER LAB	Sft		
	<u>Annexure B- XII</u>			
	STAFF DINNING	Sft		
	<u>Annexure B- XIII</u>			
	DIRECTOR ROOM	Sft		
	<u>Annexure B-XIV</u>			
	ADC ROOMS	Sft		
	ADC ROOMS	Sft		
	ADC ROOMS	Sft		
	ADC ROOMS	Sft		

**REHABILITATION OF OLD CUSTOM HOUSE**  
**BILL OF QUANTITY**

S. NO.	DESCRIPTION	UNIT	RATE	AMOUNT
	<u>Annexure B- XV</u>			
	AC & DC ROOMS	Sft		
	AC & DC ROOMS	Sft		
	AC & DC ROOMS	Sft		
	<u>Annexure B- XVI</u>			
	STAFF ROOMS	Sft		
	STAFF ROOMS	Sft		
	STAFF ROOMS	Sft		
	STAFF ROOMS	Sft		
	<u>Annexure B- XVII</u>			
	OFFICE CORRIDORS	Sft		
	OFFICE CORRIDORS	Sft		
	OFFICE CORRIDORS (PASSAGE)	Sft		
	<u>Annexure B- XVIII</u>			
	WASHROOMS	Sft		
	WASHROOMS	Sft		
	WASHROOMS	Sft		
	WASHROOMS	Sft		
	<u>Annexure B- XIX</u>			
	PANTRY	Sft		
	<u>Annexure B- XX</u>			
	STORE	Sft		
	STORE	Sft		
	<u>Annexure B- XXI</u>			
	TOILETS	Sft		
	TOILETS	Sft		
	<u>Annexure B- XXII</u>			
	DG TOILETS	Sft		

**REHABILITATION OF OLD CUSTOM HOUSE  
BILL OF QUANTITY**

S. NO.	DESCRIPTION	UNIT	AREA	RATE	AMOUNT
1	<u>Annexure C</u>				
	STRUCTURE RE STRENGTHENING	Sft	29887.5		
	Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specilzed materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.				

**REHABILITATION OF OLD CUSTOM HOUSE  
BILL OF QUANTITY**

S. NO.	DESCRIPTION	Nos.	RATE	AMOUNT
1	<u>Annexure D</u>			
	REHABILITATION AND REPAIR OF AIR CONDITION			
	Rehabilitation and Repair of Air Conditioning (AC) Units as per specifications provided by the approved vendor, including inspection, servicing, and replacement of damaged components such as compressor, indoor (evaporator) coil, condenser coil, capacitor, fan motor, and other related AC parts. The scope includes cleaning of internal components, gas charging, electrical testing, insulation of refrigerant lines, and application of approved protective and anti-corrosion treatments where required. All works shall be carried out using manufacturer-recommended materials and procedures to restore operational efficiency, improve cooling performance, and ensure durability, particularly suitable for hot and near-sea environmental conditions.	Job		
	Providing, fabricating, and fixing of M.S. steel girder with dummy column enclosure to conceal AC outdoor unit, including supply and installation of structural steel members of approved section and gauge, complete with cutting, welding, grinding, alignment, and anchoring to RCC structure as per approved drawings. The scope includes fabrication of dummy column cladding/frame to aesthetically conceal the AC outdoor unit, provision of necessary supports, base plates, anchor bolts, anti-rust treatment, red oxide primer, and enamel paint finish. All works shall be executed complete in all respects, as per specifications and instructions of the Engineer In-Charge.	JOB		

**REHABILITATION OF OLD CUSTOM HOUSE  
BILL OF QUANTITY**

S. NO.	DESCRIPTION	UNIT	Nos.	RATE	AMOUNT
1	<u>Annexure E</u>				
	REHABILITATION AND REPAIR OF FURNITURE	Sft	AS PROVIDED BY CLIENT		
	<p>Rehabilitation and Revamping of Furniture as per specifications provided by the approved vendor, including inspection and rectification of all damaged or deteriorated components. The scope comprises dismantling where required, cleaning and removal of loose or decayed elements by mechanical means, treatment against moisture and fungal attack, and repair or replacement of defective parts. Works shall include leather refabrication/upholstery replacement, foam replacement, repair and replacement of hinges, hardware and fittings, structural strengthening of wooden members, surface preparation, polishing, and application of protective coatings. All specialized materials and finishes shall be applied to enhance durability, functionality, and aesthetic quality, suitable for use in hot and near-sea environmental conditions.</p>				

# SPECIFICATION & TECHNICAL PROVISIONS

## Annexure A-I

### MUSEUM

(Room size:71'-6"x31'-0")

(Clear height 19'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer Incharge . (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"th plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium

quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Designing and development of wall including object placement as per Global museum standards.
- Supply, installation, testing & commissioning of complete lighting system including LED light fixtures suitable for MUSEUM illumination level.
- Concealed conduit wiring with copper conductors from DB to light points.
- Installation of switches, switch plates, junction boxes and earthing complete in all respect.
- Illumination design as per relevant standards such as IEC 60364 recommendations.
- Supply, installation testing & commissioning of 13A/15A switched socket outlets for general
- Staff usage (laptops, chargers, small appliances etc.).
- Complete wiring in PVC conduit with copper cables from nearest distribution board.
- Earthing, circuit protection and proper labeling included.
- Testing, commissioning and load balancing as per electrical safety standards.
- Supply & installation of ceiling-mounted smoke detector integrated with building fire alarm system.
- Installation of smoke detector/manual call point and hooter/strobe (if required) connected with central fire alarm system.
- Fire-rated cable wiring in conduit with proper identification.
- Testing, commissioning and system integration as per NFPA 72 requirements.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-II

### STAFF ROOM

**(Room size:12'-0"x14'-0")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge . (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0".
- Supply, installation, testing & commissioning of complete lighting system including LED light.
- fixtures suitable for STAFF ROOM illumination level.
- Concealed conduit wiring with copper conductors from DB to light points.
- Installation of switches, switch plates, junction boxes and earthing complete in all respect.
- Illumination design as per relevant standards such as IEC 60364 recommendations.
- Supply, installation testing & commissioning of 13A/15A switched socket outlets for general staff usage (laptops, chargers, small appliances etc.).
- Complete wiring in PVC conduit with copper cables from nearest distribution board.
- Earthing, circuit protection and proper labeling included.
- Testing, commissioning and load balancing as per electrical safety standards
- Supply & installation of ceiling-mounted smoke detector integrated with building fire alarm system.
- Installation of smoke detector/manual call point and hooter/strobe (if required) connected with central fire alarm system.
- Fire-rated cable wiring in conduit with proper identification.
- Testing, commissioning and system integration as per NFPA 72 requirements.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure A-III**

### **FACULTY ROOM**

**(Room size:12'-0"x10'-0")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium

quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0".
- Supply, installation, testing & commissioning of complete lighting system including LED light fixtures suitable for FACULTY ROOM illumination level.
- Concealed conduit wiring with copper conductors from DB to light points.
- Installation of switches, switch plates, junction boxes and earthing complete in all respect.
- Illumination design as per relevant standards such as IEC 60364 recommendations.
- Supply, installation testing & commissioning of 13A/15A switched socket outlets for general staff usage (laptops, chargers, small appliances etc.).
- Complete wiring in PVC conduit with copper cables from nearest distribution board.
- Earthing, circuit protection and proper labeling included.
- Testing, commissioning and load balancing as per electrical safety standards
- Supply & installation of ceiling-mounted smoke detector integrated with building fire alarm system.
- Installation of smoke detector/manual call point and hooter/strobe (if required) connected with central fire alarm system.
- Fire-rated cable wiring in conduit with proper identification.
- Testing, commissioning and system integration as per NFPA 72 requirements.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure A-IV**

### **PUMP ROOM**

**(Room size:10'-4"x8'-0")**

**(Clear height 10'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Providing and laying cement concrete block masonry at any level at any height with precast 1:3:6 cement concrete solid blocks machine made by semi-dry process with good workmanship in cement mortar 1:4 ratio with filling joints of racking out joints on both sides and also proper curing including fixing of Anchor Bar (3/8"Ø Bar at every 3rd course of masonry) (inclusive of cost of steel) complete as per drawings, specification, Providing & applying smooth 1/2" to 3/4" th plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints and fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.
- Supply, installation, testing & commissioning of complete lighting system including LED light fixtures suitable for PUMP ROOM illumination level.
- Concealed conduit wiring with copper conductors from DB to light points.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-V

### **CLASS ROOM**

**(Room size:35'-3"x31'-0")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply, installation, testing & commissioning of energy-efficient LED lighting fixtures suitable for classroom illumination.
- Concealed conduit wiring with copper cables from Distribution Board to lighting points.
- Installation of switches, control accessories, junction boxes and earthing complete
- Provision of switched socket outlets for general use such as laptops, projectors, chargers and teaching equipment.
- Complete concealed wiring with circuit protection (MCB), earthing and proper labeling.
- Testing, commissioning and load balancing included.
- Dedicated UPS power outlets for computers and critical equipment.
- Separate UPS wiring circuit from UPS DB including identification and protection devices.
- Integration with central UPS system for uninterrupted power supply.
- Structured data cabling (Cat-6 or equivalent) for PCs including RJ-45 outlets.
- Provision of WiFi Access Point with power/data cabling.
- Complete testing, labeling and certification of network points.
- Power and data provision for multimedia equipment such as projector/display screen, audio system and control panel.
- Conduits for HDMI/data cables and suitable mounting provisions.
- Integration with classroom AV system.
- Installation of smoke detector/manual call point and hooter/strobe (if required) connected with central fire alarm system.
- Fire-rated cable wiring in conduit with proper identification.
- Testing, commissioning and system integration as per NFPA 72 requirements.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-VI

### **CORRIDOR**

**(Room size:12'-3" wide Nos.3)**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and Installation of cement board to conceal drain pipes, AC ducting, and other services, using cement boards of size 2'-0" × 4'-0" of approved make and thickness, fixed on a properly aligned framework of galvanized steel sections including channels, brackets, screws, and all necessary supports, complete in all respects. The cement board surface shall be finished with plaster to achieve the required profile and smoothness, followed by application of paint finish. The profile, dimensions, color, and finish of the dummy beams and columns.
- Brass strips to be provided and installed as per approved design and layout.
- Supply, installation, testing & commissioning of energy-efficient LED lighting fixtures suitable for classroom illumination.
- Concealed conduit wiring with copper cables from Distribution Board to lighting points.
- Installation of switches, control accessories, junction boxes and earthing complete
- Supply, installation, testing & commissioning of CCTV cameras covering the corridor for full surveillance.
- Structured cabling (Cat-6 or Fiber as required) from cameras to NVR/control room.
- Mounting brackets, conduit, junction boxes, and power supply for cameras included.
- Configuration, testing, and integration with building-wide CCTV system following
- Labeling and documentation of all camera points and cabling.
- Supply, installation, and commissioning of fire extinguishers along the corridor as per **NFPA 10** standards, including wall mounts, signage, inspection, and tagging to ensure full coverage and safety compliance.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in

coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-VII

### **ENTRANCE LOBBY**

**(Room size: 21'-6"x27'-6" / 21'-6"x27'-6")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and Installation of cement board to conceal drain pipes, AC ducting, and other services, using cement boards of size 2'-0" × 4'-0" of approved make and thickness, fixed on a properly aligned framework of galvanized steel sections including channels, brackets, screws, and all necessary supports, complete in all respects. The cement board surface shall be finished with plaster to achieve the required profile and smoothness, followed by application of paint finish. The profile, dimensions, color, and finish of the dummy beams and columns.
- Single-piece Rudy Red granite to be supplied and installed as approved by the Architect.
- Brass strips to be provided and installed as per approved design and layout.
- Supply, installation, testing & commissioning of LED lighting fixtures suitable for lobby illumination and aesthetics.
- Concealed conduit wiring with copper cables from DB to lighting fixtures.
- Installation of switches, dimmers (if required), junction boxes and earthing complete.
- Supply & installation of CCTV cameras covering entrance/exit monitoring and lobby surveillance.
- Structured cabling (Cat-6/Fiber if required) from cameras to NVR/control room.
- Camera mounting brackets, power supply, conduits and accessories included.
- Configuration, testing and commissioning Complete.
- Installation of smoke detector/manual call point and hooter/strobe (if required) connected with central fire alarm system.

- Fire-rated cable wiring in conduit with proper identification.
  
- Testing, commissioning and system integration as per NFPA 72 requirements.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure A-VIII**

### **VIP VISITORS REST ROOMS**

**(Room size: 15'-6"x14'-6"**

**Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and Installation of cement board to conceal drain pipes, AC ducting, and other services, using cement boards of size 2'-0" × 4'-0" of approved make and thickness, fixed on a properly aligned framework of galvanized steel sections including channels, brackets, screws, and all necessary supports, complete in all respects. The cement board surface shall be finished with plaster to achieve the required profile and smoothness, followed by application of paint finish. The profile, dimensions, color, and finish of the dummy beams and columns.
- Brass strips to be provided and installed as per approved design and layout.
- Supply, installation, testing & commissioning of LED lighting fixtures suitable for restroom illumination and ambiance.
- Concealed conduit wiring with copper conductors from Distribution Board to lighting points.
- Installation of switches, accessories, junction boxes and complete earthing system.
- Provision of switched socket outlets for cleaning equipment, hand dryers, mirrors, or maintenance use.
- Concealed wiring in PVC conduit with copper cables, MCB protection and earthing.
- Complete testing, labeling and commissioning included.
- Dedicated UPS power outlets for essential loads such as emergency lighting, sensors or automated fixtures.
- Separate UPS circuit wiring from UPS DB with proper identification and protection.
- Integration with central UPS system for uninterrupted power supply.
- Supply & installation of smoke detector / heat detector (as applicable for restroom environment).
- Fire-rated cabling in conduit including accessories and proper labeling.
- Testing, commissioning and integration with central fire alarm system as per NFPA 72 requirements.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted

financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure A-IX**

### **CONTROL ROOM**

**(Room size: 8'-6"x9'-0")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of cement board to conceal drain pipes, AC ducting, and other services, using cement boards of size 2'-0" × 4'-0" of approved make and thickness, fixed on a properly aligned framework of galvanized steel sections including channels, brackets, screws, and all necessary supports, complete in all respects. The cement board surface shall be finished with plaster to achieve the required profile and smoothness, followed by application of paint finish. The profile, dimensions, color, and finish of the dummy beams and columns.
- Supply, installation, testing & commissioning of LED lighting fixtures providing adequate illumination for control room operation.
- Concealed conduit wiring with copper conductors from DB to light points.
- Switches, junction boxes, earthing, and dimming/control accessories included.
- Provision of switched socket outlets for computers, monitors, control panels, and miscellaneous equipment.
- Concealed wiring in PVC conduit with protection and proper earthing.
- Testing, labeling, and commissioning included.
- Structured cabling (Cat-6/Cat-6A) for computers, servers, and control devices.
- RJ-45 outlets installed at workstation positions.
- Testing, labeling, and certification of network points.
- Integration with campus LAN/WAN infrastructure.
- Telephone/data outlets for communication with operations and security teams.
- Cabling from PBX/telephone distribution point to control room outlets.
- Testing and commissioning of telephone lines.
- Supply and installation of smoke/heat detectors and manual call points within the control room.
- Wiring in fire-rated conduit connected to central fire alarm panel.
- Testing, commissioning, and compliance with NFPA 72 standards.
- Supply and installation of CCTV cameras to monitor control room entry and key operational areas.

- Power/data cabling via structured conduit system to NVR/control room.
- Testing, commissioning, and integration with building-wide CCTV system following ONVIF protocols.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-X

### EXECUTIVE DINING

(Room size: 18'-0"x44'-0")

(Clear height 19'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and Installation of cement board to conceal drain pipes, AC ducting, and other services, using cement boards of size 2'-0" × 4'-0" of approved make and thickness, fixed on a properly aligned framework of galvanized steel sections including channels, brackets, screws, and all necessary supports, complete in all respects. The cement board surface shall be finished with plaster to achieve the required profile and smoothness, followed by application of paint finish. The profile, dimensions, color, and finish of the dummy beams and columns.
- Brass strips to be provided and installed as per approved design and layout.
- Supply, installation, testing & commissioning of LED lighting fixtures suitable for dining ambiance and uniform illumination.
- Concealed copper wiring through PVC/conduits from distribution board to lighting points.
- Installation of switches, dimmers (if required), junction boxes, and earthing system.
- Provision of switched socket outlets for cleaning equipment, buffet equipment, or small appliances.
- Concealed wiring with protection, proper earthing, and labeling.
- Testing and commissioning included
- Provision of power outlet for TV and data/WiFi connectivity.
- Integration with existing WiFi network for streaming and media devices.
- Cabling for power and data concealed within walls or ceiling.
- Testing, commissioning, and verification of connectivity.
- Installation of smoke detectors and/or heat detectors for the dining area.
- Wiring in fire-rated conduits connected to the central fire alarm panel.
- Manual call points and audio-visual indicators (Hooter/Strobe) included.
- Testing, commissioning, and compliance with NFPA 72.
- Supply, installation, and commissioning of fire extinguishers in the Executive Dining area as per NFPA 10 standards, including wall mounts, signage, inspection, and tagging to ensure full coverage and safety compliance.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be

permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure A-XI**

### **AUDITORIUM**

**(Room size: 82'-6"x30'-3")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium

quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and Installation of cement board to conceal drain pipes, AC ducting, and other services, using cement boards of size 2'-0" × 4'-0" of approved make and thickness, fixed on a properly aligned framework of galvanized steel sections including channels, brackets, screws, and all necessary supports, complete in all respects. The cement board surface shall be finished with plaster to achieve the required profile and smoothness, followed by application of paint finish. The profile, dimensions, color, and finish of the dummy beams and columns.
- Brass strips to be provided and installed as per approved design and layout.
- Providing, fabricating, and fixing M.S. arch frames (6" wide × 13'-0" long) including laser cutting as per approved design, surface preparation, and paint finish in the auditorium.
- Necessary acoustic treatment to control sound and echo when the auditorium is in use, as per approved design methodology.
- Supply, installation, testing & commissioning of LED and decorative lighting fixtures in VIP seating and stage area.
- Dimming control panels and switches for mood/scene lighting.
- Concealed copper wiring through conduits from DB to all lighting points
- Provision of switched socket outlets for equipment, laptops, personal devices, and media devices.
- Concealed wiring from nearest DB with protection and proper earthing.
- Labeling and testing of all circuits included.
- Dedicated UPS circuits for lighting, multimedia, communication, and essential small power points.

- Integration with central UPS system for uninterrupted power supply.
- Circuit protection, identification, and commissioning included
- Power and data provisions for projector/display SMD screens, audio amplifiers, microphones, and control panels.
- Cabling routed in concealed conduits with provision for future expansion.
- Integration with audiovisual control system for VIP area.
- Testing and commissioning of all multimedia equipment
- Telephone or intercom outlets for VIP area communication with control room and administration.
- Wiring from PBX or communication hub to locations.
- Testing and commissioning of communication points.
- Structured cabling (Cat-6/Cat-6A or Fiber as required) for computers, control devices, and streaming equipment.
- RJ-45 outlets and WiFi access point provision in VIP zone.
- Testing, labeling, and certification included.
- Integration with campus LAN/WAN infrastructure.
- Installation of smoke/heat detectors, manual call points, and audio-visual alarms within VIP and auditorium areas.
- Fire-rated cable in conduit connected to central fire alarm panel.
- Compliance with NFPA 72 standards.
- Testing, commissioning, and system integration included.
- Supply, installation, and commissioning of fire extinguishers in the Auditorium as per NFPA 10 standards, including wall mounts, signage, inspection, and tagging to ensure full coverage and safety compliance.

- Supply, Installation, Testing and commissioning of VRF System.
- Supply, Installation, testing and commissioning of refrigerant copper piping with ½” thickness foam insulation hanger / supports / clamp etc complete in all respect.
- Supply, installation and testing of GI Metal Duct Works with 1” thick glasswool insulation carry density 24kg/m3, with hanger support duct sealant anti-fungus paint cloth 8oz etc complete with all respect as per SMACNA standard.
- Supply & Installation of Drain Piping with 3/8” thick rubber foam insulation hanger / support etc complete with all respect.
- Supply + Installation of Control wiring with PVC Conduit elbow, socket junction and termination etc complete with all respect.
- Supply & Installation of Air Devices as per tuttle & bellay standard complete with all respect.
- Startup, Test Run, Testing & Commissioning complete System with additional refrigerant charging.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-XII

### **WASHROOMS**

**(Room size: 12'-3" x 9'-9" / 17'-3" x 7'-3" / 13'-0" x 7'-3")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Ambiance and uniform illumination.
- Concealed copper wiring through PVC/conduits from distribution board to lighting points.
- Installation of cold and hot water pipelines, fittings, and valves for washbasins, showers, toilets, and other sanitary fixtures.
- Connection to the main water supply system, including branch lines, risers, and distribution points.
- Installation of water tanks, pumps, and pressure regulation systems if required.
- Provision of taps, faucets, and other accessories.
- Flushing, testing, and commissioning of the water supply system to ensure leak-free operation.
- Installation of drainage and soil pipes for toilets, urinals, washbasins, and floor drains, including proper slopes for gravity flow.
- Connection to the building sewerage or sewage treatment system.
- Provision of vent pipes, inspection chambers, traps, and cleanouts as required.
- Testing, flushing, and commissioning of sewerage system to ensure free flow and no blockage.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the

successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-XIII

### **PANTRY**

**(Room size: 13'-0" x 10'-0")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply, installation, testing & commissioning of LED lighting fixtures suitable for pantry illumination.
- Concealed copper wiring through PVC/conduits from nearest DB to lighting points.
- Switches, junction boxes, and proper earthing included.
- Provision of switched socket outlets for appliances such as refrigerator, microwave, coffee machine, and other pantry equipment.
- Concealed wiring with protection, proper earthing, and labeling.
- Testing and commissioning included.
- Installation of intercom handset or panel in pantry for internal communication.
- Cabling from PBX/intercom control panel to pantry outlet.
- Testing and commissioning of intercom system included.
- installation of cold and hot water pipelines, fittings, and valves for sinks, dishwashers, and other pantry appliances.
- Connection to the main water supply system, including branch lines, risers, and distribution points.
- Provision of taps, faucets, and accessories suitable for pantry use.
- Installation of water tanks or pressure regulation systems if required.
- Flushing, testing, and commissioning of the water supply system to ensure leak-free operation.
- Installation of drainage pipes for sinks, floor drains, and other wastewater outlets, including proper slopes for gravity flow.
- Connection to the building sewerage system.
- Provision of vent pipes, traps, and cleanouts as required.

- Testing and commissioning of sewerage system to ensure smooth operation and prevent blockages

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure A-XIV

### STORE

**(Room size: 12'-0" x 12'-0" / 6'-0" x 6'-10")**

**(Clear height 19'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply, installation, testing & commissioning of LED lighting fixtures suitable for pantry illumination.
- Concealed copper wiring through PVC/conduits from nearest DB to lighting points.
- Switches, junction boxes, and proper earthing included.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B-I

### DG ROOM

**(Room size:24'-0"x15'-6")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer Incharge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and Installation of UPVC Panels, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Brass strips to be provided and installed as per approved design and layout.
- Supply and installation of general, and decorative lighting fixtures including switches, wiring, conduits, and accessories to provide comfortable and efficient illumination suitable for office and meeting functions
- Provision of power outlets, floor boxes (if required), and dedicated circuits for office equipment such as computers, printers, displays, and auxiliary appliances, including proper earthing and circuit protection.
- Installation of UPS-backed power points for critical equipment to ensure uninterrupted operation of essential devices such as IT equipment, communication systems, and sensitive electronics during power outages
- Supply and installation of telephone outlets, data points, structured cabling, network accessories, and conduits to support voice, data, and IT connectivity integrated with the building communication infrastructure
- Supply and installation of fire detection devices such as smoke detectors, manual call points (if required), alarm sounders, and cabling integrated with the building fire alarm system in compliance with NFPA 72 or applicable fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B-II

### **DG CHAMBER**

**(Room size:24'-0"x12'-0")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge . (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- **Supply and Installation of UPVC Panels,** Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general, decorative, and task lighting fixtures as per approved design.
- Switching arrangements, dimmers (if required), wiring, conduits, and accessories.
- Integration of energy-efficient lighting suitable for office and executive use.
- Proper earthing, circuit protection, and labeling of lighting circuits.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure B-III**

### **PA ROOM**

**(Room size:11'-0"x12'-0")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.

- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general and task lighting fixtures, switches, wiring, conduits, and accessories to ensure adequate illumination for office work and operational efficiency.
- Provision of power outlets, dedicated circuits, and wiring for office equipment such as computers, printers, chargers, and auxiliary devices, including proper earthing and circuit protection.
- Installation of UPS-backed power points for critical office equipment to maintain uninterrupted operation during power failures.
- Supply and installation of telephone outlets, structured data cabling, network points, conduits, and accessories for voice, data, and IT connectivity integrated with the building communication infrastructure
- Installation of smoke detectors, alarm interfaces, cabling, and associated accessories connected to the main fire alarm system in compliance with NFPA 72 or applicable fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In

case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- IV

### **DINNING ROOM**

**(Room size:12'-0"x33'-6")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thich tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.

- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.
- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0".
- Supply and installation of general, decorative, and ambient lighting fixtures including switches, wiring, conduits, and accessories to provide comfortable illumination suitable for dining and hospitality use
- Supply, installation testing & commissioning of 13A/15A switched socket outlets for general staff usage (laptops, chargers, small appliances etc.).
- Complete wiring in PVC conduit with copper cables from nearest distribution board
- Earthing, circuit protection and proper labeling included.
- Supply and installation of fire detection devices such as smoke/heat detectors, alarm sounders, cabling, and associated accessories integrated with the building fire alarm system in compliance with NFPA 72 or applicable local fire safety regulations.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works,

including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- V

### CONFERENCE ROOM

(Room size:24'-0"x16'-0")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general, ambient, and presentation lighting fixtures including switching, dimming controls, wiring, conduits, and accessories to provide appropriate illumination for meetings and presentations.
- Provision of power outlets, floor boxes, and dedicated circuits for conference equipment such as laptops, displays, chargers, and auxiliary devices, including proper earthing and circuit protection.
- Installation of UPS-backed power points for critical conference equipment to ensure uninterrupted operation during power failures.
- Supply and installation of telephone outlets, data points, structured cabling, conduits, and accessories for voice, data, and IT connectivity integrated with the building communication infrastructure.
- Installation provisions for multimedia equipment including display screens, projectors, audio-visual interfaces, control panels, cabling infrastructure, and connectivity for presentation systems.
- Supply and installation of fire detection devices such as smoke detectors, alarm sounders, cabling, and associated accessories connected to the main fire alarm system in compliance with NFPA 72 or applicable fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- VI

### **CORRIDOR**

**(Room size:12'-0" wide Nos.3)**

**(Room size:13'-0" wide Nos.1)**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color,

pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Supply and installation of general corridor lighting fixtures, emergency lighting (if required), switches, wiring, conduits, and accessories to provide uniform illumination for safe circulation and operational convenience.
- Installation of CCTV cameras, cabling, mounting accessories, recording connectivity, and integration with the central monitoring system in accordance with IEC or applicable security system standards
- Supply, installation, and commissioning of fire extinguishers along the corridor in compliance with NFPA **10** standards. Works include wall mounts, signage, inspection, and tagging to ensure full coverage and fire safety compliance.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- VII

### **ENTRANCE LOBBY/ LOBBY**

**(Room size: 21'-6"x27'-6" / 21'-6"x27'-6")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specilzed materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.

- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.
- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thich tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- Single-piece Rudy Red granite to be supplied and installed as approved by the Architect.
- Brass strips to be provided and installed as per approved design and layout.
- Supply and installation of general corridor lighting fixtures, emergency lighting, switches, wiring, conduits, and accessories to provide uniform illumination for safe circulation and operational convenience.
- Installation of CCTV cameras, cabling, mounting accessories, recording connectivity, and integration with the central monitoring system in accordance with IEC or applicable security system standards

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- VIII

### **CLASSROOM**

**(Room size: 33'-6"x31'-8")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general and task lighting fixtures, switching, wiring, conduits, and accessories to provide adequate illumination suitable for teaching, presentations, and student activities.
- Provision of power outlets, floor boxes (if required), and dedicated circuits for computers, teaching aids, charging points, and other classroom equipment, including proper earthing and circuit protection.
- Installation of UPS-backed power outlets for critical equipment such as computers, multimedia systems, and teaching devices to ensure uninterrupted operation during power outages.
- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories to support voice, data, and internet connectivity integrated with the building network system.
- Provision for multimedia infrastructure including projectors or display screens, audio-visual interfaces, control panels, speakers, and necessary cabling for teaching and presentation purposes.
- Supply and installation of fire detection devices such as smoke detectors, alarm sounders, cabling, and associated accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- IX

### TEA ROOM

(Room size: 23'-3"x11'-9")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of Glass Doors**, Providing and installing high-quality tempered glass doors (8mm–12mm thick, as approved), complete with M.S. frame (16 gauge) or approved aluminum frame where required, including all necessary fittings, hardware, accessories, and fixing arrangements. The work shall include premium quality floor springs/door closers, handles, patch fittings, locks, access control devices (where required), and all related ironmongery. Glass shall be clear/laminated/frosted as per approved design and safety standards. All materials, design, size, finish, and specifications shall be approved by the Architect. Installation shall be complete in all respects, including surface preparation, enamel paint over red oxide primer for M.S. frame, and proper alignment and finishing as per approved drawings and site requirements.
- **Supply and Installation of Glass Partition Wall**, Providing and installing tempered/toughened glass partition walls (10mm–12mm thick or as approved), complete with aluminum or M.S. framework where required, including patch fittings, channels, gaskets, sealants, and all necessary hardware and accessories. Glass may be clear, frosted, or laminated as per approved design. Installation shall be perfectly aligned and finished, complete in all respects, as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general lighting fixtures, switching, wiring, conduits, and accessories to provide comfortable illumination suitable for pantry and refreshment activities.
- Provision of power outlets and dedicated circuits for pantry appliances such as kettle, microwave, refrigerator, water dispenser, and other small equipment, including proper earthing and circuit protection.
- Supply and installation of fire detection devices such as smoke or heat detectors (as applicable), alarm sounders, cabling, and accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable fire safety standards

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- X

### ROOM

**(Room size: 12'-0"x11'-9" / 11'-9"x11'-9")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of Glass Doors**, Providing and installing high-quality tempered glass doors (8mm–12mm thick, as approved), complete with M.S. frame (16 gauge) or approved aluminum frame where required, including all necessary fittings, hardware, accessories, and fixing arrangements. The work shall include premium quality floor springs/door closers, handles, patch fittings, locks, access control devices (where required), and all related ironmongery. Glass shall be clear/laminated/frosted as per approved design and safety standards. All materials, design, size, finish, and specifications shall be approved by the Architect. Installation shall be complete in all respects, including surface preparation, enamel paint over red oxide primer for M.S. frame, and proper alignment and finishing as per approved drawings and site requirements.
- **Supply and Installation of Glass Partition Wall**, Providing and installing tempered/toughened glass partition walls (10mm–12mm thick or as approved), complete with aluminum or M.S. framework where required, including patch fittings, channels, gaskets, sealants, and all necessary hardware and accessories. Glass may be clear, frosted, or laminated as per approved design. Installation shall be perfectly aligned and finished, complete in all respects, as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply & installation of lighting fixtures, switches, wiring, conduits, and accessories to provide adequate illumination for the room.
- Supply & installation of Smoke/heat detectors, alarm sounders, cabling, and accessories connected to the main fire alarm system in compliance with NFPA 72 or applicable fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XI

### COMPUTER LAB

(Room size: 23'-1"x43'-6")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer in charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general and task lighting fixtures, switching, wiring, conduits, and accessories to provide proper illumination suitable for computer workstations and lab activities.
- Provision of power outlets, floor boxes, and dedicated circuits for computers, printers, lab equipment, and other devices, including proper earthing and circuit protection.
- Installation of UPS-backed power points to ensure uninterrupted operation of computers, servers, and critical lab equipment during power outages.
- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories for voice, data, and internet connectivity integrated with the building network system.
- Provision of multimedia infrastructure including projectors, display screens, audio-visual interfaces, control panels, and cabling for teaching, presentations, and demonstrations.
- Supply and installation of smoke detectors, alarm sounders, cabling, and associated accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable local fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in

coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XII

### **STAFF DINNING**

**(Room size: 19'-7"x46'-6")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Supply and Installation of doors of various types (M.S Frame door of 16 gauge or Solid First-Class wood matching the originally installed wood as site, with 8mm Thick tempered glass where opened, and other high-class category doors of approved make, size, and specification, comprising frames, shutters/panels, glazing where applicable, fittings, hardware, accessories, and fixing arrangements, Premium Locks, installed complete in all respects. The type of door, material, design, color, glass specification, and surface finish shall be approved by the Architect. i/c door closers, access control, and special hardware, monger, Enamel paint with red oxide base as specified and as per design.
- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general and ambient lighting fixtures, switches, wiring, conduits, and accessories to provide comfortable illumination for dining activities.
- Provision of power outlets and dedicated circuits for appliances, equipment, and auxiliary devices, including proper earthing and circuit protection.
- Supply and installation of smoke/heat detectors, alarm sounders, cabling, and accessories connected to the building fire alarm system in compliance with NFPA **72** or applicable fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XIII

### **DIRECTOR ROOM**

**(Room size: 29'-0"x16'-8")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer In charge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of Glass Doors**, Providing and installing high-quality tempered glass doors (8mm–12mm thick, as approved), complete with M.S. frame (16 gauge) or approved aluminum frame where required, including all necessary fittings, hardware, accessories, and fixing arrangements. The work shall include premium quality floor springs/door closers, handles, patch fittings, locks, access control devices (where required), and all related ironmongery. Glass shall be clear/laminated/frosted as per approved design and safety standards. All materials, design, size, finish, and specifications shall be approved by the Architect. Installation shall be complete in all respects, including surface preparation, enamel paint over red oxide primer for M.S. frame, and proper alignment and finishing as per approved drawings and site requirements.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- **Supply and Installation of UPVC Panels**, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- **Supply and Installation of Glass Partition Wall**, Providing and installing tempered/toughened glass partition walls (10mm–12mm thick or as approved), complete with aluminum or M.S. framework where required, including patch fittings, channels, gaskets, sealants, and all necessary hardware and accessories. Glass may be clear, frosted, or laminated as per approved design. Installation shall be perfectly aligned and finished, complete in all respects, as per approved drawings and instructions of the Architect/Engineer In-Charge.
- **Supply and Installation of Drywall Partition**: Providing and installing drywall partitions comprising G.I. metal stud and track framework of approved gauge, lined on both sides with gypsum boards of specified thickness, including insulation infill (where required), joint treatment with tape and compound, surface preparation, and paint finish. The work shall include all necessary fasteners, accessories, and complete finishing, executed as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and installation of general, task, and decorative lighting fixtures including switches, wiring, conduits, and accessories to provide adequate illumination for office and meeting use.
- Provision of power outlets and dedicated circuits for office equipment such as computers, printers, chargers, and other devices, with proper earthing and circuit protection.
- Installation of UPS-backed power points to ensure uninterrupted operation of critical equipment during power outages.

- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories for voice, data, and IT connectivity integrated with the building network infrastructure
- Supply and installation of smoke detectors, alarm sounders, cabling, and associated accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable local fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B-XIV

### ADC ROOMS

(Room size: 25'-0"x16'-8"/19'-3"x16'-8"/23'-0"x12'-9"/18'-0"x16'-8")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of Glass Doors**, Providing and installing high-quality tempered glass doors (8mm–12mm thick, as approved), complete with M.S. frame (16 gauge) or approved aluminum frame where required, including all necessary fittings, hardware, accessories, and fixing arrangements. The work shall include premium quality floor springs/door closers, handles, patch fittings, locks, access control devices (where required), and all related ironmongery. Glass shall be clear/laminated/frosted as per approved design and safety standards. All materials, design, size, finish, and specifications shall be approved by the Architect. Installation shall be complete in all respects, including surface preparation, enamel paint over red oxide primer for M.S. frame, and proper alignment and finishing as per approved drawings and site requirements.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and Installation of UPVC Panels, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Supply and Installation of Glass Partition Wall, Providing and installing tempered/toughened glass partition walls (10mm–12mm thick or as approved), complete with aluminum or M.S. framework where required, including patch fittings, channels, gaskets, sealants, and all necessary hardware and accessories. Glass may be clear, frosted, or laminated as per approved design. Installation shall be perfectly aligned and finished, complete in all respects, as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and Installation of Drywall Partition: Providing and installing drywall partitions comprising G.I. metal stud and track framework of approved gauge, lined on both sides with gypsum boards of specified thickness, including insulation infill (where required), joint treatment with tape and compound, surface preparation, and paint finish. The work shall include all necessary fasteners, accessories, and complete finishing, executed as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and installation of general, task, and decorative lighting fixtures including switches, wiring, conduits, and accessories to provide adequate illumination for office and meeting use.
- Provision of power outlets and dedicated circuits for office equipment such as computers, printers, chargers, and other devices, with proper earthing and circuit protection.
- Installation of UPS-backed power points to ensure uninterrupted operation of critical equipment during power outages.

- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories for voice, data, and IT connectivity integrated with the building network infrastructure
- Supply and installation of smoke detectors, alarm sounders, cabling, and associated accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable local fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XV

### AC & DC ROOMS

(Room size: 13'-0"x13'-0"/21'-0"x13'-0"/16'-0"x13'-0")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of Glass Doors**, Providing and installing high-quality tempered glass doors (8mm–12mm thick, as approved), complete with M.S. frame (16 gauge) or approved aluminum frame where required, including all necessary fittings, hardware, accessories, and fixing arrangements. The work shall include premium quality floor springs/door closers, handles, patch fittings, locks, access control devices (where required), and all related ironmongery. Glass shall be clear/laminated/frosted as per approved design and safety standards. All materials, design, size, finish, and specifications shall be approved by the Architect. Installation shall be complete in all respects, including surface preparation, enamel paint over red oxide primer for M.S. frame, and proper alignment and finishing as per approved drawings and site requirements.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and Installation of UPVC Panels, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Supply and Installation of Glass Partition Wall, Providing and installing tempered/toughened glass partition walls (10mm–12mm thick or as approved), complete with aluminum or M.S. framework where required, including patch fittings, channels, gaskets, sealants, and all necessary hardware and accessories. Glass may be clear, frosted, or laminated as per approved design. Installation shall be perfectly aligned and finished, complete in all respects, as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and Installation of Drywall Partition: Providing and installing drywall partitions comprising G.I. metal stud and track framework of approved gauge, lined on both sides with gypsum boards of specified thickness, including insulation infill (where required), joint treatment with tape and compound, surface preparation, and paint finish. The work shall include all necessary fasteners, accessories, and complete finishing, executed as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and installation of general, task, and decorative lighting fixtures including switches, wiring, conduits, and accessories to provide adequate illumination for office and meeting use.
- Provision of power outlets and dedicated circuits for office equipment such as computers, printers, chargers, and other devices, with proper earthing and circuit protection.
- 
- Installation of UPS-backed power points to ensure uninterrupted operation of critical equipment during power outages.
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- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories for voice, data, and IT connectivity integrated with the building network infrastructure
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- Supply and installation of smoke detectors, alarm sounders, cabling, and associated accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable local fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XVI

### STAFF ROOMS

(Room size: 16'-0"x12'-0"/13'-3"x10'-0"/13'-3"x10'-0"/10'-6"x9'-6")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- **Supply and Installation of Glass Doors**, Providing and installing high-quality tempered glass doors (8mm–12mm thick, as approved), complete with M.S. frame (16 gauge) or approved aluminum frame where required, including all necessary fittings, hardware, accessories, and fixing arrangements. The work shall include premium quality floor springs/door closers, handles, patch fittings, locks, access control devices (where required), and all related ironmongery. Glass shall be clear/laminated/frosted as per approved design and safety standards. All materials, design, size, finish, and specifications shall be approved by the Architect. Installation shall be complete in all respects, including surface preparation, enamel paint over red oxide primer for M.S. frame, and proper alignment and finishing as per approved drawings and site requirements.
- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and Installation of UPVC Panels, Providing and fixing UPVC wall/ceiling panels of approved make, thickness, and color, including necessary framework, supports, trims, corner beads, joint strips, fasteners, and accessories, complete in all respects. Panels shall be moisture-resistant, termite-proof, and easy to maintain. Installation shall be carried out as per approved design, drawings, and instructions of the Architect/Engineer In-Charge.
- Supply and Installation of Glass Partition Wall, Providing and installing tempered/toughened glass partition walls (10mm–12mm thick or as approved), complete with aluminum or M.S. framework where required, including patch fittings, channels, gaskets, sealants, and all necessary hardware and accessories. Glass may be clear, frosted, or laminated as per approved design. Installation shall be perfectly aligned and finished, complete in all respects, as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and Installation of Drywall Partition: Providing and installing drywall partitions comprising G.I. metal stud and track framework of approved gauge, lined on both sides with gypsum boards of specified thickness, including insulation infill (where required), joint treatment with tape and compound, surface preparation, and paint finish. The work shall include all necessary fasteners, accessories, and complete finishing, executed as per approved drawings and instructions of the Architect/Engineer In-Charge.
- Supply and installation of general, task, and decorative lighting fixtures including switches, wiring, conduits, and accessories to provide adequate illumination for office and meeting use.
- Provision of power outlets and dedicated circuits for office equipment such as computers, printers, chargers, and other devices, with proper earthing and circuit protection.
- 
- Installation of UPS-backed power points to ensure uninterrupted operation of critical equipment during power outages.
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- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories for voice, data, and IT connectivity integrated with the building network infrastructure
- 
- Supply and installation of smoke detectors, alarm sounders, cabling, and associated accessories connected to the building fire alarm system in compliance with NFPA 72 or applicable local fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XVII

### OFFICE CORRIDORS

**(Room size: 7'-0" wide/ 8'-0" wide/ 6'-3" wide (passage))**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place. As approved by engineer Incharge.
- Supply and Installation of 2'-0" × 4'-0" & 2'-0" × 2'-0" (As per proposed design & Requiring of site ) porcelain tiles of approved make (Full body), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects i/c Skirting 4" high with base mortar. The color, design, and surface finish of the tiles shall be approved by the Engineer In-charge. (Basic rates = 550).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Gypsum False ceiling is incorporated in design the minimum height shall be 16'-0"
- Supply and installation of general and emergency lighting fixtures, switches, wiring, conduits, and accessories to provide uniform illumination for safe circulation.
- Provision of power outlets and dedicated circuits for corridor equipment such as cleaning devices, sensors, or signage, including proper earthing and circuit protection.
- Installation of UPS-backed power points for critical corridor systems such as emergency lighting or control devices to ensure uninterrupted operation during power outages
- Installation of CCTV cameras, cabling, mounting accessories, and connection to the central monitoring system in compliance with IEC or applicable security standards, including testing and commissioning.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XVIII

### WASHROOMS

(Room size: 12'-0" x 30'-3" / 10'-6" x 15'-9" / 8'-0" x 13'-3" / 12'-0" x 7'-10")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling at height 16'-0" of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply and installation of general and task lighting fixtures, switches, wiring, conduits, and accessories to provide adequate illumination for hygiene and safe use.
- Installation of cold and hot water pipelines, valves, fittings, and fixtures for washbasins, showers, and other sanitary equipment, including connection to the main water system, proper earthing for pumps (if any), and testing for leak-free operation.
- Installation of drainage and soil pipes for toilets, urinals, washbasins, and floor drains with proper slopes, traps, venting, and connection to the building sewerage system. Testing and commissioning to ensure smooth and blockage-free operation.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B-XIX

### **PANTRY**

**(Room size: 23'-3" x 12'-3")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling at height 16'-0" of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply and installation of general and task lighting fixtures, switches, wiring, conduits, and accessories to provide adequate illumination for pantry activities.
- Provision of power outlets and dedicated circuits for pantry appliances such as kettle, microwave, refrigerator, and other auxiliary devices, including proper earthing and circuit protection.
- Supply and installation of telephone/data outlets, structured cabling, network points, conduits, and accessories to support voice and data connectivity integrated with the building communication infrastructure.
- Supply and installation of smoke/heat detectors, alarm sounders, cabling, and accessories connected to the building fire alarm system in compliance with NFPA **72** or applicable fire safety standards.
- Installation of cold and hot water pipelines, fittings, valves, and fixtures for sinks and appliances.
- Connection to the main water supply system, ensuring leak-free operation.
- Installation of drainage pipes for sinks and floor drains, including traps, venting, and connection to the building sewerage system.
- Testing and commissioning to ensure smooth, blockage-free operation.
- Supply and installation of appropriately rated fire extinguishers with wall mounts, signage, inspection, and tagging as per NFPA 10 standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XX

### STORE

(Room size: 12'-6" x 12'-0" / 12'-0" x 12'-0")

(Clear height 17'-0")

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling at 16'-0" height of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply and installation of general lighting fixtures, switches, wiring, conduits, and accessories to provide adequate illumination for storage operations
- Supply and installation of smoke/heat detectors, alarm sounders, cabling, and accessories connected to the building fire alarm system in compliance with NFPA **72** or applicable local fire safety standards.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **Annexure B- XXI**

### **TOILETS**

**(Room size: 10'-6" x 6'-0" Nos.4)**

**(Room size: 9'-6" x 6'-4" Nos.4)**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and

shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling at 16'-0" height of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply and installation of general and task lighting fixtures, switches, wiring, conduits, and accessories to provide adequate illumination for hygiene and safe use.
- Installation of cold and hot water pipelines, valves, fittings, and fixtures for washbasins, showers, and other sanitary equipment, including connection to the main water system and testing for leak-free operation.
- Installation of drainage and soil pipes for toilets, urinals, washbasins, and floor drains with proper slopes, traps, venting, and connection to the building sewerage system. Testing and commissioning to ensure smooth and blockage-free operation.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## Annexure B- XXII

### **DG TOILETS**

**(Room size: 12'-0" x 12'-0")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors including all finishes at any level, as per approved design plan where applicable, using all necessary tools, equipment, labor, and safety measures, segregation of reusable materials for disposal or taking over by the contractor, removal and carting away of debris and surplus material from the site to designated place.
- Supply and Installation of 12" x 24" Ceramic tiles of approved make (On floor and walls), fixed using high-quality cement-based tile adhesive i/c 1:3:6 ratio PCC under floor or on Walls of required thickness, properly prepared surface including necessary spacers, alignment accessories, cutting, and finishing, complete in all respects. The color, design, and surface finish of the tiles shall be approved by the Architect. (Basic rates = 425).
- Removing all loose/ old Flooring, Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Removing all loose/ old plaster & corroded Deformed steel bars and Re-strengthen with Steel/ Carbon Fiber strips Method as per site current condition Duly Approved by Consultant Structure Engineer. Applying strengthen chemical Including (3mm thick Epoxy coating by Corro Floor SS2000 / Corro Coat SF500) or equivalent and other Re-strengthen chemical.
- Applying & fixing of Expanded metal 1/2" to 3/4" 16 Gauge (3" wide) lathing to all joints of masonry & RCC Works and over cuttings of electric conduits with washers & steel nails (as per detail) complete as per drawings, specification & as per instruction of Engineer In-charge.
- Applying specialized water Proofing to protect the Building from seepage through adjacent areas and moisture issues from environment.
- Providing & applying smooth 1/2" to 3/4"<sup>th</sup> plaster to walls columns, Ceiling etc. with 1:4 (1 cement 4 sand) ratio, i/c all corners, recesses, jambs, patta, gola, cornice and raking out joints.
- Supply and application of texture paint finish or pattern proposed in the design duly approved by Architect for make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Master, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of

primer, putty where required, and 03 coats of texture / paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect.

- Providing and fixing wall mirrors of approved quality as per specified dimensions and design.
- Providing and installing drywall partitions and UPVC doors, including application of approved waterproofing chemical treatment beneath the raised floor area.
- P/L tiled false ceiling at 16'-0" height of size 595 x 595 mm metal grid of hot dipped galvanized steel sections GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595 x 595 mm with 20% area perforation.
- Supply and application of paint finish as approved by Architect of approved make and quality, applied on properly prepared wall surfaces including surface cleaning, base coat application, texture formation using approved tools or stencils, curing, and final protective coating where required, complete in all respects. The color, pattern, and texture shall be approved by the Architect. Supply and application of premium quality plastic emulsion paint of approved brand (ICI Dulux, Berger, Nelson or equivalent) and shade, applied on properly prepared surfaces including cleaning, sanding, application of primer, putty where required, and 03 coats of paint to achieve a smooth and uniform finish, complete in all respects. The color and finish shall be approved by the Architect. Providing and fixing UPVC doors of required size (Solid without glass) i/c all monger, locks etc.
- Supply and installation of general and task lighting fixtures, switches, wiring, conduits, and accessories to provide adequate illumination for hygiene and safe use.
- Installation of cold and hot water pipelines, valves, fittings, and fixtures for washbasins, showers, and other sanitary equipment, including connection to the main water system and testing for leak-free operation
- Installation of drainage and soil pipes for toilets, urinals, washbasins, and floor drains with proper slopes, traps, venting, and connection to the building sewerage system. Testing and commissioning to ensure smooth, blockage-free operation.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. The location of all AC outdoor units shall be finalized by the bidder in coordination with and subject to approval of the Engineer In-Charge. All associated works, including fabrication and construction of platforms or supports, shall be deemed included in the respective bid items. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

# **SPECIFICATION & TECHNICAL PROVISIONS**

## **Annexure C**

### **MUSEUM**

**(Room size:71'-6"x31'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specilzed materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

### **STAFF ROOM**

**(Room size:12'-0"x14'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specilzed materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **FACULTY ROOM**

**(Room size:12'-0"x10'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specilzed materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **CLASS ROOM**

**(Room size:35'-3"x31'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specilzed materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **CORRIDOR**

**(Room size:12'-3" wide Nos.3)**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **ENTRANCE LOBBY**

**(Room size: 21'-6"x27'-6" / 21'-6"x27'-6")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **VIP VISITORS REST ROOMS**

**(Room size: 15'-6"x14'-6"**

**Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **CONTROL ROOM**

**(Room size: 8'-6"x9'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **EXECUTIVE DINING**

**(Room size: 18'-0"x44'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **AUDITORIUM**

**(Room size: 82'-6"x30'-3")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **WASHROOMS**

**(Room size: 12'-3" x 9'-9" / 17'-3" x 7'-3" / 13'-0" x 7'-3")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **PANTRY**

**(Room size: 13'-0" x 10'-0")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **STORE**

**(Room size: 12'-0" x 12'-0" / 6'-0" x 6'-10")**

**(Clear height 19'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **DG ROOM**

**(Room size:24'-0"x15'-6")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **DG CHAMBER**

**(Room size:24'-0"x12'-0")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **PA ROOM**

**(Room size:11'-0"x12'-0")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **DINNING ROOM**

**(Room size:12'-0"x33'-6")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **CONFERENCE ROOM**

**(Room size:24'-0"x16'-0")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **CORRIDOR**

**(Room size:12'-0" wide Nos.3)**

**(Room size:13'-0" wide Nos.1)**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **ENTRANCE LOBBY/ LOBBY**

**(Room size: 21'-6"x27'-6" / 21'-6"x27'-6")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **CLASSROOM**

**(Room size: 33'-6"x31'-8")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **TEA ROOM**

**(Room size: 23'-3"x11'-9")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

## **ROOM**

**(Room size: 12'-0"x11'-9" / 11'-9"x11'-9")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **COMPUTER LAB**

**(Room size: 23'-1"x43'-6")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **STAFF DINNING**

**(Room size: 19'-7"x46'-6")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **DIRECTOR ROOM**

**(Room size: 29'-0"x16'-8")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **ADC ROOMS**

**(Room size: 25'-0"x16'-8"/19'-3"x16'-8"/23'-0"x12'-9"/18'-0"x16'-8")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **C & DC ROOMS**

**(Room size: 13'-0"x13'-0"/21'-0"x13'-0"/16'-0"x13'-0")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **STAFF ROOMS**

**(Room size: 16'-0"x12'-0"/13'-3"x10'-0"/13'-3"x10'-0"/10'-6"x9'-6")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **OFFICE CORRIDORS**

**(Room size: 7'-0" wide/ 8'-0" wide/ 6'-3" wide (passage))**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **WASHROOMS**

**(Room size: 12'-0" x 30'-3" / 10'-6" x 15'-9" / 8'-0" x 13'-3" / 12'-0" x 7'-10")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **PANTRY**

**(Room size: 23'-3" x 12'-3")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **STORE**

**(Room size: 12'-6" x 12'-0" / 12'-0" x 12'-0")**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **TOILETS**

**(Room size: 10'-6" x 6'-0" Nos.4)**

**(Room size: 9'-6" x 6'-4" Nos.4)**

**(Clear height 17'-0")**

- Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

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## **DG TOILETS**

**(Room size: 12'-0" x 12'-0")**

**(Clear height 17'-0")**

- Demolition of existing flooring tiles, Ceiling, Plaster from walls etc. and removal of doors  
Rehabilitation of Ceiling, columns, beams etc as per specification provided by approved vendor with cleaning of all loose elements by mechanical means, using approved anti corrosion, containing cementitious, Fiber Reinforced polymer modified one- component repair mortar with water proofing coating and applying specialized materials to enhance the capability of the structure to sustain the load of upper floors. Suitable for use in hot and Near sea conditions.

The bidder is strongly advised to visit the site prior to finalization of the bid amount to fully understand the scope and site conditions. All materials proposed for use shall be submitted for approval to the Engineer In-Charge before procurement; any unapproved material will not be permitted at site. Detailed measurements and supporting calculations to justify the quoted financial bid rates shall be submitted by the successful bidder for verification and evaluation. In case of any irregularity, omission, or non-compliance in the financial bid, the bid shall be rejected and the financial proposal of the next lowest bidder shall be considered for review.

NAME OF SCHEME:

**REHABILITATION / RENOVATION OF OLD  
CUSTOM HOUSE KARACHI SINDH.**

**TENDER AND CONTRACT DOCUMENTS**

**VOLUME -II**

**TECHNICAL SPECIFICATIONS**



**M/S. ATIF NAZAR (PVT.) LTD.**  
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## SECTION - 1 GENERAL REQUIREMENTS

### 1. General

The General Conditions of Contract & Special Conditions of Contract shall form an integral part of these General Requirements.

The Constructor shall notify all sub-Constructor of the provisions of the Conditions of Contract and the General Requirement of this Specification.

The arrangement and divisions of these Specifications is not to be construed as establishing the limits of responsibility of sub-trades.

The Constructor is responsible for delineating the scope of Sub-Contracts and for coordinating all the Works.

All works shall be carried out in accordance with the following specifications, supplemented by detailed specifications contained in the following sections. Any inconsistencies or ambiguities shall be brought to the notice of the Engineer for his clarification/decision. Decision and direction of the Engineer, in all such cases shall be final and binding.

The Constructor shall make himself thoroughly familiar with the site conditions, foresee any and all problems likely to be encountered during execution of the works, and shall be able and ready to solve them effectively. Proposals for solutions to the problems shall be submitted to the Consultant / Engineer In Charge/Engineer In-charge for approval before proceeding with the work.

The Tender Drawings, Design Criteria and Specifications are to be read in conjunction and shall be mutually explanatory. In case of any conflict the order of preference shall be as under duly followed by the Special and General Conditions of Contract in Volume I of Tender & Contract documents.

- i) Specifications
- ii) Tender Drawings
- iii) Bill of Quantities

### 2. Scope of Work

The scope of work comprises **“REHABILITATION AND RENOVATION OF OLD CUSTOM HOUSE KARACHI SINDH”** as per drawings and specification as defined hereunder and as specified in subsequent sections of tender documents. The Constructor shall perform all relevant engineering, procurement, installation, construction and execution, coordination with other services, testing and commissioning including all documentation, drawings, calculations and supply of manuals as required completing the work. The Constructor shall also be responsible to supply and install all other items not specifically mentioned in these documents but which are necessary for proper completion of the works included in the scope of this Contract.

### 3. Applicable Codes and Standards

In the absence of other Standards being required by the Contract Documents, all work and materials shall meet the requirement of the Uniform Building Code of the United States, and/or applicable American Society for Testing Materials (ASTM)

American Association of State Highway and Transportation Officials (AASHTO) Specifications and the latest American Concrete Institute Manual of Concrete Practice and American.

Institute of Steel Construction (AISC) Manual relevant to the Works except in cases where the Pakistan Building Code requires a higher standard. In such cases the Pakistani Code shall govern, where the abbreviations listed below are used, it refers to the latest code, standards, or publications of the following organizations:

AASHTO	American Association of State Highway and Transportation Officials.
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASA	American Standard Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Material
AWS	American Welding Society
BSI	British Standards Institute
ICAO	International Civil Aviation Organization
BSICP	British Standard Institute Code of
PCA	Practice Portland Cement Association
PSI	Pakistan Standard Institute
UBC	Uniform Building Code

Should the Constructor, at any time and for any specific reasons, wish to deviate from the above standards or desires to use materials or equipment other than those provided for by the above standards, then he shall state the exact nature of the change giving the reasons for making the change and shall submit complete specifications of the materials and descriptions of the equipment for the Engineer's approval, whose decisions shall be conclusive and binding upon the Constructor.

#### **4. Codes, Standards, Certificates**

The Constructor shall supply and have at his site office:

Copies of all latest editions of codes and standards referred to in these specifications by number, or equivalent codes and standards approved by the Engineer.

Catalogues and published, recommendations from manufacturers supplying products and materials for the project.

The Constructor shall provide manufacturer's or supplier's certificates to the Engineer for all products and materials which must meet the requirements of a specific code or standard as stated in these Specifications.

#### **5. Units of Measurements**

The British System of Units (FPS) shall be used throughout this Project.

**6. Manufacturer's Recommendations**

Installation of manufactured items shall be in accordance with procedures recommended by the manufacturer or as approved by the Engineer.

**7. Existing Condition at Site**

Drawings and information pertaining to existing project conditions are furnished for reference. Neither the Employer nor the Engineer warrants the adequacy or correctness of these.

**8. Protection and Precautions**

The Constructor and his sub-Constructor shall afford all necessary protection to existing structures and will be required to make good at his own expense any damage done to such structures through his own or his representatives or sub Constructor' fault and negligence.

The Constructor and his sub-Constructor shall afford all necessary protection to existing roads in the area. He will clear and make good at his own expense any damage to or debris on these roads through his own fault and negligence. He must at all time ensure the free and normal flow of traffic and shall not cause obstruction to the traffic system. The Constructor and his sub-Constructor shall provide and maintain necessary protection and precautionary measures such as warning signs, warning lamps and barricades etc. to prevent accidents.

The Constructor shall promptly correct all such damage to original condition at no additional expense to the Employer.

The Constructor shall cooperate with trades performing work under other Contracts as necessary for completion.

**9. Setting Out of Work**

Establish all boundaries, markers, leveling stakes and benchmarks on the site to adequately set out all work. Verify all data and their relationship to establish and Engineer's survey control points and public benchmarks and report discrepancies to the Engineer.

Permanently mark the necessary controls for distance and elevation sufficient to serve throughout the Contract and protect these control points adequately against damage and displacement.

Project setting out is for the use of all trades; each trade is responsible for the layout of its own work.

**10. Sequence of Construction**

The Constructor shall submit his proposal for approval of the Engineer the sequence of Construction, prior to starting the works. the works shall be executed as per approved sequence of construction.

**11. Lines and Levels**

Survey control points will be established by' the Engineer. The Constructor shall be responsible for verifying these and shall be responsible for all requirements necessary for the execution of any work to the locations, lines, and levels specified or shown on the drawings, subject to such modifications as the Engineer may require as work progresses.

## **12. Partial Possession**

Whenever, as determined by the Employer any portion of work performed by the Constructor is in a condition suitable for use, the Employer may take possession of or use such portion.

Such use by the Employer shall in no instance be construed as constituting final acceptance, and shall neither relieve the Constructor of any of his responsibilities under the Contract, nor acts a waiver by the Employer of any of the conditions thereof, provided that the Constructor shall not be liable for the cost of repairs, re-work, or renewals which may be required due to ordinary wear and tear resulting from such use. However, if such use increases the cost or delays to the completion of remaining portions of work, the Constructor will be entitled to an equitable adjustment.

If, as a result of the Constructor's failure to comply with the provision of the Contract, such use proves to be unsatisfactory, the Consultant / Engineer In Charge/E will have the right to continue such use until such portion of the work can, without injury to the Consultant / Engineer In Charge, be taken out of service for correction of defects, errors, omissions, or replacement of unsatisfactory materials or equipment, as necessary for such work to comply with the Contract; provided that the period of such operation or pending completion of appropriate remedial action shall not exceed twelve months unless otherwise mutually agreed upon in writing between the parties.

## **13. Existing Services**

The Constructor shall search for, find locate and protect any visible/un visible wiring, cable, duct, pipe work, etc., within or immediately adjoining the site area.

The Constructor shall take full responsibly for safety of existing service lines, utilities and utility structures uncovered or encountered during excavation, dismantling and construction operations.

The Constructor shall take full responsibility for damaging any such service lines, utility/utility structure and any cost and/or expense that arises or issues from any such damage shall be borne directly by himself. Should any damage to any such service occur the Constructor shall forthwith take remedial action, initiate safety precautions, install temporary services and carryout repair all at his own cost and expense and inform the Engineer and notify all relevant authorities.

Existing utilities which are to remain in service or after the works are to be determined by the Constructor. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during these operations, they shall be safeguarded, protected from damage, and supported.

## **14. Plant and Equipment**

The Constructor shall submit a detailed list of plant and equipment, which he shall undertake to bring to the site to carry out the work. The list shall satisfy the Engineer as to type, size and quantity. The list shall include for each piece of equipment the type, manufacturer, model, identification number and year of manufacture. The Constructor shall provide on the site of the work at his cost all of the equipment listed and all subsequent equipment required for approval of the detailed program of work and such equipment which may be directed by the Engineer. The Constructor shall supply all plant and equipment necessary for the

construction of each phase of the work and it must be on site, inspected and approved by the Engineer.

**15. Construction Area and Access**

The Constructor shall confine his operations to the areas that are actually required for the Works and shall fence the area accordingly. Arrangements for access roads, storage areas and routes for haulage of materials are to be made by the Constructor at his own cost, subject to the approval of the Engineer.

**16. Storage & Handling Facilities**

The Employer will provide the Constructor possible space within or nearby the area of site of works for the storage of plant, equipment and materials and for Constructor's temporary office, during the currency of the Contract. In case the adjacent area as required by the Constructor is not available within the Project boundary for storage of plant, equipment and machines then the Constructor shall arrange at his own expense possible space for storage of plant, equipment and machines at his own cost and expense. On no account shall such temporary installations conflict/ interfere with any of the permanent installations, services and any operational function of Employer. The handling and storage of all plants, equipment and materials at site shall be the sole responsibility of the Constructor and at no risk and cost to the Employer.

The Constructor shall protect all material against corrosion, mechanical damage or deterioration during storage and erection on site. The protection methods shall be to the approval of the Engineer.

**17. Test Laboratory and Testing**

17.1 Testing, except as otherwise specified herein, shall be performed by an approved testing agency as proposed by the Constructor and at no extra cost to the Employer. The Engineer may require all testing to be carried out under his supervision only.

17.2 If suitable and adequate material testing laboratory is not available in the vicinity, then the Constructor shall provide and maintain a materials testing laboratory in the vicinity of the Constructor's Camp and the laboratory shall have sufficient working area and shall be equipped with all necessary facilities including a suitable store room.

17.3 The Constructor shall supply and maintain to the satisfaction of the Engineer or his representative complete testing equipment, apparatus, tools, gauges, instruments, etc. in sufficient number and adequate for all tests to be carried out as specified in these specifications. Valid calibration certificates of gauges instruments requirement shall be provided by the Constructor.

17.4 The Constructor, after the approval by the Engineer for the source of cement and steel "shall make available at the site sufficient stock of the materials in advance in order to allow sample testing for quality control prior to use.

17.5 The quality contract testing shall be performed" by the Constructor's competent personnel in accordance with a site testing and quality control program to be established by the Constructor and approved by the Engineer or his Representative. The Constructor shall keep a complete record of all

quality tests performed on site and submit the same to the Engineer. All quality control and related tests shall be carried out in accordance with applicable standards and codes.

#### **18. Construction & Checking At Site**

The Constructor shall submit to the Engineer in due time for approval and discussion, his proposals and plans as to the method and procedure to be adopted for the temporary and permanent works involved.

The submitting to these suggestions and arrangements, and the approval thereof by the Engineer shall not relieve the Constructor of his responsibilities and duties under the Contract.

The carrying out of all work included In the Contract is to be supervised by a sufficient number of qualified representatives of the Constructor and full facilities and assistance are to be afforded by the Constructor for the Engineer or his Representative to check & examine the execution of the work.

The Engineer reserves the right to inspect all parts of the works but may at his discretion waive inspection on certain items. This shall in no way absolve the Constructor from his responsibilities. This particularly applies to the checking of materials, the accurate setting out of foundations, and to the leveling, setting and aligning of the various parts, and to the proper fitting and adjustment of manufactured and finished materials and fixtures in position.

If the Engineer or his Representative find that the work progress is slow in such a way that the works or parts thereof will not be completed in the time specified, then he shall order the Constructor to work overtime or in shifts and the Constructor shall comply. These arrangements will be free of all financial encumbrances and at no additional costs to the Employer.

In the event of night work, the Constructor shall provide sufficient and adequate lighting to the satisfaction of the Engineer or his Representative and shall supply the necessary manpower for satisfactory continuation of the work after normal hours.

#### **19. Bar Bending Schedule**

Bar bending (reinforcement bars) schedule of all drawings shall be prepared by the Constructor and submitted to Consultant / Engineer In Charges' Head Office for approval. The approved bar bending scheduled shall be followed for cutting of steel and preparation of bills.

#### **20. Drawings**

20.1 Tender Drawings: The drawings listed in the General Conditions of contract, Volume I and provided in Volume III are referred to as Tender Drawings and these show the scope of work to be performed by the Constructor. Tender Drawings shall not be used as a basis for fabrication or construction but may be used as a basis for placing preliminary order for materials, subject to corrections based on the future issue of Drawings as provided under sub-clause 19.2 Drawings Issued for Construction. Tender Drawings are subject to be modified and supplemented by additional detail by the Engineer.

20.2 Drawings Issued for Construction: After Award of Contract, Tender Drawings shall be replaced by Drawings Issued for Construction including

supplementary Specifications as may be necessary. Such drawings and specifications shall be construed to be included in the expression Custody of Drawings under Sub-Clause 6.1 of General Conditions of Contract Part I. Drawings Issued for Construction may include some of the Tender Drawings with or without modification and additional drawings as required to express design intent in greater detail. Such drawings may also be modified from time to time. Drawings Issued for Construction will be the drawings from which shop, fabrication, erection installation, concrete placing, formwork, or other construction detail drawings shall be prepared by the Constructor. The work shall be executed in conformity with Drawings Issued for Construction. The Constructor shall prepare a schedule of Drawings Issued for Construction of various parts of the Works based on Construction program approved by the Engineer for issuance to the Constructor from time to time.

20.3 Study of Drawings: The Constructor shall study all Drawings Issued for Construction carefully as soon as practicable after receipt thereof, and any errors discovered shall promptly be brought to the knowledge of the Engineer for his instructions.

20.4 Copies of Drawing: Drawings will be issued to the Constructor free of charge as follows:

Drawings Issued for Construction - Two copies as specified in sub-clause 6.1 Custody of Drawings, of General Conditions of Contract - Part I Volume I.

20.5 Drawings to be furnished by the Constructor:

#### **Shop Drawings**

All shop drawings required for the work including all kinds of fabrication, field erection, installation, placement and layout drawings shall be furnished by the Constructor for approval of the Engineer. If additional detail drawings are necessary to complete any part of the work, such including reinforcing steel, drawings shall be prepared by the Constructor and submitted to the Engineer. for approval. All drawings shall be complete and shall be submitted in due time and in logical order to facilitate proper coordination.

##### **a. Lift and placement Drawings.**

At least thirty calendar. days prior to starting construction of any concrete lift or other placement, the Constructor shall submit lift or other placement drawings to the Engineer for approval. Lift or other placement drawings shall be submitted for each lift or other placement of concrete to be placed. These drawings shall be to such scale as to clearly show all recesses, openings, and embedded parts, including embedded structural steel, mechanical and electrical items, reinforcement placement in each lift in sufficient detail for proper execution of the work.

##### **b. Construction Plant Layout Drawings.**

Three prints of drawings, showing the layout of construction plant and equipment the Constructor proposes to use on the work, shall be submitted by the Constructor for review to the Engineer. The drawings shall show the locations of the principal components of the construction plant, offices, storage areas and yards which the Constructor proposes to construct or use at the site of the work and elsewhere. The drawings shall

also show the unloading facilities for materials and equipment at the work site.

**c. Submissions and Approvals:**

Except as otherwise specified, three copies of each drawing for approval or review shall be furnished to the Consultant / Engineer In Charge. Within thirty calendar days after receipt the Consultant / Engineer In Charge will send one copy to the Constructor marked Approved, Approved/Except as Noted, or Returned for Correction. The notations Approved and Approved/Except as Noted will authorize the Constructor to proceed with the fabrication of the materials and equipment covered by such drawings subject to the corrections, if any, indicated thereon. Drawings returned for correction will be resubmitted for approval in the same manner as for new drawings. Every revision made during the life of the Contract shall be shown by number, date and subject in a revision block.

Upon receipt of prints which have been Approved or Approved Except as Noted, the Constructor shall furnish three prints plus one reproducible of each drawing to the Engineer. If revisions are made after a drawing has been approved, the Constructor shall furnish 3 additional prints and one reproducible subsequent to each approved revision.

- d. Shop drawings to be prepared by a Sub-Constructor shall be submitted in the same manner as (a) & (b) above but they will be submitted through the Constructor.
- e. All of the applicable requirements of this Clause with reference to drawings to be prepared by the Constructor, including Sub Constructor, shall apply equally to catalogue cuts, illustrations, printed specifications, or other data submitted for approval.
- f. Any work done on Constructor's drawings shall be at the Constructor's risk. The Engineer will have the right to request any additional details and to require the Constructor to make any changes in the drawings which are necessary to conform to the provisions and intent of design and specifications without additional cost to the Employer. The approval of the drawings by the Consultant / Engineer In Charge shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Approval by the Engineer of the Constructor's drawings shall not be held to relieve the Constructor of his obligation to meet all the requirements of the Specifications or of his responsibility for the correctness of the Constructor's drawings or of his responsibility for correct fit of assembled parts in final position or of his responsibility for the adequacy of method of construction.

**21. As-Built Drawing**

The Constructor shall, at all times, keep on the site one copy of all drawings and approved samples together with copies of all building, mechanical, electrical and public safety codes and relevant standards applicable to the works. All such material shall be made available to the Engineer.

In addition, the Constructor shall, at all times, keep on site a separate set of prints on which shall be noted neatly, accurately and promptly as the work progresses all

significant changes between the work shown on the drawings and that which is actually constructed. The sub-Constructor shall each keep on site, at all times, a separate set of prints of the drawings showing their parts of the work on which shall be noted, neatly accurately and promptly as work progresses the exact physical location and configuration of the works as actually installed, including any revisions or deviation from the Contract Documents.

At the completion of the works, the Constructor shall at his expense, supply to the Engineer six copies and one reproducible copy of all drawings along with CD containing all as built drawings amended to comply with the work "As Built". The Constructor shall provide in the same format as the original drawings, any additional drawing required to record the work.

## **22. Restoration and Cleaning**

The Constructor shall do regular cleaning and clean away all rubbish and excess materials that may accumulate from time to time on completion and before handing over. Upon completion of the works he shall obliterate all signs of temporary construction facilities such as work areas, structures, foundations of temporary structures, stock piles of excess or waste materials, or any other vestiges of construction, unless otherwise directed by the Consultant / Engineer In Charge/Engineer Incharge. The works and site shall be left in a clean and satisfactory state for immediate use and occupation. Care shall be taken not to use any cleaning materials which may cause damage to the surface to be cleaned.

## **23. Protection of the Works**

The Constructor shall whenever necessary cover up and protect the works from Weather damage by his own or other workmen performing subsequent operation. He shall provide all necessary dust sheets, barriers and guard rails and clear away the same at completion.

The Constructor shall take all proper steps for protection at all places on or about the works which may be dangerous to his workmen or any other person or to traffic. The Constructor shall provide and maintain warning signs, warning lamps and barricades as necessary.

## **24. Product Data**

Manufacturer's standard schematic drawings shall be modified or deleted to indicate only information which is applicable to the project. Such standard information shall be supplemented to provide all additional applicable information.

Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive literature shall be clearly marked to identify pertinent materials products or models. Dimensions and required clearances shall be indicated. Shop performance characteristics and capacities shall be noted.

## **25. Samples**

**25.1** The Constructor shall furnish for approval of the Engineer with reasonable Promptness all samples as directed by the Consultant / Engineer In Charge or specifically called for in these Specifications. The Consultant / Engineer In Charge shall check and approve such samples with reasonable promptness for compliance with the requirements of Contract

Documents. All work shall be in accordance with approved samples.

- 25.2** Duplicate final approved samples, in addition to any required for the Constructor's use, shall be furnished to the Consultant / Engineer In Charge, one for office use and the other for the Site.
- 25.3** Samples shall be furnished so as not to delay fabrication, allowing the Consultant / Engineer In Charge/Engineer Incharge reasonable time for consideration of the sample' submitted.
- 25.4** Each sample shall be properly labeled with the name and quality of the material, manufacturers name, name of the project, the Constructor's name and the date of submission, and the Specifications Article number to which the sample refers.
- 25.5** The manufacturer's installation directions shall be provided with each sample. The Constructor shall pay all transportation costs and deliver samples to the Engineer's office & Consultant / Engineer In Charges' Head office, Site or testing laboratory as directed by the Engineer. Samples will not be returned unless return is requested at the time of submission; all packing and transportation costs for the return of samples shall be paid by the Constructor.
- 25.6** Samples shall be of adequate size and number to permit proper evaluation of the material by the Consultant / Engineer In Charge/Engineer Incharge. Where variations in color, texture, dimensions or other characteristics are to be expected, the Constructor shall submit samples showing the maximum range of variation. Materials exceeding the range of variation of the approved samples shall not be used on the Work.
- 25.7** If both Shop Drawings and samples are required for the same item, the Consultant / Engineer In Charge/Engineer In charge may require both to be submitted before approving either, 25.7 No acceptance or approval of any Shop Drawings or sample, or any indication or directions by the Engineer on any Shop Drawings shall constitute an authorization for any increase in the Contract Sum.

In the event that the site cannot be connected to a local electricity network or where the available power is insufficient the Constructor has to make his own provision and maintain such installation.

A temporary lighting system shall be furnished, installed and maintained by the Constructor as required to satisfy the minimum requirements for safety and security. The temporary lighting system shall afford adequate general illumination to all building areas. Adequate outdoor lighting shall be provided to illuminate staging trenches and the like to the satisfaction of the Engineer Incharge and general illumination throughout adequate for watchmen and emergency personnel. .

Temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of governing codes. Temporary wiring shall be maintained in a safe manner and utilized so as not to constitute a hazard to persons or property.

When the permanent electrical power and lighting systems are in an operating condition, they may be used for temporary power and lighting for construction purposes provided that the Constructor obtains the written approval of the Client and assumes full responsibility for the entire

power and lighting system and pays all charges/costs for operation and maintenance of the system mutually agreed between the Employer and the Constructor.

Approval, license etc. if required under local laws will be obtained by the Constructor on his own responsibility and cost.

At completion of construction work, or at such time as the Constructor makes use of permanent electrical equipment and devices, temporary electricity services shall be removed by the Constructor as his own expense.

#### **25.6.1 Waste Disposal**

The Constructor shall make such temporary provisions as may be required in order to dispose of any chemicals, fuels, grease, bituminous materials, waste and soil waste and the like without causing pollution to either the site or the environment. Disposal of any materials, wastes, effluents, garbage, oil, grease, chemicals and the like shall be in areas specified by the concerned local authority proposed by the Constructor and subject to the approval of the Engineer. If any waste material is dumped in unauthorized areas the Constructor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed off as directed by the Engineer In charge and replaced with suitable fill material compacted and finished with topsoil all at the expense of the Constructor.

#### **25.6.2 Fire Protection**

The Constructor shall provide and maintain adequate fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguishers, or other effective means ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of the works.

Gasoline and other flammable liquids shall be stored in and dispensed from safety containers approved by the Engineer In charge and storage shall not be within building.

Torch-cutting and welding operations performed by the Constructor shall have the approval of the Engineer In charge before such work is started and a chemical extinguisher is to be available at the location where such work is in progress.

The Constructor shall follow the instructions and specifications of the relevant department and or other local authority.

#### **25.6.3 Telephone**

The Constructor shall immediately after receiving the Letter of Acceptance take the necessary steps to obtain mobile and land line telephone on site. He shall be responsible for all installation and connection charges and periodic mobile and landline telephone accounts. The telephone shall be made available to the Engineer for the due performance of his duties at all times and free of charges during construction and defects liability period.

## **26. Construction Schedule**

A Construction schedule shall be maintained in accordance with the provisions of the General Conditions of Contract.

The schedule shall be accompanied with sufficient data and information including all necessary particulars of constructional plant, equipment machinery, temporary Works, arrival of plant, equipment at site and their installation, method of operation, work forces employed, etc, for an activities of the Works.

Should the Consultant / Engineer In Charge / Engineer consider any alteration or addition in the program and time schedule, the Constructor shall conform thereto without any cost to the Employer.

Whenever necessary and wherever the progress of the actual work shows departure, the program and time schedule shall be undated and submitted to the Consultant / Engineer In Charge/Engineer In charge for his approval.

## **27. Night Work**

When work is done at night the Constructor shall maintain from sunset to sunrise such lights on or about his work and plant as the Engineer may deem necessary for the proper observations of the work and the efficient prosecution hereof.

## **28. Weather**

No work is to be undertaken when, in the opinion of the Engineer, the weather is so unsuitable that proper protection of the work cannot be ensured.

## **29. Co-Ordination With Other Constructor**

The Constructor shall make all necessary coordination with other Constructor and shall make sure that all embedding components such as pipes, steel bases etc. (as required for completion of electrical works) are properly, accurately and timely installed. The Constructor shall inform the other Constructor the schedule of any construction activity well in advance giving him sufficient time to finish his part of job, before any compaction/concreting etc. The Constructor shall get the signature of the authorized representation of the other Constructor before carrying out any construction activity.

If any part of electrical work is damaged or has to be dismantled or redone due to negligence omissions / incorrect position of the embedding etc. on part of the Constructor, all such losses/expensed shall be borne by the Constructor.

All expenses incurred for the above works including coordination are deemed to be covered in his tendered cost and no separate/extra payment shall be paid against such item.

## **30. Submission Requirements**

**30.1** Schedule submission at least sixty days before the dates when reviewed submittals will be needed.

**30.2** Submit Shop Drawings as per provision given in Sub-Clause 20.5 (a) and number of copies of Product Data which the Constructor requires for distribution plus four copies which will be retained by the Engineer.

**30.3** Submit three samples unless otherwise specified.

**30.4** Accompany submittals with transmittal letter, in duplicate, containing: DateProject title and numberConstructor's name and addressThe number of each Shop Drawing, Product Data and the Sample submitted.Notification of deviations from Contract Documents. Other pertinent data.

**31. Resubmission Requirements Shop Drawings:**

Revise initial drawings as required and resubmit as specified for initial submittal. Indicate on drawings any changes which have been made by the Engineer. Product Data and Samples: Submit new data and samples as required for initial submittal.

**32. Survey Instruments**

All the instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Constructor. The survey work shall be carried out by competent staff consistent with the current practices. The Constructor shall maintain on site surveying instruments in perfect working conditions to enable the Engineer to check lines and level at all times.

Survey instruments and equipment shall include but not limit to the following:

Electronic Total Station

Laser Meter

Precision Level invert Staff

Automatic Levels

Power level

Compass, steel tape, ranging poles

**33. Weekly Progress Report and Photographs**

**33.1** During the continuance of the Contract, the Constructor shall submit weekly progress reports on forms as approved by the Consultant / Engineer In Charge. Suchweekly reports shall show the actual progress completed as of date of thereport plotted against the schedule as given by the Constructor at the start ofwork and shall be broken down so as to indicate status of all activitiesassociated - with mobilization design, material procurement, manufacture,surveys works, tests with regard to the agreed contract program.

**33.2** The Employer and the Engineer reserve the right to coordinate the schedules of this Constructor and other Constructor working at the Site, and to adjust and/or change any and all such schedules as required during the course of construction in order to achieve a coordinated project in harmony with the Employer'scompletion date.

**33.3** Commencing after the first week of construction, and continuing everyweek until completion, the Constructor shall take and submit photographs to the Engineer's Representative, to show progress of his work and completion of each structure or major feature.

**34. Constructor to Notify Delays Etc.**

Any delay which will affect the completion of Works shall be detailed by the Constructor who shall state the action he is taking for effective completion of the Contract program.

The Constructor shall submit a report in respect of the various sections of the Works, the equipment in use or held in readiness, 'a return of labour and supervisory staff, and details of any matters arising which may generally affect the progress of the work.

The Constructor shall give a summary of the detailed progress report giving the position with regard to the agreed Contract program.

The progress reports shall be set out in a format to the approval of the Consultant / Engineer In Charge, and forwarded promptly so that on receipt the information contained therein is not more than 21 days out of date.

If during execution of the Contract, the Employer considers the progress position of any section of the work to be unsatisfactory, or for any other reason relating to the Contract, he will be at liberty to convene a meeting and the Constructor's Representatives are to attend such meeting.

The Constructor's Site Office shall prepare and submit 6 copies of a weekly progress report to the Employer and Engineer's Site Office. This report shall summarize site activities and record and details where difficulties in maintaining the agreed program are being experienced or are likely to cause subsequent delay.

The Constructor's Site Office shall also prepare and submit to the Engineer's Site Office 2 copies of Daily Activity Report summarizing the main activities to be undertaken each day, noting special activities such a tests, alignment checks, etc. The Constructor shall be responsible for expediting the delivery of all material and equipment to be provided by him and his subConstructor.

### **35. Photographs**

As soon as work commences on Site, the Constructor shall provide photographs (at least 10 to 12) of the works from positions to be selected by the Engineer. Each photographic print shall not be less than 297 mm x 210 mm and shall bear a printed description, a serial number and the date when taken.

The negatives of all photographs shall be held at the Constructor's Site Office, numbered and handed over to the Employer at the completion of the Contract.

### **36. Facilities for the Engineer**

#### **36.1 Site Office**

The Constructor shall construct, provide and maintain Consultant / Engineer In Charge's Site Office of about 60-65 square meter covered area as per the specifications. A preliminary layout of the site office shall be provided by the Consultant / Engineer In Charge. After receiving letter of award the Constructor will submit to the Engineer detailed shop drawings for review and approval. Specifications for construction of site office shall be the same as provided in Volume-II of the tender documents.

The Consultant / Engineer In Charge's site office shall be furnished and equipped with new and unused furniture, equipment, air-conditioners, electrical fittings etc., as per the list given below:

1	Wooden office table with drawers and side racks	4 (Four) No.
2	Office Chairs	4 (Four) No.
3	Wooden sitting visitors chairs with arms (standard size)	10 (Ten) No.

4	Steel filing cabinet (standard size)	4 (Four) No.
5	Split type (1-1/2 ton)	3(Three) No.
6	Electric Kettle	1 (One) No.
7	Laptop Core i7, 7th generation 8gb ram, 500Gb Hard Disk (Samsung, Dell or Hp).	3 (Three) No.
8	Digital camera Canon SX 430 IS or equivalent and Internet DSL Facility (ZONG 4G / EVO or equivalent)	1 (One) No.
9	A3 size colour printer and Photocopier (Refurbished)	1 (One) No.
10	Conference Table (1.5 meter x 1.0 meter) & chairs 12Nos.	1 (One) set.

Mobile or Landline Telephone with connections 1 (One) No. In case telephone landline is not provided the Constructor shall furnish Rupees 1200/= per month to the Engineer for the Mobile Cards.

If any equipment, furniture and installations become unserviceable for any reason whatsoever the Constructor shall promptly replace the same as and when directed by the Consultant / Engineer In Charge. The Consultant / Engineer In Charge's Site office with fittings, fixtures and all other equipment/accessories shall be maintained and operated for the entire duration of construction period as well as for the duration of subsequent defects liability period.

The Site Office including fittings, fixtures, furniture, furnishing and all other equipment/accessories shall be the property of the Employer on completion of the Contract.

### **36.2 Transport**

The Constructor shall provide, operate and maintain One brand new, 1000 CC (KIA PICANTO or equivalent - Insured) with AC along with driver. Facility will be provided for the use of the Consultant site supervision/head office design team visits for the entire duration of actual construction period as well as for the duration of subsequent defects liability period. The use of such transport facility shall be under the control of the Consultant, and the Constructor shall be wholly responsible for providing at all times satisfactory operating services for the Engineer. The Constructor shall furnish, supply and provide, as may be necessary without specific direction of the Engineer, all fuels, lubricants, tires and other supplies, all maintenance, repairs and running costs and suitably qualified drivers at all times. The Constructor shall furnish Rupees 10,000/= per month fuel card to the Engineer for the fuel (CNG / Petrol) purposes.

Prior to Ordering the Vehicles, the Constructor shall furnish to the Engineer for approval, detailed specification, name of manufacturer and model no. of the vehicles to be supplied. These data shall be presented within one week from the date of Engineer's Order to proceed with the works and the vehicles shall be furnished to the Engineer upon approval within two weeks from the date of Engineer's Order to supply the Vehicle. Failure of the Constructor to do so shall make him liable to bear

its cost up to Rs. 80,000 per month (Rent a car with driver charges). The vehicles shall be right hand drive, and shall be brand new, properly serviced and ready for use. The Constructor shall provide vehicle to replace any such motor vehicle that is temporarily or permanently rendered unserviceable for any reason or declared to be beyond repair by the Engineer at no additional cost to the Employer. The vehicles shall become the property of the Constructor on completion of the Contract after defects liability period. If the Constructor fails to provide the facilities as per tender documents then deductions as specified in tender documents will be made from Constructor running bill and same will be compensated / paid to Consultant - Engineer In Charge.

### 37 Constructor's Employees

The Constructor shall provide and employ on the Site for the purpose of or in connection with the Contract:

S. No	Staff to be Employed with Qualification	No.	Experience
1	Construction Manager - B.E. in Civil	1	Minimum 15 years experience
2	Contracts Engineer - B.E. in Civil	1	Minimum 15 years experience.
3	Project Engineer - B.E. in Civil	1	Minimum 07 years experience.
4	Mechanical Engineer - B.E. in Mechanical	1	Minimum 15 years experience.
5	Electrical Engineer - B.E. in Electrical	1	Minimum 15 years experience.
6	IT Engineer - B.E. in Electronics	1	Minimum 15 years experience.
7	Work Superintendents	3	Metric / non-metric with 10 to 15 years experience in the construction of RCC work and can understand drawings well
Remaining staff be employed by the Constructor as required at site as per schedule of Work and also as per instruction of Consultant / Engineer In Charge whenever needed for execution of any work			

### 38 Payment of Work

No payment shall be made for the works involved within the scope of this section of specification. The cost thereof shall be deemed to have been included in the quoted unit rate of other items of the Bills of Quantities

## **SECTION – 2 CONSTRUCTOR'S CAMP**

### **1. Scope**

The work to be done under this item consists of construction, erection, installation and maintenance of the Constructor's Project Site Offices or main camp and the Constructor's sub-camps or temporary camps, if any, and shall include all offices, shops, warehouses, and other operational buildings; all' housing and related facilities including accommodations for the Constructor's personnel.

The location of the Constructor's camps, including all buildings, utilities and facilities there for, and of the camps or establishments of all persons/parties in the vicinity operating or associated with the Constructor shall be subject to approval of the Engineer.

The work to be done under this item will terminate upon the actual Completion Date. However, if directed by the Consultant / Engineer In Charge or the Employer, the Constructor shall continue such work to the extent required by the Constructor's personnel during the period of maintenance. No compensation shall be paid for the continued operation and maintenance of the Constructor's Camps during the period of maintenance.

Upon completion of the Works, or at such time within the period of maintenance as directed by the Consultant / Engineer In Charge, the Constructor shall remove all buildings utilities and other facilities from the Site and restore all camp areas to a neat and clean condition.

The construction, operation and maintenance of all camps of the Constructor shall comply with all applicable provisions of current Pakistan Labour Camp Rules.

Adequately equipped and properly staffed portable first aid stations or dispensaries shall be provided by the Constructor at camps and other strategic locations to administer first aid treatment at any time required and free of charge to all persons on the Site, including employees of the Consultant / Engineer In Charge and the Employer.

### **2. Payment of Work**

No payment shall be made for the works involved within the scope of this section of Specifications unless otherwise specifically stated in the Bills of Quantities or herein.

The cost thereof shall be deemed to have been include in the quoted unit rate of other items of the Bills of Quantities.

## SECTION – 3 STAKE-OUT SURVEY

### 1. Scope

Under this item the Constructor shall make the stakeout survey for construction purposes with competently qualified men, consistent with the current practices. The work shall proceed immediately upon the award of the contract and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Constructor shall keep the Engineer fully informed as to the progress of the stakeout survey. The scope of this section of specifications is covered by detailed specifications as laid down herein.

### 2. Material and Equipment

All instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Constructor. These instruments and equipment shall be available to Engineer at all times for the purpose of checking the work of the Contract.

All stakes used shall be of a type approved by the Engineer, clearly and permanently marked so as to be legible at all times. It shall be the Constructor's responsibility to maintain these stakes in their proper position and location at all times. Any existing stakes or markers defining property lines and survey monuments which may be disturbed during construction shall be properly tied into fixed reference point before being disturbed and accurately reset in their proper position upon completion of the work.

### 3. Construction

The Constructor shall trim trees, bushes and other interfering objects, not consistent with the plan, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stake-out survey crews and the Engineer's survey crews. The exact position of all work shall be established from control points, which are shown on the plans or modified by the Engineer. Any error, apparent discrepancy in or absence of data shown or required for accurately accomplishing' the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.

The Constructor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc. throughout the life of the contract. Damaged, destroyed or inaccessible reference points, bench marks or stakes shall be replaced by the Constructor. Existing or new control points that will be or are destroyed during construction shall be re-established and all reference ties recorded thereon shall be furnished to the Engineer. All stakeout survey work shall be referenced to the centerlines shown on the Plans. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Constructor. All computations, survey notes and other records necessary to accomplish the work shall be kept neatly and made available to the Engineer upon request and furnished to the Employer upon Contract completion.

The Engineer may check all or any portion of the stakeout survey work or notes made by the Constructor and any necessary correction to the work shall be immediately made. Such checking by the Engineer shall not relieve the Constructor of any of his responsibilities for the accuracy or completeness of his work.

Reference points, base lines, stakes and benchmarks for borrow pits shall be established by the Constructor.

All required right-of-way and easement limits shall be established, staked and referenced by the Constructor concurrent with the construction stakeout survey.

The Constructor shall place at least two offset stakes or references at each centre lines station and at such intermediate stations as the Engineer may direct. From computations and measurements made by the Constructor, these stakes shall be clearly marked with the correct centre line, station number, offset and cut or fill so as to permit the establishment of the true centre line location during construction. He shall locate and place all cut, fill, slope, line grade or other stakes and points as the Engineer may direct to be necessary for the proper progress of the work.

#### **4. Payment of Work**

No payment shall be made for the Works involved within the scope of this section of Specifications unless otherwise specifically stated in the Bills of Quantities or herein.

The cost thereof shall be deemed to have been included in the quoted unit rate of other items of the Bills of Quantities.

## SECTION – 4 CLEARING AND GRUBBING

### 1. Scope

The clearing and grubbing shall consist of clearing the designated area of all trees, down timber, snags, bush, other vegetation, rubbish and all other objectionable material, and shall include grubbing stumps, roots, and matted roots, and disposal of all spoil material resulting from the clearing and grubbing. It shall also include the removal and disposal of structures that protrude, encroach upon, or otherwise obstruct the work, except when other wise provided for on the plans or directed by the Engineer to be saved. The scope of this section of specifications is covered with detailed specifications laid down herein.

### 2. Limit of Area

#### 2.1 Location of Works

The Engineer will define the limit of areas where clearing and grubbing is to be done. Normally it will include all land within the right of way and all other construction area including ditches, detours, minor road crossings and other areas shown on the plans or as specified or as directed by the Engineer. The Engineer will designate the fences, structures and debris and trees and bushes to be cleared where grubbing is not required. It shall not include clearing and grubbing of borrow or other pit areas from which material is secured. It shall include the leveling or removal of all bunds or mounds within the right of way unless otherwise directed by the Engineer.

#### 2.2 Grubbing and Cutting

All roots and stumps within the limits of the site shall be grubbed and excavated unless otherwise specified or approved by the Engineer.

#### 2.3 Disposal

All wood and bush shall be burned or otherwise disposed off within fifteen (15) days after cutting or felling unless otherwise approved. No tree trunks, stumps or other debris shall be left within Site unless approved in writing by the Engineer. The location of disposal areas shall be within or outside the limits of the project or as approved in writing by the Engineer and shall be acquired by the Constructor at his own expense. Any useable material shall remain the property of the Employer.

#### 2.4 Protection and Restoration

The Constructor shall prevent all damage to pipes, conduits, wires, cables or structures above or below ground. No land monuments, property markers, or official datum points shall be damaged or removed until the Engineer has witnessed or otherwise referred their location and approved their removal. The Constructor shall so control his operations as to prevent damage to trees and shrubs, which are to be preserved. Protection may include fences and boards lashed to trees to prevent damage from machine operations. The existing covered or open benchmarks should be relocated as directed by the Engineer. In the event that anything specified herein to be saved and protected is damaged.

## **SECTION – 5 DISMANTLING WORKS**

### **1. Scope**

The work covered by this Section of the Specifications consists of furnishing all plant, labour, equipment, appliances and performing all operations in connection with demolition! dismantling and removal of existing building components, walls, floors, skirting, plaster and removing of doors, windows and ventilators, removal / re-routing of utility services of the building with accessories, removal of existing roof finishes and disposal/stacking of material to designated places. Whole work shall be done in accordance with these and other relevant specifications and as directed by the Engineer.

### **2. Procedures**

2.1 The Engineer will define the limits where demolition/ dismantling and removal activity is to be done and shall approve the procedures/methods to be adopted by the Constructor.

2.2 Whole work shall be performed in an orderly manner and the Constructor shall take all necessary precautions and expedients to prevent damages to the adjacent structures, installed equipment/machinery, pipes, conduits etc. Any damage caused to the structures and installations due to negligence of the Constructor during demolition dismantled and removal operations shall be repaired/replaced by the Constructor at his cost and to the satisfaction of the Engineer.

### **3. Demolition of Building Components**

3.1 The Constructor shall demolish walls, floors skirting, cutting of plaster, removing of doors, windows, ventilators, concrete/ masonry works and other associated parts to the line and depth as shown on the Drawings or as directed by the Engineer. Explosives shall not be used to remove the plain and reinforced cement concrete or any other material whatsoever. Manually or where required mechanically operated breakers, concrete saws, chipping hammers or other approved methods shall be employed for cutting. Care shall be taken that existing services and structures are not damaged. It shall be the responsibility of the Constructor to replace at his cost any services, Structures damaged by the Constructor due to his negligence during cutting operations or thereafter until the whole of cut parts areas are restored to original condition to the satisfaction of the Engineer.

### **4. Removal of Existing Services/ Utilities/Finishes**

4.1 The Constructor shall mark all the services/ utilities falling within the Contract area. After getting approval from the Engineer, the Constructor shall remove all such Services/utilities/finishes as per the requirement specifications of the relative department whose utilities/services finishes are being removed/ shifted.

### **5. Disposal**

5.1 All debris materials resulting from demolition / dismantling works shall be disposed off to places designated by the Engineer in the manner of disposition required and directed by the Engineer.

- 5.2 All useable materials resulting from demolition and removal shall remain the property of the Employer and shall be stacked at designated places.

## **6. Measurement and Payment**

### **6.1 General**

Except otherwise specified herein or elsewhere in the Bill of Quantities/Contract Documents no measurement and payment will be made for the under mentioned items related to this section. The cost thereof shall be deemed to have been included in the quoted unit rate of the other items of the Bill of Quantities under this section.

- 6.1.1 Temporary diversion and safety measures.
- 6.1.2 Loading, unloading, transportation and disposal of demolished dismantled/removed/useable material to the place designated by the Engineer.
- 6.1.3 Permissions/approvals, if required, from the relative department.
- 6.1.4 Stacking of all useable material to the place designated by the Engineer.
- 6.1.5 Earth work
- 6.1.6 Shifting of Existing lines, Sewer line, and water supply lines or rerouting the same as per new design and drawing.
- 6.1.7 Shifting of Existing Generators, Transformers, Panels, Switch boards and all electrical / plumbing accessories including motors / pumps as per new design and drawing.

### **6.2 Dismantling of Tile Floors/Dado/Skirting / Wall fly proof jali**

#### **6.2.1 Measurement**

Measurement for acceptably completed works of dismantling and removal of existing tile floors/dado/skirting/wall/fly proof jali and staking of useable material at designated places will be made on the basis of actual area in square foot of dismantled floor/dado/skirting/wall/fly proof jali as directed by the Engineer.

#### **6.2.2 Payment**

Payment will be made for acceptably measured quantity of dismantled tile floor/dado/skirting/wall/fly proof jali on the basis of unit rate per square foot quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item. If this item is not covered in the BOQ the cost thereof shall be deemed to have been included in the quoted unit rate of other items of bill of quantities.

### **6.3 Removal of Doors and Windows with Chokhats**

#### **6.3.1 Measurement**

Measurement for acceptably completed works of removal of existing doors/windows with chokhats and staking of useable material at designated places will be made on the basis of actual number of removed doors/windows with chokhats as directed by

the Engineer.

### **6.3.2 Payment**

Payment will be made for acceptably measured quantity of removal of existing doors/windows with chokhats on the basis of unit rate per number quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item. If this item is not covered in the BOQ the cost thereof shall be deemed to have been included in the quoted unit rate of other items of bill of quantities.

## **6.4 RCC Slab**

### **6.4.1 Measurement**

Measurement for acceptably completed works of removal of existing RCC slab will be made on the basis of actual volume in cubic feet of dismantled concrete as directed by the Engineer.

### **6.4.2 Payment**

Payment will be made for acceptably measured quantity of dismantling of existing RCC slab on the basis of unit rate per cubic feet quoted in the Bill of Quantities full compensation for all the works related to the item.

## **6.5 Removing / Chipping of Plaster (Int. / Ext.) at any level at any height.**

### **6.5.1 Measurement**

Measurement for acceptably completed works of removing and chipping of existing Plaster and debris to be shifted outside the premises / at designated places will be made on the basis of actual area in square foot of removed plaster as directed by the Engineer.

### **6.5.2 Payment**

Payment will be made for acceptably measured quantity of removing / chipping of existing plaster on the basis of unit rate per square foot quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item. If this item is not covered in the BOQ the cost thereof shall be deemed to have been included in the quoted unit rate of other items of bill of quantities.

## **6.6 Removing / Electrical / Plumbing fitting and fixtures at any level at any height.**

### **6.6.1 Measurement**

Measurement for acceptably completed works of removing of Electrical / Plumbing fitting and fixtures and stacked at designated places will be made on the basis of actual in Nos. of removed items as directed by the Engineer.

### **6.6.2 Payment**

Payment will be made for acceptably measured quantity of removed fittings and fixtures on the basis of unit rate per Nos. quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item. If this item is not covered in the BOQ the cost thereof shall be deemed to have been included in the quoted unit rate of other items of bill of quantities.

## SECTION – 6 BLOCK MASONRY

### 6.1 SCOPE

The work covered by this section of the specifications consists of furnishing all plant, labour, equipment, appliances, and materials and in performing all the operations in connection with masonry work, complete in strict accordance with the specifications herein and the applicable drawings subject to the terms and conditions of the contract.

The work under this section includes the block masonry in foundations, walls and partitions both load bearing and non-load bearing.

### 6.2 MATERIALS

#### 6.2.1 BLOCKS.

All blocks shall be sound, of well burnt clay, uniform in shape and size, when struck , the block should produce ringing sound. The block shall be free from flows, cracks, shipped corners, nodules of lime, kankar, other blemishes and salt. When the block is soaked in water for one hour, it should not absorb more than one sixth of its own weight. Blocks of only one size shall be used in the works. Blocks from different kilns not having the same size and color shall not be accepted. The minimum compressive strength of the blocks tested in accordance with B.S. 1257 shall be 1300 psi subject to the condition that average compressive strength of five blocks tested shall not be less than 1500 psi.

#### 6.2.2 Cement

Cement shall be Ordinary Portland Cement as specified in respective section.

#### 6.2.3 Aggregates

Aggregates used shall meet the requirements specified under respective concrete section. All the aggregates dry and properly screened from approved source, shall also be acceptable for block making.

#### 6.2.4 Block Masonry Units

- i) Concrete masonry blocks shall be made on the project site and shall be of the sizes required as per drawings and/or as directed by the Consultants and shall generally conform to the requirements of British Standard 2028, 1364:1968 until and unless specified or otherwise in the specifications.
- ii) The block shall be solid as required and shall be carefully made so that they are true in line and face with square corners and free

from all defects. The ends of the blocks, masonry, shall be double grooved or a directed by the Consultants.

- iii) The blocks shall be cured by keeping moist continuously for a period of atleast ten (10) days and then shall be allowed to dry in shade for least twenty (20) days before used in masonry.
- iv) All blocks shall have clean cut straight and true edges, smooth dense faces of uniform appearance without voids, honeycombs, projections and shall be free from cracks spalls, chips, rugged edges or other defects detrimental to their use.
- v) Where blocks are to be plastered or rendered, the blocks surface shall have a coarse texture suitable for bonding the plaster as approved by the Engineer.
- vi) All blocks shall be stacked at site in a quantity not exceeding 5,000 blocks in each stack. The stacking shall be done in such a manner as to avoid smearing of the blocks in the lowest part of the stack with clay. Blocks smeared with clay show very poor bond with mortar sand, therefore, any blocks thus affected be rejected out of hand without recourse. When transported to the site the blocks shall not be dumped from the vehicle, the blocks shall be manually unloaded and stacked as aforesaid.

#### **6.2.5 CEMENT MORTAR FOR MASONRY**

Proportion

Cement Mortar shall be composed of one part of Ordinary Portland Cement to 6 (six) parts of all block masonry walls. Hand mixing, when permitted by the Engineer shall be done on clean hard platform as much as required for immediate use with only just sufficient water, to produce mortar of a proper consistency. If directed by the Engineer, the mixing shall be done by mechanical mixers. Sand shall be of an approved quality and shall pass 100% through 3/16 inch sieve.

#### **6.2.6 PAYMENT**

Payment will be made for acceptable measured quantity of all types of Masonry on the basis of unit rate quoted in the Bill of Quantities against respective item and shall constitute full compensation for all the works including all works etc. as per details mentioned in Volume III & IV of Tender & Contract Document related to the item.

## SECTION – 7 CARPENTRY AND JOINERY

### 1. Scope

The work covered under this section of Specifications consists of providing all material, labour, plant, equipment, appliances and performing all operations in any floor and at any height. connected with the fabrication and erection of all woodwork, mill work, construction assembly, surface finish treatment and building in of all cabinet type items, supports etc. of wood or metal and incidentals, associated woodwork appurtenances, procuring and applying preservatives, installation of "Finish Hard Ware" in connection with finish woodwork as per details shown on the Drawings or as directed by the Engineer.

### 2. Materials

#### 2.1 Timber

##### 2.1.1 Hard Wood:

Hard wood shall comprise of Oak, beech, Walnut Mahogany, Teak, Iroko and Sheesham.

##### 2.1.2 Soft Wood:

All soft wood shall consist of pines, spruce, hemlock and douglas fir or cedrous deodar (referred in the document as deodar), wood locally known as 'Partal' to be used in shutter core where specified.

##### 2.1.3 General Characteristics:

All the timber shall be in accordance with the requirements of BSI No: 1186, 'Quality of Timber and Workmanship in Joinery.

The whole of the timber shall be from the heart of sound and fully grown tree, uniform in substance, straight first class quality properly seasoned, free from large or loose dead-knots, open shakes and excessive sapwood. The scantlings of all timbers shall be brig t: sound and square edged. The moisture content of timber shall not be more. than 10 (ten) percent in case of soft wood and 7 (seven) percent in case of hard wood.

##### 2.1.4 Preservation of Wood:

Prior to installation of all finish wood works in their respective positions, preservatives shall be applied to safeguard the wood work against fungus, termite and bores.

The Preservatives shall be of the best available quality as approved by the Engineer. The method of application shall be strictly in accordance with the manufacturer's instructions. The treatment and application of all the preservatives shall comply with the requirements of BS-CP 98:1964.

##### 2.1.5 Adhesive:

The adhesives shall conform to the requirements of BSI No. 745 "Animal Glues for Wood" manufactured by M/s Host shall be considered approved for this Project or as directed and approved by (he Engineer.

#### **2.1.6 Nails and Screws:**

All nails and screws shall comply with requirements of BSI NO. 1202 and BSI NO.1210 respectively.

#### **2.1.7 Ply Wood**

The ply wood shall comply in all respects with BSI No. 1455:1963. All the ply wood shall only be obtained from KDC Board (Pvt.) Limited, Jhelum as approved by the Engineer.. All plywood shall be manufactured with phenol pharamaldihide or any other approved water proof adhesive but not with urea pharamaldihide.

Ply wood used for doors, and other similar works shall be to the thickness and size as shown on the Drawings or as directed by the Engineer. The grade shall be first quality and the face and back shall be free from end joints, dead knots, overlaps, patches and other similar defects. The surfaces shall be free, smooth for painting or polishing.

#### **2.1.8 High Density Fibre (MDF) Board**

Medium density fibre board to be used on the project shall be LASANI of thicknesses as specified in the drawings. Board shall be manufactured with water proof resinous glues and shall be guaranteed by the manufacturer. All boards required for the exterior surfaces of cabinets shall be laminated with farmica in approved color and texture in factory as specified elsewhere.

### **3. Samples**

All samples of the material used for the work under this Section of Specification shall be approved by the Engineer and same type of material shall be used throughout the work. If the Engineer desires to get the material tested, this will be got done by the Constructor at his own cost from a laboratory approved by the Engineer.

### **4. Fabrication**

Unwrought' timber shall be used. Sawing shall be done with sufficient oversize margin to finally meet the requirements of specified sizes and dimensions of the finished work.

All framing shall be joined and glued properly as shown n on the Drawings or as directed by the Engineer. All joints shall be secured with sufficient number of nails. The Constructor shall perform all necessary mortising, tenoning, grooving, matching, tangoing, housing, rebating and all operations required for the correct jointing. The Constructor shall also provide all metal plates, screws, nails and other fixing material that may be ordered by the Engineer for the proper execution of the joinery work. Fabrication that develop defects due to bad workmanship or unsound materials not conforming to these specifications and the directions of the Engineer, shall be cut out and replaced at Constructor's own expense before the expiry of the maintenance period.

## **5. Protection Of Materials**

All materials and assembled units shall be protected from weather and stored in such a way as to prevent decay, warping and attack by fungus and termites.

## **6. Wooden Doors**

### **1.1 Materials**

1.1.1 First class Deodar wood as approved by the Engineer shall be used for door frames and door shutters except the core of shutters which shall be partial wood as specified and shown on drawings.

1.1.2 Architraves, beads, lippings shall be of Deodar wood of specified sizes and fixed as per details shown on Drawings.

### **1.2 Ground, Blocking & Nailing Strips**

1.2.1 Ground, blocking and nailing strips shall be provided as necessary to receive the work included herein and as required for the work of other trades.

Except as otherwise shown or specified, ground blocking and nailing strips shall be secured in place as follows:

1.2.2 To steel--- by means of 3/8" diameter bolts spaced not over 3 feet.

1.2.3 To brick wall ---- by the use of cut nails spaced not more than 1.5 feet apart and driven directly into the block. .

1.2.4 To poured concrete --- by means of 1/4" diameter galvanized expansion bolts spaced not more than 1.5 feet apart or by any approved method.

### **1.3 Exterior and Interior Door Frames**

All exterior and interior door frames shall be fabricated of wooden sections of first class deodar wood frame as shown on drawings.

All exposed surfaces of frames and architraves/beads shall be painted with synthetic matt finished enamel paint of approved shade as per the instructions of the Engineer.

The door frames shall be secured in place by means of 4 inches screws and matching Rawal plugs and built into the plastered masonry after the same has dried 4 number screws in each jamb and 2 number for upto 3.5 feet width and 3 number for upto 5 feet width of doors in the head shall be used.

### **1.4 Door Shutters**

The shutters will be fixed to the frames with approved quality fittings as per hardware schedule.

1.5 Squareness Maximum diagonal difference 1/8" (between length of diagonal measured on face of door from upper right corner to lower left corner and length of diagonal measured from upper left corner to lower right corner).

Doors, shutters shall be fabricate in a workman like manner strictly to the correct sizes and shapes as shown on the Drawings or as directed by the Engineer.

**Manufacturer's Qualifications:**

The manufacturer of doors herein specified shall have been in business of manufacturing doors of type specified for minimum period of five years. The door shutters shall be built in sections, properly jointed and glued together.

The surfaces shall be prepared for painting or polishing. All door shutters shall be paneled, fabricated from first class deodar wood as shown on drawing . Fitting, Hanging and trimming All the doors shall be fitted, hung and trimmed as Here in after specified and as indicated on the Drawings.

Doors shall have a clearance of 1/8" at sides and top unless otherwise directed by the Engineer and shall have 3/16" clearance at bottom. Doors shall be hung and trimmed with hardware as specified. All the locks shall be installed at the same height and shall be located at height as directed by the Engineer. Where directed by the Engineer margin for carpet shall be incorporated in the door shutter.

**1.6 Hardware**

Hardware shall be of best quality local make extra heavy duty and first class finished material except door locks and door closures which shall be imported of Japanese origin as per attached hardware schedule. The Constructor shall obtain prior approval from the Engineer for quality, shape, pattern, and brand of all the hardware materials by providing samples and catalogues, etc., and shall provide and fix only the approved hardware materials.

Completed doors shall be sound, rigid and free from defects and warp. All edges shall be aligned and smooth, joints shall be close fitting, hard wood doweled or mortised framed and of a strength to maintain frame and of strength to maintain the structural properties of the member connected. All adjoining faces and edges shall be flush and smooth. Edges shall be rectangular and solid.

**1.7 Quality Assurance**

6.7.1 Tolerances: Doors shall be fabricated to following tolerancesSize: Plus or minus 1/16 in overall dimensionsMaximum Warp:1/8"

**1.8 Submittal**

- 6.8.1 Provide manufacturer's literature completely describing products.
- 6.8.2 Provide shop drawings showing door types, details and locations, referred to the door type and hardware group shown on door and hardware schedules.
- 6.8.3 Provide certificates stating that doors were constructed with timber of the Species specified having moisture content and meeting equilibrium and relative humidity requirements.
- 6.8.4 Submit samples of plywood for selection of color and grain.
- 6.8.5 Procurement of materials shall be made only after the shop drawings and samples have been approved by the Engineer.

## **1.9 Product Delivery, Storage and Handling**

- 1.9.1 Deliver and store products in waterproof, protective containers with seals unbroken and labels intact until time to use.
- 1.9.2 Keep products dry, stack products off ground on level platforms, fully protected from weather, including direct sunlight.
- 1.9.3 Identify type, size and location of each door before delivery in order to permit installation at correct location.

## **1.10 Installation**

- 1.10.1 Install doors at correct openings and assure smooth swing and proper closer with frames.
- 1.10.2 Install finish hardware in accordance with manufacturer directions.
- 1.10.3 Hardware shall be carefully and securely fitted. Upon handing over the work, hardware shall be demonstrated to operate freely. Keys shall be placed into a respective locks and upon acceptance of the work keys shall be tagged and delivered to the Engineering work at site.

## **7. Wooden Railing**

Material for wooden hand railing in stairs shall be superior quality teak wood/ deodar wood & 1/2 inch dia mild steel pipes. It shall be fabricated and installed in accordance with the design shown on the drawings/details and as per the instructions of the Engineer. Sample of railing shall be fabricated & mock up samples installed at locations designated by the Engineer for approval, prior to s

Shop/detail drawing indicating the basic details at various locations including details at turnings shall be submitted by the Constructor for Engineer's approval. Hand railing shall be installed to line level and plumb. The surface of railing in stairs shall be prepared for polishing. The railing shall be polished/painted with clear lacquer and the steel surfaces shall be painted with matt finished enamel paint.

## **8. SS & Glass Railing**

Material for hand railing in stairs shall be 3" dia stainless steel pipe handrail, 1" dia stainless steel balustrades, W' thick unbreakable Security glass and clamps including all fixing accessories complete in all respect as shown on the drawings, It shall be fabricated and installed in accordance with the design shown on the drawings/details and as per the instructions of the Engineer. Sample of railing shall be fabricated & mock up samples installed at locations designated by the Engineer for approval, prior to starting work at site. Shop/detail drawing indicating the basic details at various locations including details at turnings shall be submitted by the Constructor for Engineer's approval. Hand railing shall be installed to line level and plumb.

## **9. Defective Work**

In the event of non-conformance to specification and drawings, the wood works shall be rejected by the Engineer and the Constructor shall remove and replace the rejected work by new work of same specifications.

## **10. Surface Preparation**

The surfaces of all wood works shall be prepared in the ( manner as directed by the Engineer for polishing or painting.

## **11. Mock-Up Sample**

After approval of shop drawings and tests etc., the contract shall submit at his own cost one mock-up sample of each type of wood works complete with all fixing, fixtures accessories prior to the actual fabrication of the bulk.

The samples shall be returned to the Constructor for incorporation in the works after installation of at least 80% of the works.

## **12. Measurement & Payment**

### **12.1 General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective/items of the Bills of Quantities.

The rates quoted by the Constructor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Constructor shall not be entitled to any claim or claim any compensation on this account.

12.1.1 Glazing where required and all finished hardware fittings in carpentry and joinery works, including locks, kick and push plate, architrave, beading, handles, locking arrangements etc.

12.1.2 Prime coat, painting with synthetic enamel paint/lacquer polish in carpentry and joinery works/hand railing.

12.1.3 Anti termite treatment to wood works and adhesives

12.1.4 SS / Steel balusters, steel base and steel strip for wooden railing.

12.1.5 Deodar wood blocking, shipping & base frame work in cabinets/hand railing.

12.1.6 SS Plate in the door bottom.

### **12.2 Wooden Door**

#### **12.1.1 Measurement**

Measurement of acceptably completed works of all types of wooden doors will be made on the basis of net actual area in square feet fabricated and installed in position as shown on the Drawings or as directed by the Engineer. Net area will be measured in accordance with plastered masonry opening in between jambs and plastered head and bottom of shutter.

### **12.1.2 Payment**

Payment will be made for acceptable measured quantity of all types of wooden doors on the basis of unit rate per square feet quoted in the Bill of Quantities against respective item and shall constitute full compensation for all the works including all hardware & fittings like locks, tower bolts, push plates etc. as per details mentioned in Volume III & IV of Tender & Contract Document related to the item.

## SECTION – 8 ALUMINIUM WORKS

### 1. Scope

The work covered under this section of the specifications consists of providing all material, labour, equipment, performing all operations required for providing and installation of aluminium. doors, windows, ventilators & louvers including all related items such as sealants, gasket, netting, rollers, hinges, latches, fastenings, anchor bolts, door locks, locking devices and glass complete in strict accordance with this section of specifications, the applicable drawings and as scheduled. Any additional information required in this connection and not stated in these specifications, shall be obtained from the Engineer's Representative.

### 2. Applicable Standards

Latest editions of following ISO and British Standards are relevant to these Specifications wherever applicable.

#### 2.1 ISO (International Organization for Standardization)

1804	Doors Door	Terminology
6442	Leaves	Measurement of defects of general flatness
6443	Door	
	Leaves	
6444	Door	Measurement of dimensions and defects of squareness.
	Leaves	
6613	Windows & Doors	Test of behaviour under humidity variations (successive uniform climates) wind resistance tests. Air permeability test.

#### 2.2 BSI (British Standard Institution)

1227 Hinges  
4873 Aluminum alloy windows.

### 3. General

3.1 Door, Windows, ventilators, louvers and other items to be provided shall be aluminium, of profile pattern and design shown on drawings and shop drawings manufactured by reputable manufacturer approved by the Engineer. The Constructor shall provide manufacture literature completely describing the product instructions for installation and maintenance.

3.2 All the sections used for doors, windows, ventilators & louvers fly screens shall be of best quality aluminium products such as equal and unequal angles, channels, tubes, corrugated strips, mouldings etc., in accordance with International standards conforming to ASTM B 308 & B 221.

3.3 All doors, windows. Ventilators and louvers shall be of type and size indicated on drawings and shall conform to the requirements shown and specified herein.

3.4 Constructor shall arrange tests and analysis if directed by the Engineer of scaled models of each door, window, ventilator and louvers type at the maker's works or any laboratory specified by the Engineer for the material supplied by him to be tested in the presence of the Engineer's Inspector, to whom test certificates, proof sheets, etc. shall be furnished. The models shall be submitted to the Engineer for approval prior to testing. Nevertheless, neither the fact that the materials have been tested in the presence of the inspector nor that the Engineer may have been furnished with test certificates in lieu of sending an inspector to the works shall affect the liberty of the Engineer to reject, after delivery of materials found not in accordance with these specifications.

3.5 The Constructor shall submit shop drawings conforming to design concept which shall show full construction details, quantities and locations, fastenings, stiffening members and attachments to adjacent construction and materials. Shop drawings and calculations shall be submitted at the proper time to allow for checking, revisions, and agreement and to permit manufacturer's product delivery and start of site work to suit the building program. The Constructor shall submit representative samples of finished doors, windows, anchoring mechanism, embedded parts, fastenings, glass panes, accessories and other materials for the Engineer's approval.

After approval of shop drawings and tests etc., the Constructor shall submit at his own cost one mock-up sample of each type of aluminium works complete with glazing, all components assembly method and required fittings and accessories prior to the actual fabrication of the bulk. The samples shall be returned to the Constructor for incorporation in the works after installation of at least 80% of the works.

Fabricate and assemble all work in the shop of the approved manufacturer to reduce field fabrication to a minimum unless otherwise directed by the Engineer.

The glass shall conform to specification laid down under chapter 'Glazing' and shall be free from all blemishes, bubbles, distortions and other flaws of any kind and shall be properly cut to size as shown on drawings, so as to fit the grooves in window members.

3.6 The structural shape of the Aluminium members shall be of uniform quality, color temper, clean, round, commercially straight and free from injurious defects.

3.7 All doors, windows, ventilators and louvers shall be fabricated as a complete unit, fully airtight and watertight, including rubber gasket for glazing, hinges, stays, rollers, latch, locking arrangement, handles, etc anodized in specified color, inclusive of glass sheet, necessary holes for fixing, door locks, door closures and window locking requirements, all as approved by the engineer.

Constructor shall, provide certificate signed by the manufacturer stating that each lot has been sampled, tested and respected and has met the requirements in accordance with these specifications and the same shall be furnished to the Engineer.

- 3.8 The shop drawings shall clearly show that there shall be no penetration of rainwater from the exterior to the interior in case of severe wind and rainstorm. This has to be specially ensured in bill section.

#### **4. Material**

##### **4.1 Frames/shutters**

The frames of aluminium door, windows and ventilator shall be formed from rolled, strip or extruded aluminium. The thickness of sectional members shall be at least 1.6 mm. All outer / frame sections of open able / fixed windows. Ventilators and louvers curtain wall shall be 95 mm minimum in width. The Frames for doors and door/windows curtain wall shall be at least 97 mm in width.

- 4.2 As shown on the drawings, aluminium frames shall be provided as per international standard approved by the Consultant / Engineer In Charge.
- 4.3 Fasteners shall be stainless steel of a type selected to prevent galvanic action with the components fastened.
- 4.4 Gaskets shall be vinyl glazing channel gasket to commercial standard CS-230-60.
- 4.5 Hardware shall be manufacturer's standard hardware. Flush to match doors, windows, ventilators and louvers finish. Floor mounted concealed type double action/swing imported door closures shall be provided to all doors. Heavy duty in-matching finish stays shall be provided to all open able windows, ventilators and louvers. Stays shall be attached to the window frame so as could be replaced easily.
- 4.6 Joint sealant shall be approved elastomer.
- 4.7 All Aluminium sections shall be powder coated in accordance with the standards of Aluminium Association of USA. The anodisation shall be of not less than 70-90 microns. The anodic oxide surface shall be properly sealed.
- 4.8 For powder coated finish aluminium sections to be coated shall be mill finish. The sections shall be firstly degreased with a degreasing chemical to remove all/any stains. The sections will then be given a chromating coating and electro static powder coating in the desired color with a powder-coating machine. After color coating the sections will be baked at baking temperature of 220 degree Centigrade for 25 minutes.
- 4.9 All sliding/open able windows shall be sliding/open able wire/fly screen shutters in window matching finish with wire/fly screen of size so as not to permit the entry of flies and mosquitoes. The wire mesh shall be 30 SWG. 14 mesh (14 x 14 openings per square inch).

#### **5. Design Requirement**

The Constructor shall design the installation to meet or excel the following requirements,

### **5.1 Tolerances**

The Constructor shall be responsible for agreeing to all dimensions with the Engineer before proceeding with the manufacture and for making provision to allow for building tolerances required by the Engineer. Constructor shall also take site measurements of the structure completed before manufacturing.

### **5.2 Thermal & Seismic Movements**

The window and glazing assemblies are to be constructed and installed in the openings with sufficient tolerance and, where necessary, to provide for Joints incorporated in couplings, to provide for expansion and contraction as will be caused by the local seismic and climatic conditions and temperature changes, winter to summer - day to night without buckling, distortion of joints, or other harmful effects.

## **6. Workmanship**

The Constructor shall be responsible for the protection and installation of all items furnished. All items shall be installed plumb and square and shall be solidly anchored in a good workman like manner in accordance with the manufacturer's instruction and as specified herein. The Constructor shall be responsible for the protection of installed items from damage by other trades. All items shall be left in operating, neat and clean condition, free from dirt, finger marks, etc. The Constructor shall be responsible for final cleaning before the final acceptance.

The glass panes shall firmly be secured in the rebates with the rubber gasket. Ensure that the beads and grooves are clean, dry and unobstructed at the time of glazing. The complete unit shall be airtight and watertight on completion. No doors, windows and ventilator shall be considered complete until and unless the fingerprints and other stains and marks have been removed from the surface of glass and aluminium.

## **7. Product Delivery and Storage**

7.1 Deliver doors, windows, ventilator and louvers in a manner preventing damage to units,

### **7.2 Applicable Standards**

Latest editions of following British Standards are relevant to these Specifications wherever applicable.

Store materials off the ground under cover in a manner preventing deterioration or All embedded parts and anchor bolts shall be delivered to the site carefully and keeping the fabricated shape and configuration. All these parts shall be suitably marked for identification.

## SECTION – 9 GLAZING

### 1. Scope

The work under this section of the Specifications consists of furnishing all labour, equipment, tools, appliances, scaffolding and providing in any floor and at any height glass, gaskets, sealants, compound and other materials required for performing all operations in connection with the installation and setting of all types of glass and glazing complete in every respect in accordance with the Drawings or as directed by the Engineer. The scope of this section of Specifications is covered with detailed Specifications as laid down herein.

### 2. Applicable Standards

Latest addition of following British Standards are relevant to these specifications where ever applicable:

#### 2.1 BSI (British Standards Institution)

952	Glass for glazing
5051	Security glazing part I & II
CP.152	Glazing

### 3. General

- 3.1 Each type of glass shall have the manufacturer's label on each pane, and the labels shall remain on the glass until final cleaning.
- 3.2 Glazing sealant shall be as recommended by the manufacturer for the particular application.
- 3.3 Spacer shims distance (pieces) shall be plasticized polyvinyl chloride (PVC). Thickness shall be equal to space shown on drawings between glass and rebates bead or cleat. Depth shall give not less than 1/4" cover of glazing sealant.
- 3.4 Constructor shall submit samples for each type of glass, minimum 4' x 4' in size with protective edges. Samples of glazing sealant minimum 0.1 liter of specified types shall be submitted.
- 3.5 Constructor shall submit 1 foot long sample c; each type of glazing gasket.
- 3.6 Constructor shall also submit printed materials manufacturer's installation instructions for specified glazing gaskets, compounds sealants and accessories including description of required equipment and procedures and precautions to be observed.

### 4. Delivery Storage and Handling

- 4.1 Constructor shall deliver materials in manufacturer's original, unopened containers clearly labeled with manufacturer's name and address, material, brand, type, class and rating as applicable.

Constructor shall store the materials in original unopened containers with labels intact/protected from ground contact and from elements which may damage glass.

Constructor shall handle the materials in a manner to prevent breakage of glass and damage to surfaces.

Examine each piece of glass and discard and replace glass with edge damage or face imperfection. All glazing shall be wind tight and fully water tight on completion.

Clean glazing channels and other framing members indicated to receive glass. Remove coatings which are not firmly bonded to the substrate, Remove lacquer from metal surfaces wherever elastomeric sealants are to be used. Apply primer and sealer to joint surfaces wherever recommended by the sealant manufacturer and as shown on the drawings.

Trim and clean excess glazing materials from surrounding surfaces immediately after installation and eliminate stains and discolorations.

Cure glazing sealants and compounds in compliance with manufacturer's instructions to obtain high early bond strength internal cohesive strength and surface durability.

While glazing operation is in progress great care shall be taken to avoid breakage or damage to the glass and adjoining glazing. The Constructor shall make good at his own cost, all glass broken by his workmen while cleaning or carrying out other operations. On the completion of the glazing work, all glass that has been set by the Constructor shall, if it becomes loose, within the maintenance period, be refixed at Constructor's expense.

No glazing shall be considered complete until and unless paint and other stains have been removed from the surface of the glass and checked by the Engineer for water tightness.

## **5. Protection and Cleaning of Glazing**

- 5.1 Remove all smears labels and excess glazing sealant, leave clean inside and outside free from scratches. The Constructor shall be responsible for the protection of installed glass. Before final acceptance, damaged or broken glass shall be removed and replaced with the new glass at no additional expense to the Employer and replaced with new glass at no additional aged or broken glass shall be removed.
- 5.2 All glass surfaces shall be washed clean both inside and outside within two weeks prior to final acceptance by the Consultant / Engineer In Charge.

## **6. Measurement and Payment**

No payment shall be made for the works involved within the scope of this sections specifications unless otherwise specifically stated in the Bill of Quantities or herein. The cost there of shall be deemed to be included in the quoted unit rate of the relevant item of the Bill of Quantities.

## **SECTION – 10 BITUMEN COATING**

### **1. Scope**

The work under this section of the Specifications consists of furnishing all plant, labor, equipment, appliances and materials and in performing all operations related to water proof treatment to foundations and basement structures complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

### **2. Submittal**

2.1 Samples of all materials proposed for use under this section. shall be submitted to the Engineer for approval.

### **3. Materials**

3.1 Bitumen 10/20 grade.

### **4. Delivery Storage and Handling**

Materials shall be protected from damage during loading shipment delivery and storage Non staining materials shall be used for blocking and packing

### **5. Preparatory Work**

5.1 All surfaces to be treated shall be dust free and dry. Application of finishes shall not start unless the preparatory work has been inspected and approved by the Engineer.

### **6. Bitumen Coating/Painting In Foundation Sub-Structures, Under Floors**

#### **a) Bitumen Painting:**

All surfaces to be bitumen painted shall be thoroughly cleaned of any accretion, dust, dirt etc. by scraping, wire brushing or as directed by the Engineer. The surface shall be primed with a coat of asphalt oil used at the rate of not less than 1.08 gallon /10 square meter. Two coats of hot bitumen paint shall be applied at the rate of 1.0 kg/ Sq.m. each coat. The first coat shall be allowed to dry for about 6 hours before applying the second coat. During operation of painting great care shall be taken to avoid air bubbles. The manufacturer's instructions shall be taken to avoid air bubbles. The manufacturer's instructions and Engineer's directions shall be followed.

### **7. Measurement and Payment**

#### **7.1 General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bills of Quantities.

7.1.1 All preparatory work, scrapping, scratching, cleaning, cant strips, gravel strips, etc.

7.1.2 Coats of bitumen.

## **7.2 Bitumen Painting/Coating**

### **7.2.1 Measurement**

Measurement of acceptably completed works of bitumen painting/coating will be made on the basis of net actual area in square foot as shown on the Drawings or as directed by the Engineer.

### **7.2.2 Payment**

Payment will be made for acceptable measured quantity of bitumen painting/coating on the basis of unit rate per square foot quoted in the Bills of Quantities. The unit rate shall include all cost of surface preparation and shall constitute full compensation for all the works related to the item.

## **SECTION – 11 CEMENT PLASTER**

### **1. Scope**

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances, and materials and in performing all operations in any floor and at any height connection with providing and installation of cement plaster, and specified external rendering complete in strict accordance with this section of the Specifications and the applicable drawings and subject to the terms and conditions of the contract.

### **2. General**

- 2.1 Except as may be otherwise shown on surfaces specified, all plaster work, both internal and external shall be ordinary Portland Cement plaster of the required thickness as shown on the drawings.
- 2.2 Plastering shall not commence until all electric conduits, drainage and sanitary pipes, inlets to tanks, brackets, clamps, doors and window frames and all sort\$ of inserts and embedded items are fixed in position. It shall be the responsibility of the Constructor to make sure that all such work is carried out by other Constructor before starting of plaster work. Chiseling and repairing of cement plaster shall not be permitted without the approval of the Engineer.
- 2.3 Sample of materials shall be submitted to the Engineer for his approval prior to use in the works.

### **3. Material**

- 3.1 Cement for plaster shall be Ordinary Portland Cement (B.S 12 or P.S 232) or Sulphate resisting cement (B.S 4027 or P.S. 612) as specified 'and shall conform to requirements specified in the section "Plain and Reinforced Concrete".
- 3.2 Sand for plaster shall coy with the requirements of BS 1199, BS 1200 or the draft Pakistan Standard "Sand for Plaster" as directed by the Engineer.
- 3.3 Water for plaster shall conform to requirements specified in the section for "plain and reinforced concrete".
- 3.4 All materials and workmanship for plaster, not explained in these Specifications, Shall comply with the requirements of relevant BS CP 211 and CP 221 as directed by the Engineer.

### **4. Proportioning and Mixing**

- 4.1 Measurement of materials by volume shall be by containers of known capacity to maintain consistent proportions. No lumpy or caked material shall be used. Mixing equipment boxes and tools shall be clean. Materials shall be proportioned as specified on the Drawings, in the Bill of Quantities or as directed by the Engineer. Mixing shall be continuous until all ingredients are evenly distributed and thoroughly mixed.
- 4.2 Only limited water shall be added for proper workability and such quantity of ortar shall be prepared which can be consumed in thirty minutes after preparation. Preparation of mortar in bulk quantity for use during the entire day or for any other time more than that stipulated above is

expressly prohibited. Retempering shall not be permitted and all mortar which has begun to stiffen shall be discarded.

- 4.3 Plaster ingredients shall be thoroughly mixed either by hand on a clean cement concrete platform or by a mechanical mixer, as directed by the Engineer.

## **5. Preparation of Surface to be Plastered**

- 5.1 Concrete surface to be plastered shall be cleaned to remove all grease, form oil and other surface impurities, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface of all-concrete ceilings, beams and columns shall be lightly hacked by approved means to give the required key for plastering.
- 5.2 All masonry surfaces to be plastered shall be cleaned to remove all matter, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface shall be washed with clean water and kept damp for 24 hours before further treatment. The surface thus prepared shall be treated uniformly with cement and sand slurry. The slurry to be used shall be one part cement to one part sand by volume with water added to make a stiff creamy mix. The slurry shall be applied with a stiff brush on surface, which has previously been well wetted. The surface so treated shall be left to cure for 3 days.

## **6. Application of Plaster**

- 6.1 The plaster of thickness less than the specified thickness shall be rejected. If the plaster is to be more than 1/2" thick, it shall be done in two coats. The surface of first coat shall be made rough before the second coat is applied. The plaster shall not have wavy surface and shall be perfectly in plumb. The edges and corners shall represent a straight line. The plaster shall be kept wet continuously for at least ten (10) days. No extra payment shall be allowed for jambs, junctions, corners, edges, round surfaces or for more than one layer of plaster required due to any unevenness in the work done by the Constructor. The plasterwork is to cover all conduits, pipes etc fixed in the walls and ceiling. Wherever specified, metal lath shall be nailed firmly before plastering is commenced. The plaster surface shall be tested frequently with a 10 feet straight edge and plumb bob.
- 6.2 Plaster containing cracks, blisters, pits, discoloration or any, defects shall not be acceptable. Any such plaster or loose plaster shall be removed & replaced with plaster in conformity with these specifications and as additionally directed by the Engineer. Constructor shall cut out and patch all defective work at his own cost. All damaged plaster shall be patched as directed by the Engineer. Patching plaster shall match appearance of and shall be finished level with adjoining plaster.

## **7. Metal Lath**

Metal lathing shall be fabricated from sheet steel and shall be of uniform quality and free from flaws broken strands, cracks and corrosive pitting, shall be rectangular and true to shape and shall comply with BS-1369.

All lathing shall be galvanized. Where plastering material depends entirely on the lathing for its key, these shall be not less than two complete mesh openings per 1-1/8" in one direction and the width of the aperture shall not be less than 3/16".

Sheets shall not be less than 1.6 kg/sq.m when fabricated, using 0.7 mm thick steel sheet. Where used on smooth surfaces to form a key it shall be not less than 1.2 kg/sq.m when fabricated, using 0.5 mm thick steel sheet. Tying wire shall be 1.2 mm diameter galvanized annealed iron wire.

Sheets shall be welded to angle iron frame as shown on drawings. 8.

#### **8. Angle and Beads**

Angle beads, stop beads, depth gauge beads, edging profiles, plaster dividing profiles, interior angle profiles, plaster borders and the like shall all be manufactured from sheet steel and galvanized after fabrication, all beads shall be perforated at edges to ensure good adhesion of the plaster work. Thickness and dimensions shall suit particular locations and plaster thickness.

All angle beads, stop beads, depth gauge beads and the like are to be fixed in accordance with the manufacturer's instructions, at all corners, stops, joints, etc. as per directions of Engineer In charge.

#### **9. Internal / External Plaster**

9.1 Where specified in the Drawings external surface shall have an average 20mm thick plaster finish, consisting of a base coat of 1:4 cement sand mortar in Grey cement and the finish coat of smooth plaster as shown on the Drawings and as directed by the Engineer.

9.2 Where specified in the Drawings all internal plaster shall have an average 12mm thick consisting of base coat of 1 :3:1:4 cement sand mortar in grey cement and finish coat of smooth plaster as shown on the Drawings and as directed by the Engineer.

9.3 Wire mesh should be used in joints where an RCC member such as Columns, Beams, slabs etc meets masonry in Plaster.

#### **9.3 Stucco Plaster**

Wherever specified in the drawings external stucco plaster shall consist of 1 :2, one part white cement & 2 parts approved shade of marble chips zero size mixed with approved pigment to achieve desired shade. Wherever shown on drawings, grooves shall be provided with aluminum U/Y channels. The Constructor shall prepare mockup samples of stucco plaster for the approval of Engineer. The plaster shall be applied with machines and the final rough surface/texture/shade shall be as per the approved sample, direction and approval of the Engineer-In charge.

#### **10. Cleaning and Protection**

10.1 Rubbish and debris shall be removed as necessary to make way for work of other trades and as directed by the Engineer. As each room or space is completed all rubbish, debris, scaffolding and tools should be removed to leave the room clean.

10.2 Prior to plastering all aluminum windows, finished metals should be covered by sheet of plastic or tarpaulin to protect it from damage.

10.3 Protect finished plaster from injury by any source. Constructor shall also protect walls, floors and work of other trades from Plastic materials.

## **11. Tolerances**

Surfaces of plaster work shall be finished with a true plane to correct line and level with all angle and corners to a right angle unless otherwise specified and with walls and reveals plumb and square.

Maximum permitted tolerances shall not exceed 1/8" in 6 feet variation from plumb or level in any exposed line or surface and 1/16" variation between planes of abutting edges or ends.

## **12. Measurement and Payment**

### **12.1 General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective item of the Bill of Quantities.

The rates quoted by the Constructor in the Bill of Quantities shall include work to be executed under these specifications in any floor and at any height, otherwise specifically stated in the relevant item of Bill of Quantities and the Constructor shall not be entitled to any claim or claim any compensation on this account.

12.1.1 Metal lath over reinforced concrete and masonry joint.

12.1.2 Joints, junctions, corners, beads, drip course edge, roundings, and aluminum UN channels in grooves. Etc.

12.1.3 More than one layer due to any unevenness in the finished works and base coat plaster in stucco plaster including marble chips/color pigments.

12.1.4 Cutting & patching of all defective works.

12.1.5 Surface preparation, cleaning and protection as specified.

12.1.6 Marble chips & pigments in stucco plaster.

12.1.7 Roughening of first coat of plaster before application of 2nd coat in case where overall required plaster thickness exceeds 1/2 inch.

### **12.2 Plain Plaster/Stucco plaster Measurement**

Deductions shall not be made for ends of joints, beam posts, etc., and openings not exceeding 5 square feet each and no addition shall be made for reveals, jambs, soffits, sills, etc. of these openings non for finishing the plaster around ends of joints, beams posts, etc.

In case of opening of area exceeding 5 square feet each, deduction shall be made for the openings and also no addition shall be made for reveals jambs, soffits, sills, etc., of these openings.

Measurement of acceptably completed works of plaster will be made on the basis of number of square feet of the surface area plaster as shown on the Drawings, or as directed by the Engineer.

### 12.3 **Payment**

Payment will be made for acceptable measured quantity of plaster on the basis of unit rate per square feet quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## SECTION – 12 MARBLE

### 1. Scope

The work under this section of specifications, consists of providing all material, labour, plant, equipment, appliances in any floor and at any height and performing all operations required for providing and installing marble natural stone slab for toilet counters, where shown on the drawings, complete in strict accordance with this section of the specification and the applicable Drawings.

### 2. Submittals

The Constructor shall submit manufacturer's specifications and other product data for each type of marble stone and fixtures required, including instructions for handling, storage, installation and protection.

Shop Drawings shall be submitted showing sizes, dimensions, sections and profiles of slab, arrangement and provisions for jointing, anchoring, fastening and supports and other necessary fixing details. Indicate locations, layouts and pattern arrangements for each stone type and color.

Submit three ranges samples 300mm x 300mm in size of each type of stone showing color, grade, finishing and texture for approval of the Engineer.

### 3. Delivery, Storage and Handling

Materials shall be protected from damage during loading, shipment, delivery and storage. Non staining materials for blocking and packing shall be used. Stack marble at site in accordance with manufacturer's recommendations and as required to prevent staining, scratching, etching or breakage.

### 4. Materials

#### 4.1 General

Marble shall be compact, dense, metamorphic rock of lime stone origin obtained from quarries within Pakistan. It shall have a specific gravity of 2.7 and hardness number on Moh's scale shall range from 3 to 4.

Obtain each marble stone type from a single quarry and ensure consistent color range and texture throughout the work. All pieces shall be of uniform thickness and truly square in shape.

Provide marble slabs/sills and tiles of specified sizes in floors, stair tread & risers and counter tops as shown on drawings.

Provide marble slabs/ sills and tiles of type, color and finish for each area as directed by the Consultant / Engineer In Charge/Engineer.

Provide stone of specified thickness. Saw cut the back surfaces that are meant to be concealed in finished work.

Provide irregular shaped units, staircase units and skirting base units to the profiles of required shapes & sizes and polished exposed surfaces wherever specified.

#### **4.2 Marble Stone Type**

All marble stone types are to be selected and approved by the Engineer for quality, color and texture.

Marble: Marble of approved type and color of local origin, first class quality and high class finish acceptable to the Engineer.

#### **4.3 Beds and Backings**

Where applicable, standard cementitious screed and mortar beds and backings, mixed and proportioned by volume shall be as follows: -

Grey ordinary Portland	: 1 part
Cement Sand Water	: 3 parts
	: Clean, fresh and free from deleterious substances

#### **4.4 Adhesives, Grouts and Sealants**

Proprietary adhesives, joint grouts and sealants of approved type as required and recommended by the manufacturer for specific application shall be used. The color of the joint grout and the sealants shall match with the color of stone.

### **5. Execution**

#### **5.1 Flooring, Skirting/dado and Stair**

Apply cement slurry coat over surfaces of concrete substrate immediately prior to placing setting bed. Limit area of application to avoid premature drying out. Install setting bed of required thickness and set stone units before initial set occurs. Apply a thin layer of cement paste to bottom of each unit. Set tamps and level units immediately. Set units in required pattern with uniform joint widths.

Point joints as soon as possible after initial set. Force grout into joints, strike flush and tool slightly concave.

Remove mortar and grout from surfaces well still moist and as the work progresses.

Do not permit traffic on finished surface during setting and for a minimum of 24 hours after final pointing of joints.

#### **5.2 Marble Toilet Counters**

Marble toilet counter tops of the specified size shall be installed in areas shown on Drawings with M.s. angle framing and fixing accessories in accordance with approved shop drawing. Joints shall be cement grouted with matching color or with matching color sealant.

#### **5.3 Repair and Cleaning**

Remove and replace stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework or are not in line and level as shown on Drawings. Provide new matching units, install and point joints to eliminate evidence of replacement. Repoint defective and unsatisfactory joints to provide neat, uniform appearance.

## **6. Product Delivery, Storage and Handling**

- 6.1** Material shall be delivered in original; unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size, thickness and fire rating.
- 6.2** Material shall be stored in original protective packaging to prevent soiling, physical damage or wetting.
- 6.3** Cartons shall be stored in the installation area, opened at each end to stabilize moisture content and temperature, for 48 hours prior to installation.

## **7. Job Site Conditions**

- 7.1** Work which will be concealed by false ceilings shall be completed, tested, inspected and accepted before ceiling work is started.
- 7.2** False ceiling installation shall not begin until the area has been closed in, and temperature and humidity approximate occupancy conditions. Wet work shall be cured and dry before ceiling work is started.
- 7.3** Surface which will support the ceilings, and those to which the ceiling abut, shall be inspected and accepted for completeness and adequacy to receive the ceilings before the work begins.

## **8. Installation and Workmanship**

False ceiling suspension system and panels shall be installed in accordance with the requirements of BSI-CP.290 and with the manufacturer's recommendations as approved by the Engineer.

### **8.1 Suspension System**

The hangers as specified shall be evenly disposed as per drawings, details and place and position as indicated. The suspension system should be installed by making holes in the roof and shall be made good as directed by the Engineer. Their lengths clear of roofing slab shall be as per shop drawing details.

The framing of the specified section and run at spacing as per shop drawings. The jointing of runners to hangers shall be as per approved shop drawing details. The extra framing if required shall be provided for light receptacles as per approved shop drawing details.

Wall hangers shall be positively and rigidly connected to the structure and to cross runners.

### **8.2 False Ceiling tiles.**

Tiles shall be installed in the grid system after completion of installation of the suspension of lighting and air conditioning fixtures.

Forming ceiling panels shall be laid out in pattern including border of uniform width around all sides of each ceiling area. The pattern shall be as per shop drawings approved by the Engineer.

All panels shall be furnished and installed in an approved manner and as per approved types, sizes and surface design.

**9. Fixtures**

Light fixtures shall be installed as per approved pattern and supported in accordance with manufacturer's recommendations.

**10. Finishing**

After installation, dirty, soiled or discolored surfaces shall be cleaned and left free from defects and ready to receive any painted finish if required.

The panels which are damaged or improperly installed shall be removed and replaced' by the Constructor at his cost.

**11. Measurement and Payment**

**11.1 General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

The rates quoted by the Constructor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Constructor shall not be entitled to any claim or claim any compensation on this account.

Aluminum approved suspension system including main channels, main tee/cross tee bars, wall moulding and edge trims, hanger strips and accessories hold down clips, Aluminum tiles / strips etc. complete for aluminum tile / strips ceiling.

**11.2 False Ceiling**

**11.2.1 Measurement**

Measurement of acceptably completed works of respective types of false ceiling will be made on the basis of net actual area in square feet of false ceiling provided and installed in position as shown on the Drawings or as directed by the Consultant / Engineer In Charge/Engineer.

**11.2.2 Payment**

Payment will be made for acceptable measured quantity of respective type of false ceiling on the basis of unit rate per square feet quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## SECTION – 13 FLOOR AND WALL FINISHES

### 1. Scope

The work under this section of the Specification consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in any floor and at any height in connection with the installation of cement concrete floors and floor finishes including bases, skirting and external surface treatments, complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

### 2. Material

#### 2.1 Cement

Cement shall be ordinary Portland cement conforming to B.S. 12 or PS 232.

#### 2.2 Sand

All fine sand shall be obtained from sources approved by the Engineer. The grading shall conform to B.S 882 Grading Zone 1 and 2 of which the gradation limits are as follows:

Percentage (by weight) passing

B.S. Sieve	Grading Zone 1	Grading Zone 2
3/8" (9.53 mm)	100	100
3/16" (4.765 mm)	90-100	90-100
No. 7	60-95	75-100
No. 14	30-70	55-90
No. 25	15-34	35-59
No. 52	5-20	0-10
No. 100	0-10	

#### 2.3 Coarse Aggregate

Coarse aggregate shall be crushed or uncrushed gravel or crushed stone, angular or rounded in shape and shall have granular, crystalline or smooth surface free from friable, flaky and laminated pieces, mica and shale. It shall not contain matters injurious to concrete. All coarse aggregate shall conform to BSS NO.882 and shall be graded as follows:

B.S. Sieve	% Passing by weight
1" (25.40 mm)	100
3/4" (19.05 mm)	90-100
3/8" ( 9.53 mm)	20-55
3/16"(4.765 mm)	0-10

The aggregate shall be stored on properly constructed paving or as directed by the Engineer.

There shall be a physical partition between the stockpiles of coarse and fine aggregate. If required aggregates shall be washed and screened to the

satisfaction of the Engineer. Sieve analysis of all the aggregates to be used in the works shall be carried out as and when required by the Engineer. All aggregate shall be subject to the approval of the Engineer.

Any aggregates not found to be of the specified/approved standard shall be rejected by the Engineer and all such rejected material shall be removed from site with-out delay.

Floors, sub-base or base constructed with rejected aggregates shall be dismantled and rebuilt at the expense of the Constructor.

#### **2.4 Stone Ballast**

Stone ballast to be used as soling shall comprise of strong, hard, durable stone of approved size. The stone shall be obtained from approved quarry and shall be sound, free from laminations and weak cleavages and shall conform to specifications of "Stone Soling".

#### **2.5 Water**

Water used for mixing concrete, curing or any other operation of the works specified herein shall be fresh, clean and free from organic or inorganic matters in solutions or in suspension. Only water of the approved quality shall be used for all constructional purposes:

#### **2.6 Ceramic/Porcelain tiles**

Ceramic tiles shall be imported, premium quality, plain white/ colored or printed. Porcelain tiles shall be imported Italian or Spanish or Granitto. The tiles shall be of sizes as specified on the drawings and shall conform. to BS 1281 as per samples.

#### **2.7 Cleaning Compound**

The compound used for all cleaning of terrazzo shall be an approved neutral chemical cleaner free from acid and alkali or any other material that will affect the color or otherwise damage the terrazzo and shall not affect the conductivity of terrazzo floors.

#### **2.8 PVC Vinyl Tiles**

PVC vinyl tiles shall be imported best quality of size 300mm X 300mm Color and shade shall be as per sample to be submitted by the Constructor and approved by the Engineer.

#### **2.9 Division Strips**

Division strips shall be of marble as approved by the Engineer. Standard division strips for floor finishes shall be not less than 5mm (3/16") in thickness and shall not be less than 1-3/4" in depth.

#### **2.10 Marble Chips**

Marble chips shall have an abrasive hardness of not less than 16, as determined by the test of wear resistance in National Bureau of Standards Reports MBS 98. Size shall vary from No. zero to 8.

#### **2.11 Preservative Material**

Preservative treatment for terrazzo floor shall produce a water-proof finish which will not be impaired by immersion in water at room temperature for

a period of 2-1/2 hours, approximately 18 hours after the floor is finished by buffing, as specified. The preservative material shall not discolor the terrazzo nor leave a tacky or sticky finished film on the surface after buffing.

### **3. Cement Concrete Flooring**

The materials for C.C flooring shall be same as already specified under clause 3, "Materials".

#### **3.1 Composition of Concrete**

Concrete shall be composed of Portland Cement, sand, coarse, aggregate and water, all well mixed and brought to the proper consistency. The Constructor shall mix the ingredients as indicated on the Drawings. The proportions of the various ingredients shall be determined from time to time during the progress of the work and tests shall be made of samples of the aggregates and the resulting concrete. The mix proportions and appropriate water-cement ratio will be determined on the basis of the production of concrete having required workability, density, impermeability, durability and required strength.

#### **3.2 Mixing Concrete**

The concrete ingredients shall be mixed in a batch mixer for not less than 1-1/2 minutes after all ingredients, except the full amount of water, are in the mixer. The Engineer reserves the right to increase the mixing time when the charging and mixing operations fail to produce a concrete batch in which the ingredients are uniformly distributed and the consistency is not uniform. The concrete shall be uniform in composition and consistency from batch to batch except when changes in composition or consistency are required. Water shall be added prior to, during and following the mixer charge. Excessive over-mixing requiring addition of water to preserve the required concrete consistency will not be permitted. The concrete ingredients shall be mixed by volumetric measurement in purpose made boxes approved by the Engineer.

#### **3.3 Construction**

The base course of the floor shall comprise of stone ballast of 2 inches (approx: 50 mm) mesh size. The base course shall be thoroughly compacted by suitable power rammers to the total consolidated thickness as shown on the Drawings and as approved by the Engineer. The interstices shall be filled with smaller size stones. The base course shall be blinded with sand and the whole surface watered. Over the well compacted base course, a layer of concrete of the required grade and thickness shall be laid, in panels of the sizes as indicated on the Drawing and as approved by the Engineer.

After the C.C bed has been cured, as directed by the Consultant / Engineer In Charge/Engineer, it shall be roughened and well watered before floor finishing is laid. The floor finish shall comprise of cement concrete of required grade and shall be laid in panels to the required thickness as shown on the Drawings or as directed by the Engineer. The concrete after

laying will be thoroughly rammed and mortar worked up to the top and smoothed with a steel trowel. The edge of each section into which the floor is divided should be defined by wooden screeds of the approved width and of a depth equal to the depth of the floor concrete.

Freshly placed concrete floor and completed floor portions as finished shall be protected to prevent loss of water by covering with damp hessian, water proof paper, damp sand or other approved material, and shall be kept constantly damp for a period of four days or longer after concreting as directed by the Consultant / Engineer In Charge/Engineer. The concrete shall be allowed to dry out slowly over a period of three days after wet curing is completed.

The expansion joints shall be filled in with hot bitumen, of the approved grade, as directed by the engineer.

#### **4. Terrazzo Flooring**

##### **4.1 Mix**

The terrazzo mixes shall be composed by weight as follows:

Plain terrazzo for all floors and bases indicated as terrazzo and not otherwise specified, shall be composed of one part cement, white or grey, and 2 parts of marble chips of the sizes and colors hereinafter specified.

##### **4.2 Preparation for Terrazzo**

The grade and thickness of concrete as shown on the Drawings shall be laid as under bed to receive terrazzo. The surface of the bed shall be roughened for bonding with the terrazzo finish. If the surface is too smooth it shall be roughened with a toothed chisel and, prior to laying the terrazzo the bed shall be cleaned of all dirt, oil grease and extra loose material.

##### **4.3 Division Strips**

Terrazzo floors and bases shall be divided up by marble strips of specified thickness and depth. The division strips between field work and borders shall have exposed tops in full width of the strips. The division strips shall be set immediately after the spreading of the under bed, the strips being partially embedded therein, securely anchored to the subfloor and grouted solid.

All division strips shall be set, straight to lines and to the proper level to ensure that the tops of the strips will show uniformly after grinding and smoothing operations are completed and joints and intersections shall be fitted tight. Strips shall be braced to prevent bulging during the placing of terrazzo.

Unless otherwise shown on the drawings, the divisions in field work of large areas shall not exceed 4 feet x 4 feet and in small areas shall not exceed 2 feet x 2 feet.

Edging strips shall be placed at doorways between terrazzo and other types of flooring and along the edges of all terrazzo bases or borders and adjoining other types of floor finishes or floor covering. The edging strips at doorways shall be placed in line with the step face of doors. All edging strips shall be anchored and grouted solid in the under bed or to the

concrete sub-floor and braced to prevent bulging as specified for division strip.

#### **4.4 Laying Terrazzo**

4.4.1 The sub-surface shall be swept clean, thoroughly moistened, but not saturated, and slushed with a coating of neat cement grout approximately 1/8" in thickness. The under bed consisting of class 'C' cement concrete screed shall be spread and brought to a level not less than 3/4" below the finished floor level. The dividing strips shall be installed in the green under bed. The terrazzo mix shall be spread, tamped and rolled into a compact mass not less than 3/4" thick. After rolling additional aggregate mix shall be sprinkled over the surface to fill up all depressions, to take up excess moisture and to permit the terrazzo to be trowelled to a level, dense and even surface, slightly above the finish line of floor. This level, shall allow for the surface grinding necessary to expose the specified area of aggregate, and to produce smooth, level floors free of waves and depressions.

#### **4.4.2 Seasoning**

The completed terrazzo shall be allowed to season for 6 days during which time it shall be kept moist by (1) covering with approximately 1" thickness of sand; or (2) covering with building paper or mats; or (3) sprinkling with water at every 10 hour interval.

#### **4.4.3 Surface**

Following the curing period, the terrazzo shall be machine ground to a true, even surface using a No. 24 grit followed by a No. 80 grit or finer abrasive stone. After the first grinding, the floors shall be thoroughly grouted with the same cement and color composition as specified for the matrix of the terrazzo mix. The grout shall be of the consistency of thick cream, and shall be brushed over the floor to eliminate all pits and thoroughly fill the surface for final grinding.

#### **4.4.4 Finishing**

Not less than 72 hours after application, the grouting coat shall be removed by grinding. In the later stages of grinding, the grit stones or other abrasive used in the grinding machine shall be of a grain or fineness that will give the surface smooth finish. Small areas, inaccessible portions and corners which cannot be reached by the grinding machine shall be ground and rubbed by hand.

#### **4.4.5 Protection**

The walls and all surfaces of the finished work of other trades shall be properly protected from damage and spoiling during the process of grinding and washing of the terrazzo. After the finish grinding has been completed and the surface treatment applied, the terrazzo work shall be covered and protected with material

approved by the Engineer until completion of the work of all other trades.

#### **4.4.6 Cleaning and Coating**

Prior to placing the protective covering, the terrazzo floor shall be approved by the Engineer. After the work of all other trades has been completed and the protective covering removed, all terrazzo work shall be washed with cleaning compound, mixed with warm water and using a fine abrasive where necessary to remove any stains or cement' smears. The terrazzo' shall be allowed to dry thoroughly and shall be given a sealing application of preservative material. The sealing material shall be applied in accordance with the manufacturer's directions, leaving all terrazzo work in clean condition as approved by the Engineer.

#### **4.4.7 Dado/Skirting**

The ingredients of dado/skirting shall be one part of cement and two parts of marble chips varying from Nos. zero to 2. Striking shall be laid over a base of plaster of specified thickness. The thickness of dado/skirting layer shall be as specified. The surface shall be grinded and polished to the satisfaction of the Engineer.

### **5. Installation of Tile Flooring**

When setting out the tiles, care shall be taken to establish the correct elevation for the floor. A gauge rod shall be used, indicating the overall measurement of a given number of tiles with specified joint width to reduce cutting.

After the floor has been machine finished, it should be covered with white, non-staining sand or rags to protect it while other work is being done. After removal, the floor shall be thoroughly scrubbed.

#### **5.1 General**

The base shall be prepared by laying cement concrete of specified grade and of thickness as shown on the drawings, or specified in the Bill of Quantities.

The curing period of the setting bed shall be as directed by the Engineer. As large an area of setting bed shall be spread at one time as can be covered with tiles before the mortar has set. Surplus mortar shall be removed. The thickness of setting bed in any space shall not be less than 1/2".

Floor and wall surfaces to receive the tiles shall be thoroughly cleaned of all dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the centre line of each space in an outward direction and the pattern should be made symmetrical with a minimum number of cut tiles as directed by the engineer.

Joints between the tiles shall be of uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges.

## **5.2 Ceramic/Porcelain Tiles**

The ceramic/porcelain tiles shall be laid to the required lines, levels and grades over a setting bed of cement sand mortar comprising of one part of cement and 4 parts of sand by volume and the joints filled with neat white or grey cement including vertical and horizontal covers. The tile floor shall be kept wet for at least 72 hours and no traffic should be allowed on the tiles during curing period.

## **6. Measurement and Payment**

### **6.1 General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities.

The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

- 6.1.1 Loss and wastage of material due to consolidation, erosion and settlement.
- 6.1.2 All type of joints (expansion, contraction and construction joint etc.).
- 6.1.3 Class 'C' cement concrete screed base and 1:4 cement sand mortar under floor.
- 6.1.4 Rough plaster base under skirting / dado.
- 6.1.5 Finishing/grinding, washing & polishing works of ceramic, concrete, terrazzo tile, terrazzo floors and marble tiles.
- 6.1.6 Marble strips in terrazzo floors
- 6.1.7 1 :2 and 1:4 cement sand rough cast plaster.
- 6.1.8 Sand cushion under concrete pavers
- 6.1.9 Adhesives used in the laying of PVC flooring.
- 6.1.10 Bedding / Jointing Material of Envicretejali
- 6.1.11 Pigmented grouting
- 6.1.12 Cleaning of tiles after installation.
- 6.1.13 Bull-nozing, chamfering of edges of marble tops including base mortar and making holes for wash basin including all necessary fixing accessories.

### **6.2 Cement Concrete Floor**

#### **6.2.1 Measurement**

Measurement of acceptably completed works of cement concrete floor steel trowelled finish will be made on the basis of net actual area in square feet laid in position as shown on the Drawings or as directed by the Engineer.

### **6.2.2 Payment**

Payment will be made for acceptable measured quantity of cement concrete floor steel trowelled finish on the basis of unit rate per square feet quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## **6.3 Ceramic/Porcelain Tile Floor**

### **6.3.1 Measurement**

Measurement of acceptably completed works of ceramic/porcelain tile in floor will be made on the basis of net actual area in square feet-of floor laid in position as shown on the drawing or as directed by the Engineer.

### **6.3.2 Payment**

Payment will be made for acceptable measured quantity of ceramic/porcelain tile floor on the basis of unit rate per square feet quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## **6.4 Ceramic/Porcelain Tile Dado/Skirting**

### **6.4.1 Measurement**

Measurement to acceptably completed works of ceramic/Porcelain tile in dado/skirting will" be made on. the basis of net actual area in square feet of dado/ skirting laid in position as shown on the Drawing or as directed by the Consultant / Engineer In Charge/Engineer.

### **6.4.2 Payment**

Payment will be made for acceptable measured quantity of ceramic/porcelain tile in dado/ skirting on the basis of unit rate per square feet quoted in the Bills of Quantities. The unit rate shall include all cost of cement, sand, mortar and shall constitute full compensation for all the works related to the items.

## **6.5 Terrazzo Flooring/Skirting**

### **6.5.1 Measurement**

Measurement of acceptably completed works of terrazzo flooring/skirting will be made on the basis of net actual area in square feet laid in position as shown on the Drawings or as directed by the Engineer.

### **6.5.2 Payment**

Payment will be made for acceptable measured quantity of terrazzo flooring/skirting on the basis of unit rate per square feet quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## **6.6 PVC Vinyl Tile**

### **6.6.1 Measurement**

Measurement of acceptably completed works of PVC vinyl tile flooring will be made on the basis of net actual area in square feet

laid in position as shown on the Drawings or as directed by the Engineer.

**6.6.2 Payment**

Payment will be made for acceptable measured quantity of PVC vinyl tile flooring on the basis of unit rate per square feet quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## SECTION – 14 PAINTING

### 1. Scope

The work under this section of the Specifications consists of furnishing all materials, plant, labour, equipment, appliances and performing all operations in any floor and at any height in connection with surface preparation, mixing, painting concrete works, gates, frames, walls, ceilings and all such surfaces as shown on the Drawings and/or as directed by the Engineer. The scope of this section of specification is covered with detailed specifications as laid down herein.

### 2. Applicable Standards

Latest editions of following British Standards are relevant to these specifications wherever applicable.

#### 2.1 BSI (British Standards Institution)

245 Specification for mineral solvents (white spirits and related hydrocarbon solvents) for paints and other purposes.

2521 Lead - based-priming paint for wood work .

2523 Lead based priming paint for iron and steel.

2569 Sprayed metal coatings.

4800 Paint colors for building purposes. Painting of building.CP2

### 3. Cleaning and preparation of metal surfaces

3.1 Except as otherwise specified, all painting shall be applied in conformity with BS CP 231 "Painting of Building" as applicable to the work.

3.2 The Constructor shall repair at his own 'expense all damaged" or defective areas of shop-painted metal and structural steel work. Metal surfaces against, which concrete is to be placed will be furnished shop-painted and shall be leaned prior to being embedded in concrete.

3.3 Except as otherwise specified all concrete and plastered surfaces are to be painted.

3.4 The Engineer will furnish a schedule of colors for each area and surface. All colors shall be mixed in accordance with the manufacturer's instructions.

3.5 Colors of priming coat (and body coat) where specified, shall be lighter than those of finish coat. The Engineer shall have unlimited choice of colors.

Samples of all colors, and finishes shall be prepared in advance of requirement so as not to delay work and shall be submitted to the Engineer for approval before any work is commenced. Any work done without such approval shall be redone to the Engineer's satisfaction, without additional expense to the Employer. Samples of each type of paint shall be on separate 12" x 12" x 1/8" tempered hard board panels. Manufacturer's color chart shall be submitted for color specifications and selection.

#### **4. Materials**

- 4.1 All materials shall be acceptable proven first grade products and shall meet or exceed the minimum standards of reputable manufacturers as approved by the Engineer.
- 4.2 Colors shall be pure, non-fading pigments, mildew-proof sun-proof, finely ground in approved medium. Colors used on-plaster and concrete surfaces shall be lime proof. All materials shall be subject to the Engineer's approval.
- 4.3 All synthetic enamel paints and primers for structural steel works, metal work and wood works will be the best available of its type and shall be approved by the Engineer prior to its procurement.
- 4.4 Approved quality Weather Shield Weather Coat paint shall be used for painting the exteriors of the structures or other surfaces where specified on the drawings as directed by the Engineer.
- 4.5 The plastic emulsion paint, vinyl emulsion paint or similar as approved by the Engineer shall be used for interior surfaces.
- 4.6 All material for Bitumen painting shall consist of Bitumen grade 10/20. It shall be used for foundations or wherever recommended by the Engineer.
- 4.7 Only paints manufactured by ICI, Berger or approved equivalent shall be used in this Project. All material shall be delivered to site in their original unbroken containers or packages & bear the manufacturer's name, label, brand & formula & will be mixed and applied in accordance with his directions.

#### **5. Delivery Storage And Container Sizes**

Paints shall be delivered to the site in sealed containers, which plainly show the type of paint, color (formula or specifications number) batch number, quantity, date of manufacture, name of manufacturer and instructions for use. Pigmented paints shall be supplied in containers not larger than 20 liters. All materials shall be stored under cover in a clean storage space, which should be accessible at all times to the Engineer. If storage is allowed inside the building, floors shall be kept clean and free from paint spillage.

#### **6. Surface Preparation**

- 6.1 All oil, grease, dirt, dust, loose mill scale and any other foreign substance shall be removed from the surface to be painted, polished and white washed by the use of a solvent and clean wiping material. Following the solvent cleaning, the surfaces shall be cleaned by scrapping, chipping, blasting, wire brushing or other effective means as approved by the Engineer.
- 6.2 In the event the surfaces become otherwise contaminated in the interval between cleaning and painting, recleaning will be done by the Constructor at no additional cost.
- 6.3 Surfaces of stainless steel, aluminum, bronze, and machined surfaces adjacent to metal work being cleaned or painted shall be

protected by effective masking or other suitable means, during the cleaning and painting operations.

- 6.4 All the surfaces to be painted with approved quality paint shall be free from dust, dirt, fungus, lichen, algae etc. Oil paint, varnish and lime wash should always be removed by scraping and washing.
- 6.5 All surfaces to be bitumen painted shall be thoroughly cleaned of any accretion, dust, dirt etc. by scraping, wire-brushing or as directed by the Engineer. The surface shall be primed with a coat of asphalt oil used at the rate of not less than 0.50 pound per square foot. No work in this section shall be allowed until all surfaces or conditions have been inspected and approved by the Engineer.

## **7. Application**

- 7.1 All paint and coating materials shall be in a thoroughly mixed condition at the time of application. All work shall be done in a workman like manner, leaving the finished surface free from drips, ridges, waves, laps, and brush marks. All paints shall be applied under dry and dust free conditions. Unless approved by the Engineer paint shall not be applied when the temperature of the metal or of the surrounding air is below 7 degrees centigrade. Surfaces shall be free from moisture at the time of painting.

All primary paint shall be applied by brushing. The first coat of paint shall be applied immediately after cleaning. When paint is applied by spraying, suitable measures shall be taken to prevent segregation of the paint in the container during painting operation.

Effective means shall be adopted for removing all free oil and moisture from the air supply lines of the spraying equipment. Each coat of paint shall be allowed to dry or harden thoroughly before the succeeding coat is applied. Surfaces to be painted that will be inaccessible after installation shall be completely painted prior to installation.

Coats of Weather Shield Weather Coat paint shall be applied in accordance with the manufacturer's instructions or as directed by the Engineer.

Only as much material should be mixed as can be used up in one hour. Over thinning will not be permitted. After the first coat the surfaces will be soaked evenly four or five times and the second coat shall be applied after leaving for at least overnight.

- 7.2 Where shown on Drawings all exterior surfaces shall be painted with Weather Shield/weather coat paint in approved colors as per manufacturer's specifications. The number of coats shall be as shown on the drawings or as directed by the Engineer.
- 7.3 All wooden doors shall be painted with approved synthetic enamel paint as per manufacturer's recommendation and instructions or after approval of the Engineer.
- 7.4 Plastic emulsion paint vinyl emulsion paint or matt enamel paint of the approved make and shade shall be applied to surfaces as

shown on Drawings as per manufacturer's instructions. The number of coat shall be as indicated on the Drawings or as directed by the Engineer.

- 7.5 Two coats of hot bitumen paint shall be applied to exposed concrete surfaces in contact with earth. The first coat shall be allowed to dry for about six hours before applying the second coat. During the operation of painting great care should be taken to avoid air bubbles. The manufacturer's instructions and Engineer's directions shall be complied with.

**8. Job Conditions**

- 8.1 Observe manufacturer's recommended minimum and maximum temperature but do not apply paint or finish to any surface unless ambient temperature is 10 degree C or above and less than 43 degree C. No painting shall be done above 90% relative humidity.
- 8.2 Place drop cloths to adequately protect all finished work.
- 8.3 Remove and replace all items of finish hardware, device plates, accessories, lighting fixtures or other removable items.
- 8.4 In no case shall any finish hardware or other finished item that is already fitted into place be painted, unless otherwise specified.

**9. Quality Assurance**

All paint for any one surface shall be top quality, of one manufacturer and approved by the Engineer. Deep tone accent colors shall be used and the unavailability of final coat colors may be the basis for rejecting materials for any one surface.

**10. Schedule of Measurement Of Paint Area**

- 10.1 Irrespective of prime coats and number of paint coats applied to exposed painting surface area of column, walls, projections, ceilings, false ceilings and other surfaces (Except gates, doors windows and ventilators) shall be measured as per actual paint-surface area for single time only and paid in accordance with quoted rate of Bill of Quantities.

**11. Measurement And Payment**

**11.1 General**

Except otherwise specified herein or elsewhere in Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of Bill of Quantities.

The rates quoted by the Constructor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the

relevant item of Bill of Quantities and the Constructor shall not be entitled to any claim or claim any compensation on this account.

11.1.1 Preparatory works, including .preparatory materials, scraping, scratching, sand blasting, clearing, prime coating, priming, protection of finished works etc.

11.1.2 Polishing works, including preparatory materials, scraping, cleaning, sanding etc/

11.1.3 Painting work on steel & wooden surfaces.

11.1.4 Before application of paint on existing surface the old paint surface shall be removed existing paint filling of cracks, surface preparation and application of primer coat, if any.

## **11.2 Measurement**

11.2.1 Measurement of acceptably completed respective type of painting works will be made on the basis of net actual areas in square feet of the surface painted as shown on the Drawings or as directed by the Engineer.

11.2.2 Payment will be made for acceptable measured quantity of respective type of painting on the basis of unit rate per square feet quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## **SECTION – 15 TEXTURED GRAFFITO WALL COATING**

### **1. Scope**

The work under this section of the Specifications consists of furnishing all materials, plant, labour, equipment, appliances and performing all operations in connection with surface preparation, mixing, and application of graffito wall coating as shown on the Drawings and/or as directed by the Engineer. The scope of this section of specifications is covered with detailed specifications as laid down herein.

### **2. General**

- 2.1 Except as otherwise specified, all painting shall be applied in conformity with BS CP 231 "Painting of Building" as applicable to the work.
- 2.2 The Engineer will furnish a schedule of colors for each area and surface. All colors shall be mixed in accordance with the manufacturer's instructions.
- 2.3 Samples of all colors/coating, stains and finishes shall be prepared in advance of requirement so as not to delay work and shall be submitted to the Engineer for approval before any work is commenced. Any work done without such approval shall be redone to the Engineer's satisfaction, without additional expense to the Employer. Samples of each type of coating shall be on separate 300 x 300 x 3 mm tempered hard based panels. Manufacturer's color chart shall be submitted for color specifications.

### **3. Material**

- 3.1 Material shall be acceptable, proven, top-grade products and shall meet or exceed the minimum standards of reputable manufacturers as approved by the Engineer.
- 3.2 The material for textured graffito coating shall be variable granular material and shall be composed of Acrylic Copolymer Emulsions, spheroid quartz, various additives, metallic oxides, inserts of different granule coloring agent, antibacterial and antibacterial agents.
- 3.3 All materials shall be delivered to site in their original unbroken containers or packages and bear the manufacturer's name, label, brand and formula and will be mixed and applied in accordance with his directions.

### **4. Surface Preparation**

- 4.1 All oil, grease, dirt, dust, loose mill scale and any other foreign substance shall be removed from the surface to be coated. Following the solvent cleaning, the surfaces shall be cleaned by scraping, chipping, blasting, wire brushing or other effective means as approved by the Engineer.

In the event the surfaces become otherwise contaminated in the interval between cleaning and coating, re cleaning will be done by the Constructor at no additional cost.

No work in this section shall be allowed until all surfaces or conditions have been inspected and approved by the Engineer.

The grafito coating material should be applied with stainless steel trowel and finished with plastic trowel in thickness as per manufacturer's specification. To get straight texture plastic trowel should be moved vertically and the trowel is to be rotated to obtain swirl texture.

## **5. Measurement And Payment**

### **5.1 General**

Except otherwise specified herein or elsewhere in Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of Bills of Quantities.

5.1.1 Preparatory works, including preparatory materials, scraping, scratching, sand paper rubbing, cleaning, protection of finished works etc.

5.1.2 Providing and applying rough plaster base Corner, pattas, rounding&, arches, borders, grooves etc.

### **5.2 Measurement**

Measurement of acceptably completed works of graffito coating to specified surfaces will be made on the basis of actual area in square foot of the surface coated as shown on the Drawing or as directed by the Engineer.

#### **Payment**

Payment will be made for acceptable measured quantity of coating to specified surfaces on the basis of unit rate per square foot quoted in the Bill of Quantities & shall constitute full compensation for. all the works related to the item

# **SECTION – 16 HEALTH AND SAFETY MEASURES**

## **1. Start with safety training**

All workers must hold a current white card before they commence work on-site. Site-specific induction training should also be completed by each worker, to point out any high risk areas and provide instructions for emergency management.

## **2. Minimize and manage risk**

Due to the nature of construction work, it's impossible to eliminate all safety risks. However, many common safety issues can be avoided by conducting regular safety audits and having procedures in place to report, assess and address potential risks.

## **3. Site security**

Restricted site access should not only be put in place to simply protect equipment from damage or theft. Security in and outside of work hours is integral to protect pedestrians from potential construction hazards. This includes supervision or authorized site visitors.

Strict security and safety protocols will also protect Constructor from liability and negligence in the case of a safety incident or security breach.

## **4. Safe work method assessment**

A safe work method statement (SWMS) must be prepared for all high risk construction projects, before work commences. The SWMS should outline the scope of work involved, any potential safety issues, and how risks will be prevented and managed. By law, construction work must not commence until SWMS standards are met.

## **5. Use clear signage throughout the site**

The site SWMS should be clearly displayed at the construction site, so that all safety protocols are readily available - including a 24 hour emergency contact number and a map or directions to the site office. Visible signage should also indicate site amenities (such as toilets), entry and exit points, and first aid or emergency fire equipment.

## **6. Entry and exit points**

Separate entry and exit points should be established for heavy machinery/vehicle access, to strengthen pedestrian safety at high traffic points.

## **7. Compliant chemical storage**

Chemicals need to be stored very carefully to minimize fires, explosions, asphyxiation, chemical injury and pollution on worksites. Use high quality, compliant outdoor storage solutions such as explosive storage cabinets to segregate chemicals and reduce spillage.

## **8. Environmental conditions**

Extreme weather conditions can cause serious safety hazards. Your on-site emergency plan should provide clear guidelines for workers who need to stop work in the event of natural disaster, severe environmental conditions or other emergency circumstances.

## **9. First aid**

For the construction industry, it's best practice to provide one first aid officer per 25 workers. First aid kits and equipment must be placed in an easily accessible area on site.

## **10. Provide personal protective (PPS) equipment**

In many situations an employer is obligated to provide PPS such as high vis vests, safety goggles and safety harnesses to construction site workers. To find what PPS you are required to provide for a specific project, contact Safe Work Australia.

## **11. Dropped objects**

It is your responsibility to secure objects onsite and minimize the risk of them falling. [This video](#) explains the risks and how they can be avoided by putting preventative safety measures in place.

Construction safety doesn't end once the project is completed, and your workers have gone home. All parties involved in the construction process have a responsibility in ensuring that the the right equipment and quality materials are used, so that safety risks are avoided long into the future.



- PORCELAIN TILES Imported of approved manufacturer (Nano Polish) approved by Consultant / Engineer In Charge or equivalent
- INDUSTRIAL TILES National Tiles, or as approved by Consultant / Engineer In Charge or equivalent.
- PAINT WEATHER SHIELD, SPD DISTEMPER, SYNTHETIC ENAMEL PAINT, MATT FINISH PAINT. ICI /Berger or equivalent Approved By Consultant / Engineer In Charge
- PAINTS / PRIMER & PUTTY ICI Pakistan Ltd, Berger Paints Pakistan Ltd or equivalent Approved By Consultant / Engineer In Charge.
- ALUMINIUM EXPANSION, JOINT COVER.STRIP FOR FLOORS/WALLS ETC Balco, M/s. Chemi Tech. or As Approved By Consultant / Engineer In Charge or equivalent.
- HARDWARE & HANDLES Bonco Brand or equivalent Approved By Consultant / Engineer In Charge or equivalent.
- GLASS Tinted Glass imported as approved or Ghani Glass as directed by Consultant / Engineer In Charge or equivalent.
- TEMPERED GLASS Pakistan Safety Glass or equivalent Approved By Consultant / Engineer In Charge or equivalent.
- MARBLE / GRANITE National tile or equivalent Approved By Consultant / Engineer In Charge or equivalent
- VENITIAN BLINDS Protector, MI Décor or equivalent Approved By Consultant / Engineer In Charge or equivalent.
- FIBER GLASS SHEET (Hollow / Solid) Toughlite Brand or equivalent approved by Consultant / Engineer In Charge.
- GALVANISED IRON (GI) PIPE M/s. I.I.L. or As Approved By Consultant / Engineer In Charge or equivalent.
- RCC PIPE M/s. RAZIA Brand or As Approved By Consultant / Engineer In Charge or

- UPVC PIPE

equivalent.  
Dadex, Pak Arab, AGM.,EURO GULF Pipes or or equivalent approved by Consultant / Engineer In Charge
- JUMBOLON

M/s. Diamond Foam or equivalent Approved By Consultant / Engineer In Charge.
- CONSTRUCTION CHEMICALS

M/s. FOSROC ,Mitchels& Co or equivalent Approved By Consultant / Engineer In Charge.
- STEEL GROUTING

M/s. Fischer , M/s. Hilti or equivalent Approved By Consultant / Engineer In Charge
- ALUMINIUM COMPOSITE PANEL (ACP) SHEETS

M/s. Dadex, M/s. Aluco MASTER or equivalent Approved By Consultant / Engineer In Charge
- ALUMINIUM SUSPENDED FALSE CEILING

DFB brand or equivalent Approved By Consultant / Engineer In Charge
- BITUMEN / ASPHALT

National Refinery/ Pak Hy Oils or equivalent Approved By Consultant / Engineer In Charge
- BITUMINOUS MEMBRANE

Pak Oils or equivalent Approved By Consultant / Engineer In Charge
- UPVC DOORS

M/s. Framez, / M/s. Mentors Pvt. Ltd or equivalent Approved By Consultant / Engineer In Charge
- CONCRETE KERB BLOCKS

M/s. Envicrete, M/s. Izhar Crete, M/s. Magna Crete, M/s. or equivalent Approved By Consultant / Engineer In Charge.
- CONCRETE HOLLOW BLOCKS / SPLIT BLOCKS

M/s. Envicrete, or equivalent approved by Consultant / Engineer In Charge.
- BURNT BRICKS

brunt bricks of approved quality from Karamabad or equivalent approved by Consultant / Engineer In Charge will be used.

- CONCRETE BLOCKS

M/s. Envicrete / M/s. Bes Block Hub or equivalent approved by Consultant / Engineer In Charge.

- CONCRETE PAVERS

M/s. Envicrete, M/s. Izhar Crete, M/s. Magna Crete, or equivalent approved by Consultant / Engineer In Charge.

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**Constructor.**

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**Engineer In-charge.**

**TABLES OF CONTENTS  
ELECTRICAL WORKS**

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**SECTION – A  
TECHNICAL SPECIFICATIONS**

The specification describes the requirements for the supply and installations of electrical/ low current systems.

**2. MATERIALS ORIGIN**

- a) All material and equipment supplied by the Contractor shall be new and shall be in accordance with the details described in BOQ and/or shown on drawings. If the contractor desires to use different materials other than specified, he shall obtain the approval from consultant in writing before using the materials.
- b) The Contractor shall also be responsible to supply any other equipment not mentioned in specifications but which is necessary for completion of works, it shall be provided by the Contractor as part of the Contract.
- c) Material shall be in accordance with high standard specifications. The contractor shall submit the samples of materials with complete specifications etc for the approval of consultants, before ordering or installation of materials. Approval of materials/installations shall not relieve the contractor of any of his obligations or liabilities under the contract. The Consultants/Owners or Representatives reserve the right to inspect the materials in store or in installed at site and to reject any material not complying with specifications without any extra cost.
- d) When choice of manufacturers is allowed for any material/equipment, the contractor shall obtain the whole quantity required to complete the job from one manufacturer otherwise he shall provide evidence to the consultant for non-availability of material/equipment in market.

## SECTION - B LOW VOLTAGE SWITCHGEAR

### 1. GENERAL

#### 1.1 Purpose

This section describes the minimum requirement for the design, construction and performance of factory assembled LV switchboard.

#### 1.2 Scope of Work

The job consists of supply, installation, testing, connecting and commissioning of switchboards as specified in BOQ or shown on the Drawings.

#### 1.3 Installation

Switchboard shall be installed indoor. The equipment shall be capable of operation under the prevailing ambient conditions without any deleterious effect of any kind. Switchboard shall be suitable for continuous operation at full load rating under combined variation of both voltage and frequency.

### 2. MAIN ELECTRICAL CHARACTERISTICS

#### 2.1 Power Supply System

Main characteristics of power supply system applicable to all switchboards are:

- Voltage 400 V  $\pm$  10%
- Phase 3 phase, 4 Wires.
- Frequency 50 Hz.  $\pm$  2 Hz.
- Neutral system firmly grounded.

Main characteristics of auxiliary supply system are:

- Control / Command system 24 VDC.
- Space heater system 230 VAC.

#### 2.2 Ratings

The equipment shall be capable of carrying the specified current continuously 24 hours per day, without exceeding the permitted temperature.

The current ratings must be guaranteed at the specified design temperature. Equipment shall be fully rated and constructed for withstanding, making and breaking the specified short circuit duty.

Pins of auxiliary circuits shall be sized for a rated circuit of minimum 10 Amp.

**1. ENCLOSURES**

The Switchboard shall be prefabricated metal clad cubicle(s), floor standing type, totally enclosed, dust tight and vermin proof and front access only. It shall complete in all respects with material and accessories, factory assembled, tested and finished all according to the specifications and to normal requirements. For indoor installations the international classification shall be IP42.

- a) The short service breaking capacity, ICs at 400 VAC, conforming to IEC 60947-2 unless otherwise stated on the drawings.
- b) To provide with adequate clearance from live parts so that flash over cannot be caused by switching, vermin, pests, etc.
- c) All components shall be rated for insulation class 600-volt minimum.
- d) It shall be designed for flush mounting of all instruments on the front side only.
- e) All incoming or outgoing connections from top or bottom shall be completed. The components mounted so as to facilitate ease of maintenance from the front. Common lamp test facility for all lamps.
- f) The wiring diagram on the inside of door. Be labeled with name plate on the front side of door.
- g) To provide 25% space for extension in future.

**3.1 Cable Accessibility**

Switchboard shall preferably be arranged for bottom cable entries. Adequate space must be provided for cable entries and termination. It shall be possible to work easily and safely on cable of a main or control outgoing circuit in OFF position with the remainder of the board alive.

Adequate system shall be provided for installation and clamping of cables inside the cable compartment. Position of terminals and cables shall allow use of clamp ammeter.

Power and Control cable termination shall avoid obstruction to other cable termination and provide easy access for terminating cables. Cable supports shall be provided to avoid undue strain on cable termination. Easily accessible locations shall be reserved in the compartment for measuring transformers.

**3.2 Heaters**

Space heaters shall be provided for prevention of moisture in each cubicle. Heaters shall be wired together and shall be automatically controlled to avoid over heating the equipment. Heater shall be suitable for operation on 230 VAC supply from an external source (to be provide in main Distribution Board)

**3.3 Name plates**

On the front side, a name plate shall be provided at the top to indicate the name of

manufacturer, system voltage and frequency and the current carrying capacity of switchboard.

Each breaker shall have a circuit identification label fitted below the breaker aperture or as suitable.

Drawing indicating the branch circuit names, breaker elements, cable sizes and connecting services shall be placed in a clear plastic pocket provided at the back of the front access.

Labels described shall have block letters 7 mm high on a white back ground, to be made from trifoliate and be fixed with screws.

Each incoming and outgoing circuit shall also be labeled with name plate 75 mm x 15 mm, as described above on the front side of door.

#### **4. CONSTRUCTION**

- 4.1** The switchboard shall be fabricated, welded, grinded, finished with angle iron frame work and clad with 2MM MS sheet, to form a rigid, free standing, flush mounting fronted assembly.

It shall be suitably divided into panels and compartments for accommodating the required number of circuit components, instruments and accessories. Each compartment shall be fully partitioned from its neighbor both horizontally and vertically, allowing safe cable routing / termination without shutting the switchboard down.

All live parts within cubicles, compartments or modules, which have to accessible during normal maintenance operations, shall be adequately protected and / or buried to ensure protection of works and to avoid accidental contact. Barriers may be rigid, transparent, insulating material fitted with warning labels.

The doors shall be provided with hinges on the left-hand side and locking handles on the right hand side for fastening the door. The front assembly shall be fastened to the enclosure by means of self locating fasteners for quick and easy fixing.

All holes, cutouts shall be tool or jib manufactured and free from burrs and rough edges. All structural components shall be of standardized design to provide complete uniformity and inter change ability of common parts. Removable gland plated shall be provided at top and / or bottom as required.

The switchboard shall be supplied complete with foundation bolts and other installation materials as recommended by the manufacturer. Proper size cable clamping channels

with galvanized steel clamps and brass cable clamps respectively for PVL/PVC and SWA cables shall be provided.

The cabling inside the Switchboard shall be suitably numbered and harnessed by means of straps or cords. Wiring to door mounted components shall be in flexible PVC conduit. All indicating, control and selecting equipment shall be suitably arranged and clearly labeled with indelible labels indicating the rating of fuses, switches, etc.

All metal work of the switchboard shall be cleaned down to bare shining metal, phosphate and the surfaces chemically prepared for powder coating. Then these shall be coated with powder of color RAL 7032 and then baked in oven. The thickness of powder coating shall not be less than 120 microns.

#### **4.2 Bus Bars**

Bus bars and droppers supported on non - hygroscopic material are to be high conductivity electrolytic tinned copper, completely isolated and mechanically braced and rated to withstand the specified short circuit currents for one second duration.

Bus bars and droppers shall be housed in a separate compartment and shall be clearly marked with Red, Yellow and Blue colors. Bus bars shall be provided for three phases, neutral and multi - terminal earth. The temperature rise shall not exceed 50 degree centigrade at rated current. Neutral bus assembly shall consist of outgoing screw terminals with one terminal for every MCCB / MCB.

Removable metal covers on the bus bar chamber shall be provided with suitably sized labels at regular intervals, fixed with self tapping screws and warning of live metal work.

All bus bars connectors shall be tinned plated connections and joints. Horizontal bus bars shall be of the same current rating throughout their length.

#### **4.3 Earthing**

A copper earth bar of suitable section for the specified fault level shall extend the entire length of the Switchboard. Provisions shall be made for possible future extensions at both ends.

Earthing facilities shall be provided on each incoming and outgoing unit to permit earthing of the connections.

All metallic non-current carrying parts of the Switchboard shall be bonded together and connected to the Switchboard's earth bar.

Each circuit wiring shall be green / yellow color. Earthing mass continuity between

withdrawable parts and fixed frame shall be correctly ensured whatever withdrawable part position.

Provision shall be made adjacent to cable termination for earthing cable armor to the earth bus bar.

Earthing switch shall be provided wherever mandatory as per rules and regulations / codes and standards and shall be manually operated. An interlocking system shall provide the following locking and safety functions:

- Impossibility of closing the earth switch if the switching device is closed.
- Visual check of earthing switch positions to be possible.
- Possibility of locking the earthing switch operating handle in open and closed position.
- The earthing of the bus bar shall be done manually by the operator without provision of general earthing system.

## **5. DISTRIBUTION BOARDS**

The enclosure of the LV Distribution Board shall be fabricated from electro-galvanized / zinc coated sheet steel.

The LV Distribution Board shall be fabricated with 1.6mm sheet steel recess or surface mounting. All components shall be installed on a component mounting plate inside the enclosure and protected from the front with screwed sheet steel safety plate. The door shall be fully gasket with hinges on the left hand side and locking handle on the right hand side for fastening the door. The locking handle should be detachable. The dead / front assembly shall be fastened to the enclosure by means of self - locating fasteners for quick and easy fixing.

The incoming and outgoing cable connections shall be according to the wiring requirements. If required, an adapter box of same material & finish shall be provided for accommodating the cables and conduits.

An earth bar or terminal strips shall be provided for connection of incoming and outgoing earth conductors. The earth bar or terminals shall be permanently connected to the body of Distribution Boards at two points. Flexible copper strip shall be provided for earthing of the door.

Neutral bus assembly shall consist of outgoing screw terminals with one terminal for each MCB. All holes, cutouts, etc., shall be tool or jib manufactured and free from burrs and rough edges. Removable gland plates shall be provided at top/bottom, as required.

The cabling inside the distribution board shall be suitably numbered and harnessed by means of straps or cords. Wiring to door mounted components shall be in flexible PVC pipe. All

indicating, control and selecting equipment shall be suitably arranged and clearly labeled with indelible labels indicating the rating of components etc.

All metal work of the distribution board shall be cleaned down to bare shining metal, phosphate and the surfaces chemically prepared for powder coating. Then these shall be coated with powder of color RAL 7032 and then baked in oven. The thickness of powder coating shall not be less than 120 microns.

## **6. COMPONENTS**

The switchboards shall be provided with all components as specified or shown on the Drawings and as necessary for the satisfactory operation of the Switchboard and electrical system. Typical specifications are given here under:

### **6.1 Circuit Breakers**

The circuit breakers shall be panel mounted, compact modular design, trip shall be standard and shall have built in overload and short circuit protection. The breakers shall have high performance, multifunctional type under modern design concept. The breakers should confirm international standards.

The breakers shall have inverse time limit characteristic, instantaneous magnetic trip element for short circuit and thermal overload protection.

#### **a) Molded Case Circuit Breakers (MCCB)**

The MCCB shall be three pole 400 / 500 volts rating. The breakers shall have both time delay over current and instantaneous short circuit protection.

The MCCB's shall be installed such that their switching levers are accessible through the dead front plate for operation. Circuit numbers / designation on all circuits shall be clearly marked to facilitate connection and maintenance.

The breakers shall have quick make - quick break toggle mechanism with positive 'ON', 'OFF' color indication and intermediate 'Tripped' positions.

Trip mechanism shall be trip free on overload or short circuit ensuring that the breaker will not close / remain close even if the close command is given while the circuit breaker has tripped due to short circuit or continuing overload.

#### **b) Miniature Circuit Breaker (MCB)**

The MCB's with current rating from 1 to 125 Amps shall be conforming to BS EN 60-898 or IEC 60947-2. The circuit breakers shall be suitable for DIN-rail mounting, maintenance-free and fully tropicalised.

The MCB's shall be designed for horizontal or vertical mounting, or reverse feeding, without any adverse effect on electrical performance.

The operating mechanism shall be quick make, quick break type, trip free, with all poles opening and closing simultaneously (except for the neutral pole, which if required shall be of the advance-closing and late-opening type). The operating toggle shall clearly indicate the ON and OFF color indications.

The individual operating mechanism of each pole of a multiple MCB shall be directly linked within the MCB casing and not by the operating handle.

Each pole of the MCB's shall be provided with bimetallic thermal element for overload protection and a magnetic element for short circuit protection.

**c) Earth Leakage Circuit Breakers (ELCB)**

ELCB's shall be four pole, current operated type with tripping current of 0.3A and tripping time not more than 0.1 seconds.

**6.2 Transformers/Meters etc.**

**a) Current Transformers**

Current transformers shall comply with the requirements of IEC 60185 (or equivalent).

Current Transformers shall be polyester resin insulated, ring type, air cooled having transformation ratio as indicated on the drawings. The current Transformers shall be of suitable burden having accuracy class 1.0. The Current Transformers shall have rated secondary current 5A / 1A as required.

Current Transformers shall mechanically and thermally withstand the specified short circuit capacity. Test terminal blocks shall be provided for current Transformer secondary circuits having short circuiting provisions to allow portable apparatus to be connected.

**b) Voltage Transformers**

Voltage transformers shall comply with the requirements of IEC 60186 (or equivalent) and shall be of accuracy class 1.0.

Voltage Transformers shall be equipped with primary fuses with an interrupting capacity of the incoming circuit breakers. Test terminal block shall be provided for each Voltage Transformer system.

**c) Ammeters and Voltmeters**

Indicating instruments shall be semi-flush Switchboard type, moving Iron, spring controlled with standard scale having white background and black

graduations and markings. The front dimensions shall be 144 x 144 mm for instruments on incoming side and 96 x 96 mm on all outgoing circuits.

Indicating instruments shall be 1.0 class percent of full scale basic accuracy class in accordance with IEC 60051.

The ammeter shall be suitable for connection to 5 Amp. Secondary of current transformer or directly through shunt as shown on the drawings. The instruments shall have measuring range indicated on the drawings. A red mark shall be provided at the working voltage on the scale of all voltmeters.

**d) Selector Switches**

Ammeter and voltmeter selector switches shall be complete with front plate, grip handle, R-Y-B and OFF position for ammeter and RY-YB-BR-RN and OFF positions for voltmeters.

The selector switches for controls shall be rotary cam type and shall be provided complete with knob and front plate, showing all positions as required.

**e) Push Buttons**

The push buttons shall be momentary make / break contact type (normally open / normally close) and suitable for flush mounting. The push button for ON and OFF switching shall be red and green respectively.

**f) HRC Fuses**

HRC Fuses shall be provided complete with fuse bases, fuse, etc. The fuses shall have a fusing factor as specified for class Q1 in accordance with BS 88.

**g) Pilot Lamps**

Switchboard shall be provided with phase indicating pilot lamps. The lamps shall be rated for 250 volts supply and suitable for flush mounting. The front of the lamps shall have colored rosettes for identification of phases.

**h) Line up Terminals**

Line up terminals wherever provided for Control or Power circuits shall be suitable for voltage and size of conductors as indicated on drawings. The Line up terminals for controls shall be suitable for channel mounting. All necessary accessories such as end-plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

**i) Secondary Wiring**

All wiring shall be copper conductor, thermoplastic insulated, at least 1.5 sq. mm flexible, neatly arranged and clipped in groups.

Each conductor and its termination are to be identified and marked with numbered ferrules. All live terminals are to be shrouded.

Secondary wiring for Current Transformers shall be carried out with not less than 2.5 sq. mm. Terminals shall be specially marked to avoid opening of the circuit by accident.

## **7. POWER FACTOR IMPROVEMENT PLAN (PFI)**

The power factor improvement plant shall be used for improving the power factor of the system. The plant shall be automatic cum manual.

The PFI plant shall be aligned with main LT switch board and it shall be a part of that LT switchboard as shown on the drawing. The capacitors shall be suitable for three phases, 415 volts 50 Hz system and shall be self cooled, designed for indoor use in tropical climate for maximum ambient temperature of 45 degrees centigrade and relative humidity 90%. The capacitors shall be in the form of banks divided for 12 stages, 6 stages and 4 stages. Each capacitor bank unit shall be 12.5/25 and 50 KVAR. The total KVAR capacity shall be as indicated on the drawings. Each capacitor unit shall be complete with discharge resistors and internal fuses and shall be connected with control panel with proper size of single core PVC insulated cables.

The panels shall be supplied complete with a set of 3-phase, full capacity, isolated tinned copper bus bars, interconnections, risers, designation labels, cable sockets, holding down bolts, wiring with cleats and ferrules, earthing sockets and studs, etc. Each control panel shall comprise.

- 1 No. Multi stage power factor correction relay for automatic/manual control.
- 1 No. 3-phase, 4 wire, 415 volts, unbalanced load power factor indicator.
- 1 No. Auto-off-Manual selector switch
- 1 No. Current transformers with 5 amps secondary current having suitable output burden and accuracy.
- 3 Nos. Instrument protection fuses.

Following equipment shall be provided for every 250 KVAR capacitor bank:

- 1 No. 630 amps, triple pole 415 volts air break contractor with auxiliary contacts (2 N.O+2 NC) Contractor shall be suitable for AC 3 duty.
- 1 Set of 2 Nos 630 Amps H RC back-up fuses with base and carrier.
- 1 Set of ON and OFF push buttons.
- 1 No. Red lamp for "ON" indication to the contactor.

### **Requirement of Capacitor Banks**

According to IEC-83 1 -1 and 831-2.

Fully insulated terminals to be shielded by a cover.

Dielectric: Plastic poly-propylene, impregnated.

Electrodes: Aluminum coating vacuum metalized.

Safety features: Self healing. Over pressure tear-off fuse.

Withstand switching operations safely.

Maximum in rush current 200 times rated current.

Loading capacity: 1.1 times rated voltage. 1.3 times rated current at delta max.

Overloading capacity 1.5 times rated output at delta max.

Acceptable tolerances - 5/+ 10% of rated output at rated frequency.

Static life expectancy > 100,000 operating hours.

Test Specifications: Terminal versus terminal with an AC voltage 2.15 times rated voltage for 10 seconds duration. Terminals to casing with an AC voltage of 3 KV for 10 seconds duration.

## **8. INSTALLATION**

The LV Switchboard shall be installed at location shown on the drawing. The Contractor shall coordinate with civil & allied works for providing any openings, holes, etc. to avoid any breakage. In case the provisions in civil works for the installation of electrical equipment are not made or made incorrect the same shall be rectified by the Contractor at his own cost and to the satisfaction of the Engineer. The Contractor shall provide foundation bolts and grout them in cement concrete floor using non-shrinkable material with the approval of Engineer.

All installation material for physically erecting the switchboard, such as bolts, nuts, washers, supporting steel, etc., shall be provided and installed by the Contractor. The Switchboard shall be installed upright and in level and shall be firmly and rigidly bolted to the floor and concrete supports.

The switchboard shall be completely erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking provided by the manufacturer for safe transportation shall be released only after the switchboard is erected in position.

The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armor shall be connected effectively to ground.

The Switchboard enclosure shall be connected to earth terminal. The Switchboard shall be tested before energizing in the presence of the Engineer.

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**SECTION - C**  
**LOW VOLTAGE CABLES AND WIRES**

**1. SCOPE OF WORK**

The work under this scope consists of supply installation, testing, connecting and commissioning of all material and services of low voltage cables and wires and the accessories as specified herein or shown on the Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with project Engineer and coordinate at site with other trades for exact route, location and positions of electrical cables and equipments etc.

**2. GENERAL**

All multi-core and single core wires for light circuits, socket outlets and circuits operating up to 250 volts shall be 300 / 500 volts grade. All single core sheathed cables shall be of 450 / 750 volt grade. Power cables for main feeders, main to sub-main feeders, power equipment, etc., armored or unarmored shall be of 600 / 1000 volts grade. Armoring of cables shall be done with appropriate size galvanized steel wire as per codes.

The conductors shall be stranded or solid, high conductivity, soft annealed copper. Conductor of single core cables shall be circular, whereas of multi-core cables may be circular or shaped according to standard practices and codes. The PVC insulation shall be extruded with a PVC compound having good flexibility, resistance to aging and ability to withstand the ambient temperatures. Cable should be capable of running 125% of full load current without any damage.

**3. STANDARDS**

All Cables & Wires shall be manufactured to confirm the following standards as given below:

BS 6004 / 6346	PVC insulated cables for lighting and power.
BS 6746	PVC insulation for electrical cables.
BS 6360	Copper conductors
BS 6500	Insulated flexible cords.

**4. MATERIAL**

#### **4.1 General**

The power, lighting and control cables shall be furnished and installed in accordance with the routes and requirements shown on the drawings. The single core cables shall be delivered as complete coils with wrapping & seal intact.

All cables shall have phase identification colors on insulation of each core. The color code for three phase circuits shall be red, yellow and blue for phases, and green for earthing.

Single phase circuits shall have insulation of red color for phase / line, black color for neutral and green color for earth conductor.

All DC circuits shall have insulation of red color for positive, black color for negative and green for earth conductor.

The ends of each length of multi-core armored or unarmored cables shall be properly marked for clock-wise and anti clock-wise sequence of core colors.

#### **4.2 Cables for Conduit Wiring**

All cables / wiring in concealed or surface mounted PVC or MS conduits shall be single core PVC insulated of specified grade and size, unless specifically shown on the drawings or given in BOQ.

#### **4.3 Cables on Surface / Concrete Trenches**

Cables for distribution system to be installed on surface, in cable ducts, in concrete trenches or on trays shall be single or multi-core PVC insulated and PVC sheathed of specified voltage grade and size, unless specifically shown on the drawings or given in BOQ.

#### **4.4 Underground Installation**

Cables for laying directly underground shall be PVC insulated, PVC sheathed and armored with galvanized steel wire. Cables fully installed in underground ducts / pipes and mechanically protected from end to end shall be PVC insulated and PVC sheathed unless specifically shown on the drawings or given in BOQ.

#### **4.5 Cable Accessories**

All cable accessories such as lugs, ties, tapes, glands, flexible pipes, connectors, ducts, clips, tags, bushes, etc shall be provided for the complete cabling and wiring system without any additional cost.

### **5. INSTALLATION**

## **5.1 General**

When the laying is effectuated by others, the contractor shall test the cable characteristics insulation and continuity, at all phases of these and communicate them in a report to the Engineer, as per recommendations of the standards according to which the cable is manufactured.

The cables shall be spaced by categories along their entire length as well as upon penetration into buildings and in their interiors, according to their following rated voltages:

- 30 cm at least between a cable carrying I KV - 30KV and other cables.
- 20 cm at least between a cable carrying voltages between 50V - 500V, and any power or control 10 cm at least between a cable carrying voltages lower than 50V and telephone or these possible being grouped.

All installation material, labor, tools and accessories for cable installation shall be furnished by the Contractor. The cable and accessories shall be installed as described in accordance with these specifications, drawings and manufacturer's instructions.

The wiring must be strict in accordance with layouts, details, schematic diagrams given in the drawings.

The light circuit and power circuits shall be run in separate pipe. The circuits/sub-circuits shall be provided identifications by numbers permanently attached. The wiring shall be done to maintain color coding.

## **5.2 Conduit Wiring**

The wiring in conduit shall be started only after the conduit system is completely installed and all outlet boxes, junction boxes, etc., are fixed in position. The filling rate inside the conduits shall not exceed 50 %. Cables directly embedded in the masonry are not accepted.

The wires shall be pulled in conduit with care to prevent damaging the wires, preferably without the use of any lubricant like soap, oil or grease. Where necessary and if approved by the Engineer, the cable manufacturer's recommended lubricant may be used. Where several wires are to be installed in the same conduit, they shall be pulled together along with the earth conductor. All wires of same circuit shall be run in one conduit.

The wires shall not be bent to a radius less than 10 times the overall diameter of the wire, or more if otherwise recommended by the manufacturer.

The wiring shall be continuous between terminations and looping-in system shall be followed throughout. Any joint in wires shall not be allowed. The use of connectors shall only be allowed at locations where looping-in is rendered difficult. The consent of the Engineer shall be required for using connectors. The connector shall be of suitable rating having porcelain body with sunk-in screw terminals. The connector shall be wrapped with PVC insulation tape after its installation. A minimum of 150 mm extra length of cable / wire shall be provided at each termination to facilitate repairs in future.

The size & quantity of cables contain in one pipe shall not be excess in accordance with IEE regulations.

### **5.3 Cables on Surface / Trenches**

All cables for installation on surface of wall, column, ceiling, trenches, etc., shall be fixed to the surface by means of galvanized steel clips, secured to a steel channel using suitable stud plate, nuts and washers.

The erection of cables and position of support shall be agreed by the Engineer on site, having taken into consideration the accessibility of all such routes. These shall be so arranged that cable crossing one another be minimized if cannot be avoided.

Cables shall be fixed throughout their length by means of approved saddles, clips, etc., at every 600 mm vertically and 900 mm horizontally.

Cables and equipment fixed to a building fabric, i.e., brickwork, concrete, etc., shall be fixed by means of appropriate fixing devices, i.e., Raw bolts, Hilti fixing devices, etc. Contractor shall be responsible for all drilling of steel work, brick work and masonry where necessary for fixing clamps and brackets for supports.

Cables shall not be pulled into conduit until the conduit system has been completed, cleared and free from obstruction and sharp edges cables shall be put into conduits in such a manner that there will be no cuts or abrasions in the cable insulation, protective braid and jackets. There shall be no link in the conductors.

Distance of saddles shall be used for installation of cables in defined condition of the surface of wall etc.

Grease or other injurious lubricants shall not be used in pulling cables. The use of talc or non injurious lubricants is permissible, if desirable.

The number of wires installed in any conduit shall be such that the resulting space factor does not exceed 50 %. Spliced wires shall not be pulled through conduits.

All conduit wiring shall be carried out in the loop - in principle from outlet box to outlet

box and in no circumstances shall joints be used except in fixed base connection blocks housed in outlet boxes.

The vertical clearance between two adjacent cables at any point is 50 mm minimum. Common mounting, channels are to be furnished for cable along the same route. The Contractor can offer alternate cable fixing arrangement, which shall be approved by the Engineer before commencement of installation.

The wall crossings where the outdoor cables penetrate in the building shall be carefully obstructed by means of polyurethane foam. The Contractor shall be fully responsible for the perfect tightness of these cable penetrations.

#### **5.4 Underground Cables**

The Contractor shall plan and take special care to prevent any damage to existing underground facilities such as piping, cables, foundations, etc. The Contractor shall notify the Engineer of any obstruction encountered and shall provide protective support or removal of such obstructions as instructed by the Engineer. Excavation adjacent to existing facilities, such as foundations manholes, ducts, underground pipelines and paving shall be braced and / or shored properly to protect those facilities during excavation and construction.

Sufficient slack shall be left in cables for this purpose that cut lengths of cables shall allow about 3% more in the measured lengths between terminations.

Cables, whether installed underground or in concrete trenches, shall not be bent to a radius less than 10 times the diameter of the cable or as recommended by the cable manufacturer, whichever is higher.

All cables shall be marked at least at each end, switch gear and equipment termination, where cable enter or leave underground cable trenches or channels, where cable rises from one level to another, at 30M intervals with predetermined identification numbers, by means of proprietary non-deteriorating type, PVC, heat shrinkable, strap-on type or equivalent, for the identification of cable and circuit. These shall be indelibly marked with cable number and securely fixed to the cable. Where conductors are left to be terminated by another party or left to be connected later, they shall be identified. The earth continuity conductor shall be laid in the trench with the cables.

Cables entering the buildings shall also be laid in protective pipes. The protective pipe ends, after installation of cables, shall be plugged water tight by means of polyurethane foam / bituminized Hessian or equivalent method as approved by the Engineer.

#### **5.5 Cable Termination and Joints**

Cables shall be terminated in a safe, neat and approved manner at the associated equipment, included that erected by others.

Compression type connectors (lugs) shall be of the correct size and approved type for the conductors concerned. Compression tools shall be supplied for specific use and shall be maintained in good order. After compression the conductor and terminal shall form a solid mass ensuring good conducting properties and mechanical strength. The compression jointing system used throughout the installation must be approved by the Engineer.

The Contractor shall be responsible for all drilling and if necessary, tapping entries where these have not been provided by others.

When preparing cables prior to fitting glands, the gland manufacturer's instructions for cable preparation shall be observed. In all cases where armored cables are used, care shall be taken to ensure that the lay of the armor is maintained after the gland is completely fitted.

Termination and joints shall be suitably insulated for the voltage of the circuits in which they are used.

Every compression joint shall be of a type, which has been the subject of a test certificate as described in BS 4579.

Cable ends, which are not terminated immediately after cutting, shall be sealed effectively to prevent ingress of moisture and shall be protected from damage until termination.

For all cables above 6 sq. mm in section, if a substantial mechanical clamp is not provided a compression type lug or socket shall be provided. At all equipment, cable shall be installed and terminated so that no strain is imposed on the cable or gland and due allowance made to counter the effect of vibration. At all termination an ample length of 'tail' shall be left.

Where joints in cable conductors and bare conductors are required, they shall be mechanically and electrically sound and they shall be accessible for inspection. Joints in non-flexible cables shall be made either by soldering or by means of mechanical clamps or compression type socket, which shall securely retain all the wires of the conductors.

Any joint in flexible cable shall be affected by means of cable coupler. Cable couplers and connectors shall be mechanically and electrically sound and shrouded in metal, which can be earthed. Where the apparatus to be connected require earthing every cable coupler shall have adequate provision for maintaining earth continuity.

The insulation of cables must be brought into DB's switch boards or fixtures to which the cables are connected. All openings shall be sealed properly. The outdoor apparatus shall normally be connected by means of cables with conduit termination down to about 30 cm below ground level or concrete foundation. The conduit shall be firmly secured down to their penetration into the trench or channel.

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## **SECTION - D CONDUITS AND PIPES**

### **1. SCOPE OF WORK**

The job includes supply and installation of all Conduits, Pipes and Accessories as specified herein and / or shown on the Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with others for exact route, location and positions of electrical conduits.

### **2. GENERAL**

The extent of works shown on the drawing does not indicate the exact position of conduit and pipes. The Contractor shall ensure exact location and route of conduit and pipes in coordination with other services drawings, as per site requirements and as directed by the Engineer.

The quality and material for the accessories of conduits and pipes such as sockets, elbows, bushes, bends, inspection / pull boxes, round boxes, etc., necessary for the completion shall be similar to that of conduit or pipes.

### **3. STANDARDS**

The conduits, pipes and accessories shall confirm the following standards:

BS 31	MS Conduit and accessories
BS 1378	Galvanized Iron Pipes and accessories.
BS 3595	PVC Pipes and accessories.
BS 4607	PVC Conduits and accessories.

### **4. MATERIAL**

#### **4.1 PVC Conduits, Pipes and Accessories**

The PVC conduits and accessories for lighting and power circuits shall be standard manufactured length of high tensile strength and sufficiently flexible to provide resistance against breakage. It should not dent or flatten under pressure and it should be chemical resistant to chemical action of the atmosphere. The conduit shall be self extinguishing and should not support combustion.

The PVC conduit withstand against concrete additives, electrolysis, corrosive atmosphere, soils, salts or excessive humidity and should be non-magnetic to reduce

voltage drop and minimize power loss. The conduit should be non-conductive & non-sparking.

The PVC bends shall have enlarged ends to receive conduit without any reduction in the internal diameter at joint. Manufactured smooth bends shall be used where conduit changes direction.

The round PVC junction boxes for ceiling light or fan points shall have minimum dimensions of 64 mm diameter and 64 mm depth. The junction boxes for wall light points shall have minimum dimensions of 57 mm diameter and 40 mm depth. Round junction boxes shall be provided with one piece Bakelite cover plate fixed to the box by means of galvanized screws.

The PVC pipe shall be rigid and shall be minimum **d** class, unless otherwise stated on Drawings or Bill of Quantities. For jointing of pipe, all precautions and procedures recommended by manufacturer shall be followed.

#### **1.2 PE Conduit & Accessories**

The PE conduits & accessories shall be corrosion resistant, non-toxic, light weight, impact strength, weld ability and abrasion resistance. It should be manufactured as per ISO 4427 and other international standards.

#### **4.3 MS Conduit and Accessories**

All conduits shall be of 16 SWG steel, manufactured and tested in accordance with latest relevant standards.

The conduit shall be protected by two base coats of red oxide (antirust paint) and finished in first quality black enamel paint. The coating shall be of heavy enamel, which shall not flake or crack during installation and handling. Each conduit length shall be furnished with threaded ends and a threaded coupling at one end. Soft metal bushes shall be provided at conduit termination to prevent damage to cable during pulling operation.

Junction boxes shall be 100 mm square, having minimum depths of 38 mm or 65 mm as required for accommodating the number of wires. The junction box shall be 16 SWG sheet steel provided with anti-corrosion paint and finished in heavy black enamel paint. The cast Iron outlet boxes for light points shall be round having 50 mm diameter and 63 mm depth. The above dimensions are given as minimum only, and the exact size shall be determined by the Contractor keeping in view the ease of Installation and maintenance. All outlet boxes and junction boxes shall be provided with one piece Bakelite cover plate of suitable design.

#### **4.4 Galvanized Iron Pipes and Accessories**

The G.I. pipes shall be galvanized from inside and outside by hot dip galvanizing

method. The pipes shall be free from stains, burrs or any other defect. The accessories for G.I. pipes shall be galvanized from inside and outside. The conduit shall be NPT threaded, with at least 5 complete threads and assembled with TEFLON tape.

**4.5 Inspection Boxes / Pull Boxes**

The rectangular inspection boxes or pull boxes shall be of 16 SWG heavy gauge, sheet steel having nipples welded to box at entry holes to receive PVC conduit with force fit. The box shall be painted inside and outside with black enamel paint over a base coat of red oxide primer paint. The minimum length of inspection box shall not be less than six times the cable manufacturer's recommended bending radius of the cable. All concealed type pull boxes shall have ebonite sheet of appropriate size fixed to the box by means of galvanized screws.

**4.6 Pull Boxes**

Pull boxes shall be made of 16 SWG sheet steel box, painted and finished to the same quality as the light Distribution Board. The boxes shall be 50 mm in depth for conduits up to 25 mm diameter, 63 mm in depth for conduits up to 40 mm diameter and 87 mm in depth for conduits up to 50 mm in diameter. For conduits more than 50 mm in diameter, the minimum depth shall be two times the diameter.

**4.7 Conduit / Pipe Accessories**

Bushes, plugs, glands, etc., shall be of brass and all male bushes shall be of long thread pattern. Covers for boxes shall be screw fixed and finished as the boxes. Gaskets shall be fitted only when finish is galvanized unless otherwise specified.

**5. INSTALLATION**

The contractor shall provide all conduits & accessories for the installation as required. The drawings shows the approximate & terminal points of conduits. However if for any reason the contractor desire to use any alternative route, he may do so at his own responsibility without interference with other installations and get the prior written permission from Engineer.

Conduits shall be run atleast 150mm from flues, steam or water pipes. Where multiple conduits runs, these shall be arranged symmetrically to present a uniform and neat arrangement. The minimum size of conduit shall be 20mm diameter unless notified otherwise. Conduits are installed to confirm the location of conduit to avoid obstructions, furnaces, hot lines & other places of high temperature.

**5.1 PVC Conduits - Concealed**

The conduit shall be installed concealed in roof, wall, column, etc.

At all joints and bends, PVC jointing solution of approved make must be used to

strengthen and to seal the joint.

Manufactured smooth bends shall be used. Bending of conduits by heating or otherwise will be allowed in special situations only, for which the consent of the Engineer shall be required. The use of 90 degree bends and tees will not be allowed.

The conduit shall have a minimum of 38 mm cover of concrete. The conduit shall be laid above the steel of the slab and shall be firmly secured by tying to steel. Under any circumstances RCC structures chiseling not to be made.

All outlet boxes to be firmly supported and installed such that they finish flush with the soffit of slab or beam.

Where conduits have to be concealed in cement concrete work or in block masonry, the chiseling shall be made with appropriate tools and shall not be made deeper than required. The conduit shall than be fixed firmly in the recess and covered with cement concrete mixture to have to at least 25 mm cover before plastering. The work of curing in the cement concrete work or block masonry work shall be coordinated with the civil work. The Contractor shall obtain approval from Engineer for the route, to suit the site conditions before starting chiseling and cutting.

The termination of conduits at or near the Switchboard / Distribution Board is shown diagrammatically on the drawing. The exact locations of the termination shall be confirmed with the Switchboard / Distribution Board to be installed. Conduit ends pointing upwards or downwards shall be properly plugged in order to prevent the entry of foreign materials. All openings through which concrete may leak shall be carefully plugged and boxes shall be suitably protected against filling with concrete. At all termination of concrete, soft bushes shall be fixed to prevent sharp edges of conduit ends from cutting or damaging the wires or cables to be pulled through them.

The entire conduit system shall be installed and tested before plastering. Any obstruction found shall be cleared by use of cutting mandrel or other approved device and the conduit shall be cleaned out. Water that has entered in conduit shall be removed by drawing swabs through the conduit. No cable shall be pulled until the water has thoroughly dried out.

Pull boxes / Adaptable boxes shall be provided in conduit runs wherever required to facilitate pulling operation. The drawings are diagrammatic and do not indicate the position and spacing of pull boxes or adaptable boxes. However, these shall meet the following requirements:

- Pull boxes.  
For straight runs the spacing shall not be more than 30 meters.

For runs with one 90 degree bend, the spacing shall not be more than 15 meters.

- Adaptable boxes.  
For conduits up to 25 mm diameter, the boxes shall be 50 mm in depth.  
For conduits up to 40 mm diameter, the boxes shall be 63 mm in depth.  
For conduits up to 50 mm diameter, the boxes shall be 87 mm in depth.

Wherever the conduit lengths cross the expansion joint either along the column or slab, suitable arrangement shall be provided so that when the conduit lengths in the expansion joint are stressed, the conduit neither develops any cracks nor breaks down.

Bending, offsetting and similar operations shall be performed through the help of proper bending tool to give a perfect bend of required angle without Desha ping of conduit to the least.

## **5.2 Conduits on surface**

- a. The conduits accessories shall be firmly held with the surface of walls by means of PVC saddles, clamps, brackets etc. Rawal plugs or Phil plugs must be used for fixing such saddles etc. The saddles shall be fixed at an interval of 750mm, depending upon the size & weight of conduit. The MS clamps, brackets etc shall be painted anti-corrosion paint before and after fixing.
- b. In all areas where the conduit is exposed to damp or wet conditions, brass or stainless steel screws must be used for fixing.

## **SECTION - E WIRING ACCESSORIES**

### **1. SCOPE OF WORK**

The job consists of supply, installation and commissioning of switches, switch sockets, etc., and miscellaneous items as specified herein and / or shown on the Drawings and given in the Bill of Quantities.

### **2. GENERAL**

The locations of the wiring accessories such as sockets, switches etc. are tentatively shown on the drawings. The Contractor shall ensure exact positions and locations of wiring accessories in coordination with other services drawings, as per site requirements and as directed by the Engineer. The Contractor shall be responsible for proper functioning of wiring accessories after installation and Commissioning.

### **3. STANDARDS**

All wiring accessories shall confirm to the following international standards:

- BS 67 Ceiling roses.
- BS 1363:1984 13A fused plugs and un-switched socket outlets
- BS 116 Two and three terminal ceiling roses.
- BS 2135 Capacitors for radio interference suppression
- BS 3676 Switch for domestic and similar purposes.
- BS 4934 Safety requirements for electric fans and regulators.
- BS 5060 Performance of circulating fans and their regulators.

### **4. MATERIAL**

#### **4.1 Switches**

Switches for controlling light and fan points shall be single pole, rated for 10 Amp, 250 VAC. The body of switches shall be made of poly carbonate / urea with white face plate suitable for flush mounting on sheet steel outlet box. The switches shall be gang type having silver tipped contacts and operate with snap action.

The fixing of plates on outlet boxes shall be means of flat head counter sunk galvanized screws with the head of the screw finish flush with the surface of the plate. Except for switches controlling light points, all single switches for fans, sockets, etc., shall have

identification symbols on the operating levers.

Two way switches shall be used to control lights from two different locations as shown on the drawings.

#### **4.2 Switch Socket Outlets**

Switch socket units shall be conformed to BS 1363. 2 and 3 Pin rated for 13 Amps. or 2 Pin rated for 13 Amps, 250V.

3 Pin 13 Amps. /15 Amps switch sockets shall be mould type having white plastic face plate, suitable for mounting on a sheet steel box of appropriate dimensions. Switch sockets shall have shrouded live contacts such that the earth pin is engaged to socket earth before making with the live contacts. Where specified, the switch socket unit shall have spring loaded dust tight cover for mechanical protection.

#### **4.3 Sheet Steel Boxes**

The outlet boxes for installation of switches, fan dimmers and socket outlets shall be 16 SWG sheet steel having appropriate dimensions. The boxes shall have suitable knockouts or welded nipples for receiving the conduits. An earth terminal shall be provided for connecting at least three earth wires of 4 sq. mm. The outlet boxes shall be given two coats of anti-corrosion red oxide and one coat of enamel before installation. The boxes shall be suitable for mounting flush with the surface of wall or on the surface of wall as may be required. The boxes shall not be less than 75 mm x 75 mm (3" x 3"). All boxes shall be water tight where installed in the vicinity of liquids.

#### **4.4 Ceiling Rose**

The ceiling rose shall be suitable for 5 Amps. 250V AC. It shall have white plastic molded base plate, copper or brass terminals for connecting at least two wires of 2.5 sq. mm size. The ceiling rose shall have a cover with cable inlet hole for multi-core PVC insulated and PVC sheathed cable.

#### **4.5 Fans**

The fans shall comply with BS 380 as far as constructional requirements, range of fan speed, speed regulator starting, radio interference silent operation and temperature rise is concerned. For testing BS 848 as amended 1 960 shall be complied with.

##### **4.5.1 Ceiling Fans**

The ceiling fans shall be three blades capacitor type, mounted with ceiling by means of pre-installed fan hook. The fan shall be suitable for operation on 250V AC with  $\pm 10\%$  tolerance.

The sweep of the fan shall be as given in BOQ drawings. Fans shall be supplied complete with fan coil unit, capacitor, suitable fan rod, canopy etc.

#### **4.5.2 Bracket Type**

The bracket type fans shall be suitable for mounting on the wall and suitable for operation semi-horizontally. These shall operate satisfactorily on 250 volts, single phase, 50 Hz, A.C. supply with + 10 % tolerance.

The sweep of the fan shall be as given in BOQ/drawings.

#### **4.5.3 Exhaust Fan**

The exhaust fans shall be three blade types, mounted on the steel/plastic structure of its own, which will be fixed to the structure by means of suitable grouted foundation bolts. The fan shall be suitable for operation on 250 VAC with + 10 % tolerance.

The sweep of the fan shall be as given in Bill of Quantities/drawings. Fans shall be direct driven and supplied complete with electric motor, back draft dampers and anti-vermin screen. The bearings shall be ball, roller or sleeve type of permanently lubricated and sealed type. Wheels shall be heavily and rigidly constructed and accurately balanced both statically and dynamically and free from objectionable vibration or noises.

#### **4.5.4 Cassette Type Fan**

Supply, installation, testing, and commissioning of locally made 2×2 ft ceiling cassette fan units, including mounting with anti-vibration supports, electrical connections, duct integration (if applicable), and proper earthing. Units to be level, securely fixed, tested for airflow, noise, and vibration, with removable filters installed. All works to comply with manufacturer guidelines, local codes, and project specifications. Includes 2-year replacement warranty.

## **SECTION - F LIGHT FIXTURES**

### **1. SCOPE OF WORK**

The job consists of supply, installation and commissioning of all light fixtures as specified herein and / or shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact location/positions of light fixtures.

### **2. GENERAL**

The Contractor shall submit samples of each and every light fixture specified and obtain approval of the Owner/Engineer before purchasing. The quality and finishes of local make light fixtures (if mentioned in BOQ) shall be same as that of standard manufacturer.

All fixtures shall be finished in standard color schemes as mentioned in the manufacturer's catalogue for respective fixtures, unless specifically stated in the Specifications, Drawings or Bill of Quantities or directed by the Engineer.

### **3. STANDARDS**

The light fixtures shall confirm the following standards:

LED light fittings shall comply with the latest applicable standards such as IEC 60598, IEC 62031, EN 62471 / EN 55015, and local electrical codes. Drivers shall be constant-current, high PF ( $\geq 0.9$ ), THD  $< 20\%$ , and lamps shall be suitable for 220–240V, 50Hz supply.

### **4. MATERIAL**

#### **1. 12 W Round Recessed LED Downlight**

##### **Electrical Specifications**

- Rated Power: 12 W
- Input Voltage: 220–240V AC, 50/60 Hz
- Power Factor:  $\geq 0.9$
- Driver Type: Constant current, external

### Photometric Specifications

- Luminous Flux: 1000–1200 lm
- Color Temperature (CCT): 3000K / 4000K / 6500K
- CRI:  $\geq 80$
- Beam Angle: 90°

### Mechanical Specifications

- Mounting Type: Recessed ceiling
- Housing: Die-cast aluminum
- Diffuser: Opal polycarbonate
- IP Rating: IP20
- Finish: White powder-coated

### Compliance

- Conforms to IEC 60598

### Installation

- Cut ceiling as per specified cut-out dimension
- Connect driver to mains supply
- Fix luminaire using spring clips

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### 2. 18 W Round Recessed LED Downlight

(Same structure as above with updated ratings)

- Rated Power: 18 W
- Luminous Flux: 1500–1800 lm
- Other specifications: Same as 12 W model
- Installation: Recessed with spring clip mounting

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### 3. 24 W Round Recessed LED Downlight

- Rated Power: 24 W
- Luminous Flux: 2000–2400 lm
- Other parameters: Same as above
- Installation: Recessed ceiling mounting

#### 4. 18 W Wall Mounted Decorative LED Light

##### Electrical

- Power: 18 W
- Input: 220–240V AC

##### Photometric

- Luminous Flux: 1400–1600 lm
- CCT: 3000K / 4000K
- CRI:  $\geq 80$

##### Mechanical

- Mounting: Surface wall mounted
- Body: Decorative metal/aluminum
- IP Rating: IP20

**Compliance:** IEC 60598

##### Installation:

- Fix mounting plate to wall
  - Connect wiring
  - Secure fixture to base plate
- 

#### 5. 18 W 2ft LED Batten Light

##### Electrical

- Power: 18 W
- Voltage: 220–240V AC

##### Photometric

- Luminous Flux: 1600–1800 lm
- CCT: 4000K / 6500K
- CRI:  $\geq 80$

##### Mechanical

- Length: 2 ft
- Mounting: Surface (ceiling/wall)

- Body: Aluminum + Polycarbonate
- IP Rating: IP20

**Compliance:** IEC 60598

**Installation:**

- Surface mounting using clips/screws
  - Direct AC wiring connection
- 

## **6. High Density LED Strip Light**

### **Electrical**

- Input Voltage: 12V / 24V DC
- Driver: External constant voltage

### **Photometric**

- LED Density:  $\geq 120$  LEDs/m
- CCT: 3000K / 4000K / 6500K
- CRI:  $\geq 80$

### **Mechanical**

- Type: Flexible strip
- IP Rating: IP20 / IP44
- PCB: High-quality flexible copper board

**Compliance:** IEC 60598 / IEC 62031

### **Installation:**

- Surface adhesive mounting
  - Install with aluminum profile (recommended)
  - Connect to compatible LED driver
- 

## **7. 24 W LED Tube Light**

### **Electrical**

- Power: 24 W
- Input Voltage: 220–240V AC

**Photometric**

- Luminous Flux: 2400–2600 lm
- CCT: 4000K / 6500K
- CRI:  $\geq 80$

**Mechanical**

- Length: 4 ft (typical)
- Body: Aluminum housing with PC diffuser
- Mounting: Surface

**Compliance:** IEC 60598

**Installation:**

- Install mounting brackets
- Direct wiring to AC supply
- Clip tube into holder

---

**8. 6 W LED Pictorial Light**

**Electrical**

- Power: 6 W
- Input: 220–240V AC

**Photometric**

- Luminous Flux: 600–700 lm
- CCT: 3000K / 4000K

**Mechanical**

- Mounting: Wall/Sign
- Slim aluminum body
- IP Rating: IP20

**Compliance:** IEC 60598

**Installation:**

- Wall bracket mounting
- Connect supply wiring

- Secure luminaire
- 

### **9. 8 W LED Spot Light**

#### **Electrical**

- Power: 8 W
- Input: 220–240V AC

#### **Photometric**

- Beam Angle: 24° / 36°
- CCT: 3000K / 4000K
- CRI:  $\geq 80$

#### **Mechanical**

- Housing: Die-cast aluminum
- Mounting: Recessed / Surface (as applicable)

**Compliance:** IEC 60598

#### **Installation:**

- Recessed: Ceiling cut-out + spring clips
  - Surface: Base plate mounting
- 

### **10. 18 W Circular Hanging Pendant**

#### **Electrical**

- Power: 18 W
- Input: 220–240V AC

#### **Photometric**

- CCT: 3000K / 4000K
- CRI:  $\geq 80$

#### **Mechanical**

- Mounting: Suspended (adjustable cable)
- Body: Circular aluminum frame
- IP Rating: IP20

**Compliance:** IEC 60598

**Installation:**

- Fix ceiling canopy
  - Adjust suspension height
  - Connect driver to supply
- 

**11. 15 W Suspended LED (Chain/Rod)**

**Electrical**

- Power: 15 W
- Voltage: 220–240V AC

**Photometric**

- CCT: 3000K / 4000K
- CRI:  $\geq 80$

**Mechanical**

- Mounting: Chain or rigid rod
- Decorative metal housing

**Compliance:** IEC 60598

**Installation:**

- Install mounting plate/hook
  - Attach chain/rod
  - Connect wiring
- 

**12. 24 W 2×2 LED Panel Light**

**Electrical**

- Power: 24 W
- Input Voltage: 220–240V AC
- Driver: External, constant current

**Photometric**

- Luminous Flux: 2400–2800 lm
- CCT: 3000K / 4000K / 6500K
- CRI:  $\geq 80$

## Mechanical

- Size: 600 × 600 mm
- Frame: Aluminum
- Diffuser: PMMA/PS
- IP Rating: IP20

**Compliance:** IEC 60598

## Installation Options:

- Recessed into T-grid ceiling
- Surface-mounted using frame kit
- Suspended using wire kit

General Requirements for All LED Lights

Input Voltage: 220–240V AC, 50 Hz

Power Factor:  $\geq 0.9$

THD:  $\leq 20\%$

Operating Temp:  $-10^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$

Lifetime:  $\geq 25,000$  hours

Protection: IP rating as per location (IP20/IP44/IP65 where applicable)

Driver: Built-in high reliability LED driver

Compliance: EMC, Safety & Harmonic standards as per IEC

Finish: Powder coated / anodized

### 4.3 water proof light fixtures

The underwater lights shall be suitable for 24V, 80Hz Dc. The DC supply shall be available from a step down transformer. The fixture shall be completely water tight and shall have scaled reflector flat lamps.

### 4.4 flood light fixtures

The flood light fixtures shall have cast aluminum body, angle adjustable stand, polished mirror reflector and clear front glass. The flood light fittings for outdoor use shall be weather proof type having rubber gas-kit ring to fit of the front glass.

## 5. INSTALLATION

### 5.1 General

The mounting heights of light fixtures are indicated on the drawings, and position of fixtures according to the mentioned scale.

The Contractor must ensure that the light fixtures are installed uniformly with respect to the dimensions of the area. Any modifications due to site conditions may be made with

the approval of Engineer. All fixtures shall be carefully aligned before fixing in position. All fixing accessories such as ceiling rose, flexible cord, lamp holder, suspension rod; pipe or chain with suitable canopy, etc., shall be provided and installed.

The wiring between ceiling rose or terminal box of the fixture shall be carried out with 3 core 0.75 sq. mm, PVC / PVC cable. The wiring inside light fixture body shall be done with heat resistant cables or PVC insulated cable in heat resistant sleeves as approved by the Engineer.

Glasses, shades, reflectors, diffuses, etc., must be in a clear condition after installation.

All light fixtures shall be earthed by an earth wire connected to the earth terminal in the fitting.

## **5.2 Fluorescent Light Fixtures**

The fluorescent light fixtures on the surface of ceiling shall be installed with the back of the body flush with the ceiling surface, and in a manner so as to facilitate wiring. Nylon plugs and galvanized steel bolts or screws shall be used for fixing the light fixture to the ceiling. The recessed type shall be light fixtures installed on false ceiling, the installation method detail shall be coordinated with ceiling design and submitted for approval of Engineer. The installation shall include cutting and making of holes in false ceiling. Care shall be taken to prevent the weight of the fixture from being transferred to the false ceiling.

Pendent light fixtures shall have two holes in the top of each casing by a 1/4" diameter galvanized pipe or any other standard method as approved by the Engineer. Wiring from ceiling rose to the fixture shall be installed through the pipe. Proper arrangements such as long threads with check nuts, etc. for minor adjustment in the mounting heights of the fixtures shall also be provided.

## **5.3 Incandescent Light Fixtures**

The incandescent light fixture shall be installed on the surface of ceiling or wall by means of nylon plugs and galvanized steel screws, such that their back finish flush with the surface for exposed conduits and flush with outlet box for concealed conduit system. Wherever convenient, screws for fixing light fixtures shall be screwed into the holes of the outlet box. The light on false ceiling shall be installed in a manner as described for fluorescent light fixture.

## **5.4 Outdoor Lighting**

For illumination around buildings during dark hours, light fittings in various arrangements shall be provided in accordance with these specifications. The items not shown on drawings or called for, but which are necessary for a complete working system as required, these shall also be provided and deemed to have been considered as

such.

In case, the specified materials and equipment are not used, the Contractor shall then essentially use the standard products of a manufacturer, regularly engaged in the manufacturer of the product and shall meet the requirement of the specifications.

### **5.5 Emergency lights:**

- The emergency light fixtures shall be IP 65 polycarbonate construction suitable for interior/exterior applications. The florescent lamps shall be 2x8Watt, T-5, and batteries shall be self contained version – sealed nickel cadmium.
- The fixtures shall be suitable for ceiling/wall mount.
- The duration for emergency lights shall be 3 hours, maintained and non-maintained operation.

## **SECTION - G EARTHING SYSTEM**

### **1. SCOPE OF WORK**

The job consists of supply, installation and commissioning of all material and services of the complete earthing system as specified herein and / or shown on the Drawings and given in the Bill of Quantities.

### **2. GENERAL**

All exposed conductive non-current carrying parts of switchgear, boxes, trays, fixtures etc should be efficiently earthed. It should be separate with the earthing of transformer or generator.

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

### **3. STANDARDS**

Following standards should be applicable:

BS 951	Earthing Clamps
BS 1433	Hard drawn bare copper conductor for earthing.
BS 2874	Nuts, Bolts, Washers and Rivets for use on copper.
BS 6346	PVC Insulated Cables.
CP 1013	Earthing

Any other standard referred to in above standards or these specifications.

#### **4. MATERIAL**

##### **4.1 Earth Rod Electrodes**

Drive extensible rods of the same diameter into the ground, either manually or by power driven hammer, to a suitable depth to obtain low resistivity in the particular soil. Weld earth connectors to the top of the rods, in sufficient number to take all incoming cables.

##### **4.2 Earthing Lead**

The earthing lead shall connect the earth electrode to earth connecting point or equipment in the building. It shall be round hard drawn bare electrolytic copper of size shown on the drawings.

##### **4.3 Earth Continuity Conductor**

Earth continuity conductor (E.C.C) shall be hard drawn bare copper wire or single core PVC insulated copper conductor cable of sizes indicated on the drawings. All thimbles, lugs, sockets, nuts, washers and other accessories necessary for the complete installation of ECC shall be provided & installed.

The earth continuity conductor should form a continuous path from any point of installation to the earthing sets. When two earthing sets are provided for same mains, these shall be at least 6m apart. The earthing lead shall be taken up to the earthing electrodes in a 32mm of G.I. pipe irrespective of wiring system, and shall be efficiently bounded to the earth electrodes by means of sweating socket, brass nut, bolts, etc. to make a permanent and positive connection with the earthing electrodes. The other end of the earthing lead shall be sweated into a cable lug of a correct size for the wire for its connections to the main apparatus to be earthed.

#### **5. INSTALLATION**

The earthing system shall give earth resistance, including resistance of soil, earth leads and E.C.C. equal to less than one ohm, without ground pits water spraying.

The fastening of the earthing conductors shall be made on a sufficient length so as to prevent crushing or cross section weakening. The parts on which they are connected shall be conveniently cleansed and surface.

Leads sheaths or steel tape amours are not permitted as earthing conductors. The earthing system shall be installed to ensure that when any part of the earthing system is disconnected for the purpose of carrying out periodic testing an alternative path to earth is available.

At all connections of earth continuity conductor to any metallic body, proper size or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or termination shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket.

The earth continuity conductor shall be generally run in cable trench or in conduits / pipes or in cable trays as shown on the drawings. For under floor runs, these shall be installed in pipe / conduit of appropriate sizes. Where laid along underground cables, these shall be laid directly under ground in unpaved areas and in pipes under paved areas.

The electrode plate shall be installed at a minimum depth of 5 meters from finished ground level or 1 meter below permanent water level, whichever is less. The minimum horizontal distance between earth electrodes shall be 3 meters. Proper mixture of lime and charcoal in the ratio of 1:3 shall be made and buried along with the copper plate in the ground to increase the soil conductivity. The electrode shall be installed as per details shown on the drawings. The inspection chambers shall be constructed at locations approved by the Engineer.

A 50 mm diameter UPVC pipe shall be provided from inspection chamber to earth plate for watering purposes. The pipe shall have 10 mm diameter holes at 500 mm center to center all along the length. At the ground level an inspection chamber with cast iron cover shall be constructed having dimensions as shown on the drawings. The inspection chamber shall have a copper supported on angle iron frame. The cover shall be hinged type, as approved by the Engineer and shall finish flush with the ground level.

The earth connecting point shall be installed at locations shown on the drawings. It shall be fixed on wall surface by means of brass screws with nuts, washers and other insulating material as instructed by the Engineer.

The earth continuity conductor of sizes shown on the drawing shall be installed all along the cable runs and connected to the earthing bar / terminals provided in the equipment.

At any joint or termination, the E.C.C. shall be connected using proper accessories. No connection shall be made by twisting of earth conductors.

**SECTION – H  
LIGHTNING PROTECTION SYSTEM**

**1. GENERAL**

The system of lightning protection shall be installed so as to protect the building against lightning.

**2. QUALITY ASSURANCE**

Engage an experienced manufacturer who produces system components made of high quality

materials as listed herein. Engage an installer who is listed or who is certified by the Lightning Protection Institute as a Master Installer.

Life service of the materials used shall not be less than 30 years.

lightning protection and IEC 61643 11 for surge protection..

### **3. SEQUENCING AND SCHEDULING**

Coordinate installation of lightning protection with installation of other building systems and components, including supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

### **4. COMPONENTS:**

#### **a) Air Terminal**

It shall be of taper pointed copper air terminal 1000 mm long 15 mm diameter with base and installed above the finish floor level. The air terminal shall be complete with single pointer rod of high tensile brass bar; it shall be reinforced so as to withstand the excessive pressure of air during storms. Use all accessories for fixing as recommended by the manufacturer. All accessories shall be made of copper. Bare copper tape shall be of copper, minimum 25 x 3 mm size similar to Furse TC-030 or equal.

#### **b) Down Conductors**

70sqmm PVC Copper conductor in surface GI pipe connected to tape protective conductors on roof down to the test link for earthing as indicated on the drawings. Each down conductor shall be equipped with independent testing points, earth termination lead & earth. The earth termination lead shall be of copper strip as per drawing.

The whole of the earth termination network should have a combined resistance to earth not exceeding 10 Ohms without taking into account any bonding to other services.

Provide horizontal bonding tape around the building at every 10 meter as per BS Standard.

### **5. INSTALLATION**

Install lightning protection as indicated, according to manufacturer's written instructions.

Comply BS-6651.

Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends and narrow loops.

Cable Connections: Use approved exothermic-welded connections for all conductor splices and connections between conductors and other components, except those above single-ply

membrane roofing.

Bond extremities of vertical metal bodies exceeding 60 feet (18m) in length to lightning protection components.

## **6. CORROSION PROTECTION**

Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.

Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

## **7. FIELD QUALITY CONTROL**

Periodic Inspections: Provide the services of a qualified person to perform periodic inspections during or after completion of building.

**Section - I**

**Cable Tray System:**

- i. The cable trays shall be fabricated by prime quality 1.6mm MS sheet steel or GI sheet, solid or perforated and painted powder coated RAIL- 7032. Supply and install all accessories like tees, bands, elbows, risers, etc. to complete the cable tray system.
- ii. The length should be standard of 2.44 meters.
- iii. All fixing or supporting accessories shall also be provided & installed like hangers, brackets, clamps etc.
- iv. The cable trays shall be capable to support all type of wiring like high voltage, medium voltage, low voltage etc. it should be fabricated with the standards laid down by NEMA.  
For internal areas, it should be mill galvanized.

For external areas, the cable trays and accessories should be hot dip galvanized after fabrication.

After fabrication process, all trays, ladders and accessories (bands, elbows, risers etc like nut, bolts, washers, tees) shall be dipped into liquid zinc bath, the surface including all cut edges being coated with a homogenous zinc layer to provide better protection against low chemical stress, marine air, urban air & other low atmospheric influences which activate corrosion.

**SECTION – J**  
**VOICE & DATA COMMUNICATION SYSTEM**

**1. GENERAL**

The proposed cabling system for the UTP and Fiber network cabling and Fiber Links shall be an open system and application and vendor independent and shall be warranted by an International Vendor for a minimum of 20 years. The contractor Installers (labor) and engineers must be trained and certified by this vendor to design and install cabling system.

A Main Patch Panel (MPP) shall be provided at the server room of the Building. The Patch panels are located as marked in drawings. The cable run from the Patch Panel to the associated outlet is limited to 90m. The cable run must be free of bridges, taps and splices.

Wiring system used shall be star topology i.e. each data/voice outlet is connected directly to Patch Panel. Both ends of the cables shall be labeled to ISO/IEC 11801, TIA/EIA 568, and BS EN 50173 administration standards.

Transmission Media:

**For Data:**

Vertical runs between floors extending from the MDF to each Patch Panel in a star topology using fiber optic cables installed in cable trays.

Horizontal runs from a patch panel to the data outlets using CAT-6, 4 Pairs UTP twisted pair cables.

**For Voice:**

1. Vertical runs between floors extending from the MDF to each JTB using multi pair CAT 5 cables installed in cable tray.
2. Horizontal runs from a TJB to the telephone outlet using 2 Pair telephone cables.

Data & voice processing system shall be supplied installed and tested complete in place including but not in a way of limitation, cables, socket outlets, adapters, connectors, patch panels, 110 wiring blocks, patch cords, cable management, floor distributors (racks/cabinets).

The Cabling System shall be designed using standard, proven equipment and materials with the latest technology version or model. If there is any problem during warranty period related to the shortage of Materials, the Contractor shall supply them with no extra cost.

The design shall fully comply with EIA/TIA 568B & ISO 11801 in a full star topology configuration collapsing in the MDF.

The network data cabling systems support at least 1000 Base-T (Gigabit) Ethernet or faster protocol.

The UTP (unshielded twisted pair) Category 6 cable's technical specifications shall be up to the highest industry standards and should have performance specifications better than 250 MHz and should exceed all proposed requirements for data, video & Gigabit applications.

The UTP Category 6 cable's technical specifications shall be up to the TIA/EIA-568B.2-1 industry standards and should have performance specifications better than 250 MHz and ample margin compared to the Category 6 Standard for performance in factors such as NEXT.

Data & Voice cables may be drawn through the same conduits and raceways & terminated in separate face plates.

#### **4. QUALITY ASSURANCE:**

For Manufacturer:

Firms regularly engaged in manufacture of signal transmission media and accessories of types required, whose products have been in satisfactory use in similar service for not less than 5 years.

For Installer:

Firms with at least 5 years of successful installation experience with projects utilizing systems and equipment similar to that required for this project.

Coordinate with other electrical work including wires/cables, electrical boxes and fittings, and raceways, to properly interface installation of data system with other work.

Sequence installation of data system with other work to minimize possibility of damage and soiling during remainder of construction.

#### **5. COPPER & FIBRE OPTIC CABLE AND CONNECTORS**

UTP Copper & fiber optic cables shall be approved & recommended by component manufacturer. This is to enable the component manufacturer to give the necessary product and application warranties for the system.

Provide UTP copper cable, fiber optic cable and connectors, in sizes and types as recommended by the active equipment manufacturer for indicated applications. Mate and match connector

materials to factory installed equipment.

Cabling Accessories:

Provide computer accessories, including modular wall and floor jacks, junction boxes, connecting blocks and pre-wired boxes.

The selection and type of material required for the Services shall conform to the specifications given herein and items or matters not specified herein shall conform to ISO/IEC 11801, EN 50173 and EIA/TIA 568B Category 6 Standards as applicable. The Contractor shall also ensure that the materials utilized to complete the Cabling System installation are capable of supporting the minimum expected performance requirements for emerging applications such as ATM services (1.2 Gbps), including 10 GB Ethernet. The complete system shall guarantee a minimum of 250 MHz & 100 MHz bandwidth performance and the products shall be from an internationally reputable manufacturer. The selection of materials shall be subject to approval by The Company.

The cables that are used to complete the installation shall be Category 6 UTP, capable of carrying high bit rate signals for extended distances in building distribution systems over frequency ranges up to and potentially beyond 250 or 100 MHz, designed to work on an ISO 11801 Class “E” link.

The cable shall be composed of 23 or 24 AWG bare, solid-copper conductors. The insulated conductors shall be twisted into individual pairs and four such pairs twisted together.

The cables shall be fully color coded as provided hereunder, color contrast being such that each pair in the cable is easily distinguishable from every other pair.

<b>Conductor Identification</b>	<b>Colored Code</b>	<b>Abbreviation</b>
Pair 1	White – Blue Blue – (White)	WT – BL BL
Pair 2	White – Orange Orange – (White)	WT – OR OR
Pair 3	White – Green Green – (White)	WT – GN GN
Pair 4	White – Brown Brown – (White)	WT – BR BR

**6. TELEPHONE SYSTEM**

**6.1 General**

The work included under this section consists of furnishing of all labor, services and skilled supervision necessary for the construction, erection, installation and connection of all facilities specified herein and as shown on the drawings and/or normally required for the complete telephone system and its delivery to the owner on completion in all respects ready for use, except the main telephone exchange equipment (PABX) and telephone instruments which will be supplied and installed by the relevant authority in accordance with the requirements of the PTCL.

**6.2 Telephone Services**

The telephone service entrance location shall be coordinated with PTCL. For bringing in the service connection and underground UPVC pipe 75mm diameter shall be installed, a minimum 500mm below ground level and as shown on drawings. Pull wire shall be furnished and installed in the pipe line as recommended by PTCL.

**6.3 Telephone Conduit System**

The telephone conduit system, including telephone outlet boxes, rosettes, junction boxes, etc. shall be generally in conformity with the specifications of similar items given in BOQ and shall be in accordance with the recommendation of PTCL.

**6.4 Telephone Junction Boxes**

The telephone junction/terminal boxes shall be cubical design of 1.6mm sheet steel fabricated with a hinged door fixed flush with the wall and having built in concealed lock. The color of the box shall be powder coated RAIL 7032, and it shall be installed in such a manner so as to have easy access for service and repair. The TJB shall be vermin proof. It shall be made to accommodate tag blocks with indicating and marking arrangements.

**6.5 Telephone Wiring**

Wiring of telephone system will be done by multi-core PVC insulated and sheathed cables complying with BSS 2746. The conductor shall be of high conductivity tinned copper diameter 0.6mm. PVC insulated and PVC sheathed. All telephone cables shall be continuous between telephone outlets and junction boxes. All connections shall be made, marked and identified on tag blocks and socket outlets.

**7. SPECIFICATIONS OF UTP CABLES:**

Cable Type	Category 6 UTP
Conductor Size(mm)	23 or 24 AWG

Number of Pairs	4
Nominal Outer Diameter (mm)	6.0
Impedance(Ohm)	100+/-15
Velocity of propagation (% speed of light)	69
Frequency (MHz)	250
Max. Attenuation @ 250 MHz (dB)	32.1
Worst case NEXT @ 250 MHz (dB)	38.3

**8. FIBRE OPTIC & UTP CABLING**

The backbone cabling interconnecting distribution cabinets to the main Central distribution cabinet shall be of multimode fiber cable 50/125 microns; 12-core cable with color-coded fibers. All fiber optic cables shall be laid in straight run without intermediate splices and all fibers shall be terminated at either end using suitable fiber cable patch panels mounted on the wiring closets.

All fiber optic backbone links between the main cross connect and the Telecommunication rooms have a backup link using a different route from the main fiber optic link. Each of these links shall be 12-core fiber optic cable as described in this document.

The Contractor shall be responsible for the supply, installation, testing and commissioning of the complete fiber cable backbone interconnection/cross connection requirements of the “building/complex” LAN Cabling System.

The Contractor shall install suitable fiber optic pigtails/connectors needed to complete the entire fiber cable installation as per the manufacturer’s recommendation and shall ensure that the backbone is capable to handle the traffic and provide error- free universal data transport for the foreseeable future.

The backbone Fiber optic cable shall be run either vertically between floors or horizontally to connect wiring closets to the MDF.

The 12 core fiber optic cables shall be installed from the Main Cross-Connect to each Telecommunication rooms. The cable shall be tied down to the designated area at the rear side using cable ties around the outer jacket, leaving 2 to 3 meters of excess length of the cables, in addition to the length required to facilitate the termination process.

All of the fibers in the backbone shall be terminated with LC type connectors at the time of the installation. The Contractor shall ensure proper testing of the fibers and make them available whenever they are needed. No fibers shall leave un-terminated, all fibers must be terminated. A document with fiber cable test results for every fiber cable link shall be provided by the Contractor.

The Contractor shall observe the manufacturer’s specifications for maximum tension and

minimum bend radius for each fiber optic cable. The contractor shall provide a copy of the manufacturer's specifications to the owner prior to the commencement of the work.

Care must be taken when mechanical pulling devices are used, that maximum tension limits are not exceeded. Minimum bend radius specification shall not be violated when the cables are routed through walls or around corners. The contractor shall ensure that all installation personnel are aware of these limitations.

The Contractor shall follow an intelligent numbering system based upon the destination and channel number. The numbering system shall have a prefix 'F' to indicate it is a fiber optic cable, followed by the destination IDF, then a hyphen and the channel within the cable.

100 pairs UTP shall be installed between the Telephone MDF and the Voice/Data MDF. This cable shall be of category 5, 100 MHz and shall be terminated in a rack mounted patch panels installed in the telecommunication closet at the MDF.

Multi-pair, CAT 5, 100 MHz UTP cable shall be installed as backbone between the voice MDF to the IDF in each floor/location as indicated in the drawings.

Logical labeling should be as per ANSI/TIA/EIA-606. Labels should be ring and printed type. No labels should be written by hand.

**9. OPTICAL FIBRE CABLE TECHNICAL SPECIFICATION**

Fiber optic cables within the premises shall use multimode, graded-index.

Fibers must comply with EIA/TIA 492 specifications and OM3 fiber specification as in IS 11801 standard.

Fibers will have dual wavelength capability; transmitting at 850 and 1300nm ranges.

All fibers shall be color coded to facilitate individual fiber identification. The coating shall be mechanically strippable.

Core	50 μm ± 3 μm
Core Non-Circularity:	<6%
Core/Cladding Error:	<3.0 μm
Numerical Aperture:	0.200 ± 0.015

Cladding diameter:	125 $\mu\text{m} \pm 1 \mu\text{m}$
Cladding Non-Circularity:	<2.0%
Colored Fiber Diameter:	250 $\mu\text{m} \pm 15 \mu\text{m}$
Buffering Diameter:	890 $\mu\text{m} \pm 50 \mu\text{m}$
Minimum Tensile Strength:	100,000 psi
Fiber Minimum Bending Radius:	.75 in. (1.91 cm)
Cable Minimum Bending Radius:	
During Installation:	
After Installation:	20 times cable diameter 10 times cable diameter

Operating Temp. Range:	32°F to 122°F (0°C to 50°C)
Storage Temp. Range:	-40°F to 149°F (-40°C to 65°C)
Maximum Fiber Loss:	3.5 dB/km at 850 NM 1.5 dB/km at 1300 NM
Minimum Bandwidth:	1500 MHz km at 850 nm (OFL) 500 MHz km at 1300 nm (OFL) 2000 MHz km at 850 nm (DMD, laser) 500 MHz km at 1300 nm (DMD, laser)

**10. DATA & VOICE OUTLETS**

The Contractor shall provide the identification labels at each and every information outlet with clear information of its connection. (TR, cabinet number, patch panel number and port number). The labeling shall be on the faceplate of the information outlet according to EIA/TIA 606 Administration Standard.

The contractor has to provide clear identification labels for data & voice.

In the process of installing the information outlets, if the Contractor envisages difficulty in mounting the outlet at planned location in the drawings. The contractor shall notify the Engineer/Owner, the contractor shall not make his own discretion in modifying or changing any information provided in the drawings.

The type of information outlets shall be of modular RJ45 of Matt Chrome/ metallic or any other approved finish, 8 position, 8 conductor designed for high speed networking applications that use data transmission rates over frequency ranges up to and potentially beyond 250 MHz & 100MHz. The outlets shall be of insulation displacement connectors type (IDC).

The 8 position/8 conductor outlet shall meet the category 6 transmission requirements for connecting hardware specified in ISO/IEC 11801 and EIA/TIA-568A/B and Class E design guidelines.

The modular outlet shall provide maximum versatility in designing a premise distribution system. It shall be designed to snap into modular faceplate. When the outlet is inserted into the faceplate or frame, it shall lock into place and shall only be released using the dual-purpose wire insertion tool. The mounting and removal system shall allow easy installation and modification. The faceplate jacks must be shutter protected and shall include a label window required to write circuit identification number. Each port must support a color icon to identify the port function.

The plastic used to construct the modular data outlet shall be of high impact, flame-retardant, made of poly(phenylene oxide) with flammability rating meeting UL 94V-0UL, the jack wires shall be at least 50 micro-inch lubricated gold plating over 100 micro-inch nickel under plate. The connector shall be of copper alloy, at least 100 micro-inch bright solder over 100 micro-inch nickel under plate.

The insulation displacement connector shall accept 24/23 AWG solid copper wire conductors. The connector shall have multicolor labels marking wire terminals with numbers, assuring fast, accurate installation. The outlet must support wiring configuration as per T568A and T568B on the same RJ-45 jack

The connector shall be wired using the wire insertion tool (impact tool). The module shall be wired from the centre to the outside and shall not untwist paired conductors more than 12.7 mm. In the process of terminating the cables in patch panels/outlets the Contractor shall ensure ISO/IEC and TIA/EIA category 5E/6 transmission performance requirements.

## **11. PATCH CORDS**

The contractor shall supply patch cords for all the installed points on the network switch side as well on the workstation side. The cord length shall be of two different sizes, 1m on the network switches side and 3m on the workstation side.

The patch cable shall meet the requirements warranted to meet ISO/IEC 11801, EN 50173 and EIA/TIA 568A/B category 6 wiring standards capable of connecting high speed information terminal devices to information outlets, to interconnect information terminal devices and 8-position modular jack panel applications. The patch cord shall be designed to provide support for extended multimedia transmission distance over frequency ranges up to and potentially beyond 100/250MHz.

The patch cord shall support the computer networking applications over frequency ranges up to and potentially beyond 250 MHz and shall be compatible with voice and information applications.

The construction of the cord shall be of stranded type cordage tightly twisted, 24 AWG, 8

conductor. The cord shall be terminated to an 8-position RJ-45 modular plug on both ends. The cords shall support the transmission requirements warranted to meet ISO/IEC 11801 Class E, EN 50173 or TIA/EIA 568B Category 6, Class E component specifications and standards.

The Contractor supplied cord shall be of factory crimped modular plug at both ends.

Pre-wired patch cords, 110 to 8 position (RJ45), constructed of 24 gauge, stranded wire in PVC jacket shall be used to add modularity to 110 system.

## **12. PATCH CORD ORGANIZER**

The Contractor shall supply and install sufficient patch cord organizers/inter-bay patch cord organizers that are used for routing patch cords in 19-inch (48.3-cm) frames. The patch cord organizers shall support the requirements of routing patch cords both at the equipment side as well as the Category 6-patch panel cabling side at the wiring closets. These organizers shall be located in the 19-inch frame inside the wiring closet.

The Contractor supplied patch cord organizers/inter-bay patch cord organizers shall support the requirements of routing cords in both horizontal and vertical pathways.

## **13. PATCH PANELS (JACK PANELS)**

The Contractor shall supply and install the modular patch panels to meet the full cabling system requirement of the “building/complex”. Every category 6 cables serving the information outlets at work areas shall be terminated at the patch panels. The Contractor shall ensure that the supplied patch panels meet the ISO/IEC 11801, EN 50173 and TIA/EIA 568 warranted component specifications and standards.

The patch panels shall be of 19-inch rack-mounted panels. The rear of the panel shall feature connecting blocks mounted on a printed wiring board. These connecting blocks shall be capable for use in terminating category 6 station wires, equipment, or tie cables. The modular patch panel shall be capable of supporting up to 24 jack positions (ports) as required by the design drawings of the voice and data system and shall have the facility to write the circuit designation details at the front side of each jack. The contractor shall provide 20% spare capacity for both voice and data.

The insulating displacement connector field in the patch panel shall be made continuous to the 8-pin modular jack field on front of the panel through printed wiring board connections to enhance the features to confirm to EIA/TIA 568A/B cabling recommendations.

The construction of the modular jack panel shall be of category 6 – compliant and shall have

the stringent requirements of connecting hardware as specified in EIA/TIA 568A/B commercial/ residential building Cabling System standards.

When the patch panels are tested in accordance with the appropriate test methods described in EIA/TIA 568 A/B and ISO/IEC 11801, EN 50173 Category 6 specifications. The modular patch panels shall meet the worst-pair near-end cross talk (NEXT) requirements over the entire frequency ranges up to and potentially beyond 100/250 MHz on all pair combinations.

Care must be taken to ensure that the cables are terminated correctly at category 6 cross connect hardware (patch panels).

The pair twist of the cables must be maintained as close to the termination at the patch panel IDC Modular outlet as possible. Cables shall not be untwisted for more than 12.7 mm. The cable conductor's entry shall be at the center of the IDC module and the module shall be wired from the center to the outside.

The cable conductors shall be terminated as described in EIA/TIA 568A/B and ISO/IEC 11801, EN 50173 Category 6, Class E wiring sequence by using the proper insertion tool (impact tool).

When terminating the cables in the insulating displacement connector field, care must be taken to ensure that the strip – back is limited only as much cable jacket as is required to perform connecting hardware terminations. The cables shall be properly secure terminations. The cables shall be properly secured to the 19 – inch rack with cable ties as well as at the patch panels.

The IDC connectors must be color coded to meet both T568A and T568B wiring Configuration.

Each port of the patch panel must support color Icon to identify the port function.

Each port must be numbered in sequence with white printing on black background or other high contrast colors.

Each port on the patch panel must have a label place holder and for the patch panel number.

The IDC connector on the back of the patch panel shall support 22 to 25 AWG solid conductors cables.

The package must include frame mounting screws, labels, cable ties and instruction sheet.

#### **14. IDC WIRING SYSTEM**

The IDC blocks shall be used for the voice cross connect and should be 19” rack mountable type.

The IDC blocks shall be capable of terminating up to 336 pairs.

Shall be capable to terminate 22-26 AWG solid conductors or 22-26 AWG stranded conductors.

Shall be made of high-impact UL 94V-0 rated thermoplastic.

Maximum insulated conductor outside diameter 0.05"

Complete kit include connecting blocks, labels and label holders shall be used.

Jumper troughs shall be used to route cable horizontally and vertically.

## **15. CABLING CABINET (Racks)**

The Contractor shall supply and install cabling System Cabinets to house the passive and active network equipment. The cabinets shall be free/standing or wall mounting types.

The Cabling System cabinets shall meet the requirements of accommodating the high volume of cabling 19" 24-port patch panels & LAN Equipment fully assembled with the following items.(Cabinet dimension 42U 600 mm x 800 mm nominal width & depth). The cabinets must meet the following specifications:

42U 800 x 800 Ready Rack

500 KG load rating

42U 600 4mm Safety Glass Door (On the front).

42U 600 1.6 mm steel Door (On the rear).

600 x 800 side vented top cover.

Castors heavy duty braked.

42U Panel mounting angle kit.

800 X 800 thermostat controlled Low Noise Fan Tray.

A power outlet strip shall have a 2 meter flying lead, (3-wire extension cord) with a 3 prong British plug with fuse and shall have 13 amp. 250 volt 3 prong British outlets with individual on/off switch and indicator light with mounting brackets. The AC Mains distribution integral at the rear pillar of the cabinet should have at least 10 of 13 amp. Power Outlets. Cable management panel inclusive of other accessories such as earthing kits, screws, washers, grip-nuts and a removable shelf, able to resist a weight of 50 to 60 kgs. The cabinets shall be rugged and strong and all steel shall be finished scratch proof in a durable enamel Grey paint on both sides.

The cabinets must include Low Noise Thermostat controlled fans and shall automatically switch on and off according to the temperature inside the cabinets, the temperature range shall be from 10 to 60 degrees centigrade. The dimensions of the tray shall be of 600 mm x 800

mm. The fan tray shall have minimum of four fans 250 Volts AC + 6% 50 Hz. The low noise top mounted fan tray shall aid the cooling requirement of the LAN equipment installed inside the cabinets, and in the process of installing the fan tray on top of the cabinet it shall not occupy any of the usable U height in the cabinet.

The front glass door shall have at least 4 mm toughened & 50 percent light transmission smoked safety glass able to resist a weight of 80 to 100 Kgs. Placed within 200 mm of the door center. The door shall be lockable and shall have a swing handle supplied with 2 keys.

The rear door shall be the same as the front except the construction of the door shall be of rugged and strong 1.6mm steel finished in a durable enamel Grey paint on both sides, and without glass.

The internal panel mounting angles shall be supplied in pairs to provide 19" mounting positions with hole patterns to accept captive nuts on universal centers. In the design of the panel mounts the centers of each U height shall be notched, to make the positioning of cage nuts much simpler. The panel mounting shall be fitted onto panel mount angle supports to allow infinite adjustment throughout the depth of the track.

The cabinets shall be supplied at least with one shelf kit. The shelf should carry a load rating of 50 Kgs. And shall be manufactured with holes/slots providing sufficient airflow to LAN equipment when installed inside the cabinets.

Four steel castors with rubber wheels at least 40 mm high. These castors shall be mounted at the corners of the cabinet and be able to support the total weight of the cabinet and all options.

The cabinets must support the installation of fire protection units and all 19" equipment including frames for 110-punch block.

The supplied cabinets must meet the following standards:

IEC 297-2

D/N 4/494 Part 7

D/N 4/491 Part 1

Load rating 500 Kg

Rust proof coating

EN 60950

VDE 0100

Material 1.6mm steel

Paint finish according to RAL 7035

For the 25U freestanding cabinets the specifications is as follows:

The 19" 6U, 350 x 600, rack mounted type. Tempered glass front & rear door with key lock for maximum protection.

A power outlet strip shall have a 2 meter flying lead, (3-wire extension cord) with a 3 prong British plug with fuse and shall have 13 amp. 250 volt 3 prong British outlets with individual on/off switch and indicator light. The AC Mains distribution Integral at the rear pillar of the cabinet should have at least 6 of 13 amp. Power Outlets.

The cabinet shall be fitted with at least a 2 way low Noise Fan Tray and medium duty castors.

The supplied cabinets must meet the following standards:

IEC 297-2

D/N 4/494 Part 7

D/N 4/491 Part 1

Load rating 500 Kg

Rust proof coating

EN 60950

VDE 0100

Material 1.6mm steel

Paint finish according to RAL 7035

18 42 U free standing open frame

Integrated cable and cord management

allows for more efficient and effective cable management

Focused on accessibility

Extruded aluminum construction

Modular open frame design (no doors and side panels to remove)

Pre-threaded mounting holes

42U with 270 holes per vertical channel meets EIA/TIA RMU rack mounting unit dimension

Mounting screws with pilot point

Cable guides provide an effortless solution to transitioning cables

Flexible cable guides allow cable to snap-in easily for quick cable routing

Spacing of cable guides aligns exactly with the standard ISO 1101 rack

Unique switch gate Door / Cover provides easy access to the door

Edge protected pass through holes for transition of cables to rear side

## **SECTION - K**

### **ADDRESSABLE FIRE ALARM SYSTEM**

#### **1. SCOPE**

The work consists of supply, installation and commissioning of all material and services of the complete Addressable Fire Alarm system as specified herein and / or shown on the Drawings

and given in the Bill of Quantities.

## **2. STANDARDS**

Following standards/codes shall be applicable:

BS 5839

NFPA 72

Any other international standard

## **3. OPERATION**

The Fire Alarm System shall be pre-signal non-coded type complete with battery backup.

As per drawings the break glass type fire alarm stations and automatic detectors shall be installed at site. In case of any Fire, the manual station shall be operated by pulling down the handle or breaking the glass. The actuation of this station shall cause an audio as well as visual alarm at the fire alarm control and indication unit, duly indicating the location of the respective station/zone.

An authorized person shall immediately visit the affected area and if after investigating, it is deemed necessary, alarm in the whole building shall be initiated from either the alarm switch located beside the fire alarm control panel by inserting a special key or the actuation of any indication at the Main Fire Alarm Control Panel. The general alarm shall be initiated by an authorized person after inspecting the affected location.

Circuit shall be so arranged that an open circuit in an initiating or indicating loop shall cause the individual zone and common trouble indication at the fire alarm control panel.

## **4.0 MATERIAL**

### **4.1 Wiring**

Fire Alarm Cable shall be 2 core shielded twisted pair, fire resistant, PVC insulated, 250/440 volts grade cable to be laid in concealed PVC conduit.

### **4.2 Power Supply**

The supply and operating voltages shall be 220 volts, 50 c/s and 24 volts D.C. respectively. The control stations shall be provided with sufficient capacity nickel

cadmium battery with charger to operate the complete system for the least 15 hours in case of mains failure. A 20 Amp SPN switch socket shall be provided near the central fire alarm panel to feed the mains supply.

#### **4.3 Fire Alarm Control and Indication Unit**

The fire alarm control and indication unit shall be a Solid State Modular Unit consisting of the following Modules; suitable number of modules shall be used to provide facility for 6 loops. It shall not be possible to remove the key without turning the key to its normal position, thus resetting the alarm contacts.

##### **i. Loop Module**

loop Module shall have multiple of supervised initiating circuit with a trouble and an Alarm Lamp for each loop. Detection circuit wiring shall be two wire Class 'A' and shall power all Detectors (Relay outputs and) voltage output for each zone alarm and voltage output for each zone trouble shall be provided.

##### **ii. Audible Expander Modules**

Audible Expander Modules shall provide for supervised control circuit for polarized alarm signaling devices. Loop activated lamp shall be provided for each loop to aid on system testing and trouble- shooting provide (1) (2) (3) indicating circuits.

##### **iii. Power Module**

Power Module shall supply the necessary power for the loop module and all Detectors (and shall contain a Battery Charger to charge the batteries) An AC power to Lamp shall be provided to indicate the normal condition of the panel. Individual supervisory lamps shall be provided for AC power failure indication, ground fault detection, and low battery. All controls shall be behind a key locked door to prevent unauthorized operation. Two supervised control circuits for audible signaling shall be provided as part of this module. Common trouble and common alarm relay and logic outputs shall be provided. The panel cover shall be key locked to prevent unauthorized access.

#### **4.4 Manual Call Point**

It shall be re-settable (non-breaking) glass type, electronically addressed and suitable for semi finish and surface amount installation as per drawing. The break-glass manual station shall be operated by pulling down the handle. When operated, the handle shall remain down with the pre-signal alarm contacts closed until the station is reset. The general alarm contacts shall remain open until after investigation. The general alarm switch shall be operated by an authorized person with a special key.

#### **4.5 Fire Alarm Bell**

Fire alarm (bell) shall be of red color surface mounted installed where indicated on the drawings. Sound intensity shall be such that an audible signal will be heard clearly throughout the structure when all the bell ring. The bell shall be connected in multiple cross loop conductors.

**4.6 Smoke Detector**

The detector shall use the light scattering principal to measure smoke density & shall send data to FACP indicating analog level of smoke density. It should be low profile design, electronically addressed, twin LED's for 360 degree vision and removable optical chamber for cleaning & maintenance. The operating voltage shall be 24V DC and surface mounted ceiling and shall include a separate twist-lock base that includes a temper proof feature.

**4.7 Heat Detector**

It should be low profile design with fixed temperature and rate of rise heat detection type. The heat detector shall be intelligent addressable device rated for 135 degrees. Electronically addressed and twin LED's for 360 degree vision. The operating voltage shall be 24V DC and surface mounted as per drawing.

**4.8 Fire Alarm Sounder**

It shall be of red color surface mounted installed as per drawing. It should be electronically addressed and strobe provided by high intensity LED cluster. The operating voltage shall be 24V DC.

**4.9 Annunciator**

The remote visual annunciator shall have the capacity for indicating 6 distinct alarm loop and one common trouble condition. The annunciator shall be back lighted type to increase visibility and to deter tampering with the lamps. The descriptions of each zone shall be approved by the Engineer In-charge. In the normal condition the annunciator shall have a blank appearance. Alarm and trouble condition shall be annunciated both visually and audibly. Lamp shall be 24 V DC, and replacement shall be readily available. Lamp replacements shall be accomplished without tools.

A test switch shall be provided for periodic testing of all lamps in the annunciator. To reduce tampering the annunciator shall have a key operated silence switch and a key locked cover. For aesthetic reasons the unit shall be compact, have a brushed metallic trim ring and be surface mounted.

**4.10 Function of Addressable Fire Alarm Control Panel (FACP)**

**i. Design**

The FACP shall be solid state, modular design with integral static protection. All indicating lamps shall be long life, low maintenance solid state light

emitting diodes (LED). It shall have graphically LCD display, programmable from PC built-in gas extinguishing control and integrated security alarm facilities. It should be designed to receive signals emitted by manual call points & fire detectors, producing sound & light indications. It should provide options for integration of external sound units & executive devices.

**ii. Enclosure**

The FACP enclosure shall be semi flush mounted. The enclosure shall be hinged from the left and the cover shall have clear windows and locking mechanism to keep the system operating and status switches from being tampered keys shall be made available to fire department and other authorized operating personnel. Finish shall be "FIRE ALARM RED" and "BLACK".

**iii. Loops & Identification**

All controls shall be labeled, all loop locations shall be identified, and the FACP shall be provided with a set of permanently mounted operating instructions, to avoid confusion. Loop location identification shall be as approved by the Engineer In-charge and contain up to three lines of text with 1/8" minimum character heights.

**iv. Components of Fire Alarm Control Panel**

- a. All hardware and software to allow the panel configuration and operation to be changed at the panel. System that require off-site programming are not acceptable.

The memory data for panel configuration and operation shall reside in non-volatile, memory provided by battery backed RAM. Removal of the board shall not cause loss of memory contents.

Switches for panel setup, set reset, manual, evacuation alarm, silence and acknowledge. Individual supervisory LEDs shall be provided for power, run, alarm, trouble, disconnect, low battery and ground fault.

- b. Indicating zones: As indicated on the drawings, each zone containing smoke detectors shall provide power and monitoring for up to only 50% detectors. (All hardware and software shall be provided to facilitate selection of circuit performance to provide alarm verification for smoke detector circuits with field false alarms. When a detector signals an alarm, the panel shall automatically reset the detector, wait and their double checks to verify the alarm. Each zone shall have a red LED to indicate alarm and yellow or amber LED to indicate a trouble condition.

- c. Indicating Loops: 1 or 2 indicating circuits shall be provided. Each circuit shall provide power for polarized alarm signaling devices. A red LED to indicate the energized state of the circuit and a yellow LED to indicate a trouble condition shall be provided for each circuit. A disconnect switch for each circuit shall be provided to allow the FACP to be tested with sounding alarm signals. When disconnected, the FACP shall indicate both trouble condition and disconnect.

**v. Manual Functions**

At any time, even without an alarm condition on an indicating circuit, the operator shall provide the following manual capabilities in the FACP by means of switches located behind a key locked cover:

- a. In case of fire if a general evacuation is needed all bells shall sound. These signals can be initiated from the main panel and secondary switch at manual fire alarm initiating device (break glass unit).
- b. Silence the local audible signal. This shall also cause the LED(s) to cease flashing and to be continuously 'ON'.
- c. Silence the alarm signals.
- d. Reset the FACP, after all initiating devices have been restored to normal.
- e. Disconnect any individual initiating or indicating circuit from the alarm sequence. This action shall light a disconnect LED and cause a trouble condition.
- f. Perform a complete operational test of the system microprocessor with a visual indication of satisfactory communication with each board.
- g. Test all panel LEDs for proper operation without causing a change in the condition on any zone.

**vi. System Supervision**

- a. Upon application of primary power, or reapplication following power failure, the FACP shall automatically be in a normal supervisory condition.
- b. In the normal supervisory condition, a green "POWER" LED shall be illuminated, indicating the presence of primary power.

- c. A green "RUN" LED shall be illuminated indicating that the microprocessor is communicating with the system and the memory contents are satisfactory.
- d. The following shall be electrically supervised:

All initiating and indicating device circuits.

All plug-in circuit board shall have proper board type in the position. System that use electrical continuity to supervise the presence of plug boards, but that do not assure that board position have been exchanged, shall provide equivalent means for specified supervision, beyond that provided by the locked cover.

#### **4.11 Test**

Upon completion, the Contractor shall conduct a total system test where line supervision and each device shall be tested. All the tests shall demonstrate that the system meets the tests shall operating requirements of this specification, that individual conductors of all circuits are free of grounds, shorts and breaks, and that no grounds exist between any piece of equipment in the control unit and the cabinet. All final connections, testing, adjusting and calibrating shall be made under the direct supervision of a factory trained technician of the system supplier.

#### **4.12 Installation**

The Fire alarm system shall be installed as mentioned in the drawings. The system shall be connected, tested and commissioned as per manufacturer's instructions and in the presence of Engineer In-charge. The wall recessed mounting Fire alarm manual stations shall be installed at a height of 4.5' feet above finished floor level. The connections of the appropriate Contactors of the Fire alarm system shall be made as per manufacturer's instructions.

The Fire alarm system conduit shall be laid 15cms (6") from the electrical conduits and cross the electrical conduit at 90 degree only. The Fire alarm system conduit shall be marked with red color at terminations in order to distinguish it from other conduit system.

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**SECTION – L**  
**CLOSED CIRCUIT TELEVISION (CCTV) SYSTEM**

**1. GENERAL**

- A. All equipment and materials used shall be standard components that are regularly manufactured and used in the manufacturer's system.
- B. All systems and components shall have been thoroughly tested and proven in actual use.
- C. All systems and components shall be provided with the availability of a toll-free, 24-hour technical assistance program (TAP) from the manufacturer. The TAP shall allow for immediate technical assistance for either the dealer/installer or the end user at no charge for as long as the product is installed.
- D. All systems and components shall be provided with a one-day turnaround repair express and 24-hour parts replacement. The repair and parts express shall be guaranteed by the manufacturer on warranty and non warranty items.

IEC 62676 – International standard for video surveillance systems.

BS EN 62676 – British/European equivalent.

**2. GENERAL SPECIFICATIONS**

Indoor/Outdoor CCTV Camera Bullet/Dome System

- A. The indoor/outdoor CCTV camera bullet/dome system shall be a discreet, miniature camera dome system consisting of a dome drive with a variable speed/high speed pan and tilt drive unit with continuous 360° rotation, 4 MP (4K) 1/4-inch high resolution color (or monochrome or color/black-white) CCD camera, motorized zoom 4mm lens built in mic AI Human / vehicle classification on IP67 Metal Housing with optical and digital zoom and auto focus; and an enclosure consisting of a back box, lower dome, and a quick-install mounting.
- B. The indoor/outdoor CCTV camera dome 4K laser AEW 500m laser range 300m IR wiper auto tracking system shall meet or exceed the following design and performance specifications:

**3. NVR**

Supported Channels: 8, 16, 32, 64, or 128 IP cameras (as per project design).

Video Compression: H.265 / H.264 / MJPEG.

Recording Resolution: Up to 4K UHD per channel.

Frame Rate: 30 fps per channel (adjustable).

Storage: Multiple SATA HDDs with RAID 0/1/5/6/10 support; hot-swappable bays.

Network Interfaces: Minimum 1–2 Gigabit Ethernet ports; support for multiple VLANs.

Remote Access: Web browser, mobile app, and CMS software support.

Display Output: HDMI / VGA dual output for live monitoring.

Alarm & Event Management: Motion detection, input/output triggers, and push notifications.

Power Supply: 220–240V AC or PoE (if supported).

Operating Temperature: 0°C to 45°C (typical).

**MECHANICAL:**

Mounting: Capable of being mounted in an EIA-standard 19-inch rack or placed on a shelf or desktop  
Connectors:

- a. Depending on model, eight or sixteen BNC video inputs plus eight or sixteen looping video outputs with automatic termination
- b. Two 9-pin, D-type connectors for COM 1 and COM 2 ports (disabled)
- c. Two 6-pin, mini-DIN connectors for a PS/2 mouse and keyboard
- d. One 15-pin, D-type port for a PC monitor connection
- e. One 25-pin D-type port for Printer connection
- f. One S-video jack for analog monitor output (disabled)
- g. Two multiplexed analog video outputs (optional)
- h. One RJ-45 connector for network connection
- i. Four RJ-45 ports for RS485/RS422 support
- j. Depending on model, eight or sixteen push-in connectors for alarm inputs and eight or sixteen push-in connectors for relay outputs
- k. Six high-speed USB 2.0 ports

Dimensions:

- a. Desk Mount  
7.0 (H) x 17 (W) x 19.9 (D) inches  
(17.78 x 43.18 x 50.55 cm)
- b. Rack Mount  
7.0 (H) x 19.0 (W) x 22.0 (D) inches  
(17.78 x 48.26 x 55.88 cm)

Operating Temperature: 50°F to 95°F (10° to 35°C)

Relative Humidity: Maximum 80% non condensing

Optical Drive: CD-RW

**ELECTRICAL:**

Input Voltage 100-240 VAC, 50/60Hz, auto ranging

**7. GENERAL SPECIFICATIONS**

- A. The DSP color CCTV camera shall consist of a 1/3-inch format CCD imaging chip.
- B. The DSP color CCTV camera shall meet or exceed the following design and performance specifications:

**8. VARI-FOCAL LENGTH, DC-DRIVE, AUTO IRIS LENS**

The lens shall be a 1/3" format, variable focal length, auto iris lens, along with any accessories that may be required for a complete lens system.

The lens shall meet or exceed the following design and performance specifications:

The lens shall be a "CS" mount.

The lens shall be used with 1/3" or smaller format cameras.

The lens shall provide DC-drive auto iris, manual zoom and manual focus adjustments.

The lens shall provide high resolution optics in a compact body.

The lens shall automatically compensate for changing light conditions utilizing DC-drive voltages from the amplifier circuitry resident in the camera.

The lens shall be equipped with a 4-pin "square" connector for auto iris functions.

## **SECTION – M MULTIMEDIA SYSTEM**

### **1. SUMMARY**

This section includes supply and installation of equipments for amplifying, distributing, and reproducing sound signals.

### **2. GENERAL**

A complete sound system is required for project and shall consists of an amplifier, loud speakers, microphone, outlets on walls and the necessary wiring etc. The Contractor is required to supply and install complete sound system equipment, surface/concealed P.V.C conduit wiring etc. as specified herein or otherwise required for proper functioning and on drawings, the Contractor shall submit detailed shop drawings of the sound system offered by them, for final approval and acceptance of the consultants. IEC 60268 – Audio, video and similar electronic apparatus; particularly sound system equipment. BS 5839-8 – Fire alarm voice alarm systems (if integrated with PA for emergency announcements). EN 54-16 – Voice alarm control and indicating equipment (VA system) for emergency communication.

### **3. AMPLIFIER**

The amplifier shall consist of a preamplifier unit and 25 watts power amplifier. The unit shall be fully transistorized and modular type so that by sliding different components and clip-on connections are made it forms one compact unit.

The preamplifier shall have two microphones inputs and shall be suitable to drive at least two amplifiers in parallel or to feed one or more remotely located power amplifier. The preamplifiers should have besides microphone channels at least one music channel for use with record player. The preamplifier shall be completed with master tune control and volume controls as required. The external connections shall be by plugs. The hum and noise level shall be between 44 dB to 62 dB and distortion shall be less than 2% at maximum output.

It shall be suitable to operate on 220 volts 50 c/s single phase circuit. The output voltage made be of manufacturer standard (48-70V). There shall be two loudspeaker output and switching arrangement. The input and output impedance, sensitivity, distortion, hum and noise levels etc. shall be as per manufacturer's standards keeping in view the best performance of the sound system.

### **4. MICROPHONE**

The microphone shall be unidirectional moving coil type with frequency response range of 40 c/s to 18Kc/s. The impedance shall be 500 Ohms. The microphone shall be provided with metal

stand of pleasing appearance having anti-vibration base, adopter, swivel holder, and about 3 meters of microphone cable, built-in plug and switch.

## **5. LOUD SPEAKERS**

The loudspeakers shall be recessed mounting type, 5 watts output having impedance of about 8 Ohms. Frequency range shall be 60-15Kc/s. The loudspeaker shall be of pleasing appearance and it shall be suitable to install on the false ceiling or on the walls as required.

All accessories required for complete sound system and to suit the type of equipment offered shall be supplied and installed by the Contractor. Such accessories shall include switching device, socket outlets for microphone on wall, matching transformer, line transformer, adopter and other installation materials etc. The Contractor shall submit a complete list of accessories for the entire sound system offered by him. The price of such accessories shall be included in the BOQ.

## **6. WIRING**

The wires for loudspeakers outlets wiring shall be twin core P.V.C insulated and screened. The size of wire shall be 2.5mm<sup>2</sup> minimum.

## **7. FUNCTIONAL DESCRIPTION OF SYSTEM**

Delete functions in subparagraphs below that are not required and edit remaining descriptions to suit Project; add other functions as required.

Selectively connecting separate zones to different signal channels.

Selectively amplifying sound among various microphone outlets and other inputs.

Communicating simultaneously to all zones regardless of zone or channel switch settings.

Paging, by dialing an extension from any local telephone instrument and speaking into the telephone.

Producing a program-signal tone that is amplified and sounded over all speakers, overriding signals currently being distributed. Reproducing high-quality sound that is free of noise and distortion at all loudspeakers at all times during equipment operation including standby mode with inputs off; and output free of non uniform coverage of amplified sound.

## **8. EQUIPMENT AND MATERIALS**

Coordinate features to form an integrated system. Match components and interconnections for optimum performance of specified functions.

Modular equipment type using solid-state components, fully rated for continuous duty, unless otherwise indicated. Select equipment for normal operation on input power usually supplied at 110 to 130 V, 60 Hz.

## 9. PREAMPLIFIERS

It should be either separately mounted or as an integral part of power amplifier.

Output Power: Plus 4 dB above 1 mW at matched power-amplifier load.

Total Harmonic Distortion: Less than 1 percent.

Frequency Response: Within plus or minus 2 dB from 20 to 20,000 Hz.

Input Jacks: Minimum of two. One matched for low-impedance microphone; the other match able to cassette deck, CD player, or radio tuner signals without external adapters.

Minimum Noise Level: Minus 55 dB below rated output.

Controls: On/off, input levels, and master gain.

## 10. POWER AMPLIFIERS

Mounting: Rack mounted.

Output Power: 70-W balanced line.

Frequency Response: Within plus or minus 2 dB from 50 to 12,000 Hz.

Minimum Signal-to-Noise Ratio: 60 dB, at rated output.

Total Harmonic Distortion: Less than 3 percent at rated power output from 50 to 12,000 Hz.

Output Regulation: Less than 2 dB from full to no load.

Controls: On/off, input levels, and low-cut filter.

Input Sensitivity: Matched to preamplifier and providing full-rated output with sound-pressure level of less than 10 dynes/sq. cm impinging on speaker microphone or handset transmitter.

## 11. SMD LED Screen (Indoor Video Wall)

### General:

Indoor high-resolution SMD (Surface Mounted Device) LED display suitable for office lobbies, conference halls, auditoriums, and control rooms.

### Electrical:

- Input Voltage: 100–240V AC
- Avg. Power Consumption: 250–350 W/m<sup>2</sup>
- Max. Power Consumption: 600–800 W/m<sup>2</sup>
- Power Factor:  $\geq 0.9$

### Display Specifications:

- Pixel Pitch: P1.25 / P1.56 / P1.86 / P2.0 / P2.5
- LED Type: SMD RGB 3-in-1
- Brightness:  $\geq 600$ –1000 nits (indoor)
- Refresh Rate:  $\geq 1920$  Hz
- Viewing Angle:  $\geq 160^\circ$  (H)

- Contrast Ratio:  $\geq 3000:1$
- Lifetime:  $\geq 100,000$  hours

**Cabinet:**

- Die-cast aluminum cabinet
- Typical Size: 500×500 mm
- Front or rear serviceable
- IP20 (Indoor use)

**Control & Connectivity:**

- Video processor with HDMI/DVI input
- Sending & receiving cards
- LAN control capability

**Installation:**

- MS structural frame mounting (wall/floor supported)
- Power distribution with proper earthing
- Data interconnection via CAT6
- Alignment, calibration, and commissioning required

**12. COMPONENTS**

Parameters listed in this Article are typical values. Performance and product characteristics vary among manufacturers. Revise to suit Project.

Microphone:

Type: Dynamic, with cardioids polar or unidirectional characteristic.

Impedance: 150 ohms.

Frequency Response: Uniform, 50 to 14,000 Hz.

Output Level: Minus 58 dB minimum.

Finish: Satin chrome.

Cable: C25J.

Mounting: Desk stand with integral-locking, press-to-talk switch.

Quantity of Microphones: [Four] <Insert number>.

Quantity of Desk Stands: [Three] <Insert number>.

Equipment Rack: For house amplifiers and auxiliary equipment racks should be 19 inches.

Group items of same function together, either vertically or side by side, and arrange controls symmetrically.

Power-Supply Connections: Approved plugs and receptacles.

Arrange all inputs, outputs, interconnections, and test points so they are accessible at rear of rack for maintenance and testing, with each item removable from rack without disturbing other items or connections.

**Blank Panels:** Cover empty space in equipment racks so entire front of rack is occupied by panels.

**Enclosure Panels:** Ventilated rear and sides and solid top. Use louvers in panels to ensure adequate ventilation.

**Finish:** Uniform, baked-enamel factory finish over rust-inhibiting primer.

**Power-Control Panel:** On front of equipment housing, with master power on/off switch and pilot light; and with socket for 5-A cartridge fuse for rack equipment power.

**Service Light:** At top rear of rack with an adjacent control switch.

**Vertical Plug Strip:** Grounded receptacles, 12 inches (300 mm) o.c. the full height of rack, to supply rack-mounted equipment.

**Maintenance Receptacles:** Duplex convenience outlets supplied independent of vertical plug strip and located in front and bottom rear of rack.

**Spare Capacity:** [20] <Insert value> percent spare space capacity in rack for future equipment.

Coordinate paragraph and subparagraphs below with Drawings.

**Cone-Type Loudspeakers:** Comply with TIA/EIA SE-103.

**Minimum Axial Sensitivity:** Pressure rating of 45 dB.

**Frequency Response:** Within plus or minus 3 dB from 50 to 15,000 Hz.

**Size:** 8-inches (200 mm) with 1-inch voice coil and minimum 140grams ceramic magnet.

**Minimum Dispersion Angle:** 100 degrees.

**Rated Output Level:** 10 W.

**Matching Transformer:** Full-power rated with four standard taps. Maximum insertion loss of 0.5 dB.

**Surface-Mounting Units:** Ceiling, wall, or pendant mounting, as indicated, in steel back boxes, acoustically dampened. Front face of at least 1.2mm steel and whole assembly rust proofed and shop primed for field painting.

Revise finish description below to suit aesthetic requirements.

**Flush-Ceiling-Mounting Units:** In steel back boxes, acoustically dampened. Metal ceiling grille with white baked enamel.

**Microphone Outlet:** Three-pole, polarized, locking-type, microphone receptacles in single-gang boxes. Equip wall outlets with brushed stainless-steel device plates. Equip floor outlets with gray tapered rubber or plastic cable nozzles and fixed outlet covers.

**Conductors and Cables:** Jacketed, twisted pair and twisted multi-pair, un-tinned solid copper.

**Insulation for Wire in Conduit:** Thermoplastic, not less than 0.8mm thick.

**Microphone Cables:** Neoprene jacketed, not less than 0.8mm thick, over shield with filled interstices. Shield No. 34 AWG tinned, soft-copper strands formed into a braid or approved equivalent foil. Shielding coverage on conductors is not less than 60 percent.

**Plenum Cable:** Listed and labeled for plenum installation.

### **13. EXECUTION INSTALLATION**

### **Wiring Method**

Install wiring in raceways except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Use plenum cable in environmental air spaces including plenum ceilings. Conceal cables and raceways except in unfinished spaces.

Install exposed cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings so designed and installed to avoid damage to cables. Secure cable at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, or fittings.

### **Wiring within Enclosures**

Bundle, lace, and train conductors to terminal points with no excess use lacing bars in cabinets. Control-Circuit Wiring: Install number and size of conductors as recommended by system manufacturer for control functions indicated.

### **Separation of Wires**

Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches (300 mm) for speaker microphones and adjacent parallel power and telephone wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.

### **Splices, Taps, and Terminations**

Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

### **Identification of Conductors and Cables**

Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.

Wall-Mounting Outlets: Flush mounted.

Floor-Mounting Outlets: Conceal in floor and install cable nozzles through outlet covers. Secure outlet covers in place. Trim with carpet in carpeted areas.

Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than No. 18 AWG and conductors from microphone receptacles to amplifiers not smaller than No. 22 AWG.

Speaker-Line Matching Transformer Connections: Make initial connections using tap settings indicated on Drawings.

## **14. EARTHING**

Revise this Article to suit system requirements. Include earthing electrodes for special applications only.

Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment earthing.

## **15. FIELD QUALITY CONTROL**

Perform the following field tests and inspections and prepare test reports:

Schedule tests with at least seven days' advance notice of test performance.

After installing public address and music equipment and after electrical circuitry has been energized, test for compliance with requirements.

### **Operational Test**

Perform tests that include originating program and page messages at microphone outlets, preamplifier program inputs, and other inputs. Verify proper routing and volume levels and that system is free of noise and distortion.

Signal-to-Noise Ratio Test: Measure signal-to-noise ratio of complete system at normal gain settings as follows:

Disconnect microphone at connector or jack closest to it and replace it in the circuit with a signal generator using a 1000-Hz signal. Replace all other microphones at corresponding connectors with dummy loads, each equal in impedance to microphone it replaces. Measure signal-to-noise ratio.

Repeat test for each separately controlled zone of loudspeakers.

Minimum acceptance ratio is 50 dB.

Distortion Test: Measure distortion at normal gain settings and rated power. Feed signals at frequencies of 50, 200, 400, 1000, 3000, 8000, and 12,000 Hz into each preamplifier channel. For each frequency, measure distortion in the paging and all-call amplifier outputs. Maximum acceptable distortion at any frequency is 3 percent total harmonics.

Acoustic Coverage Test: Feed pink noise into system using octaves centered at 500 and 4000 Hz. Use sound-level meter with octave-band filters to measure level at five locations in each zone. For spaces with seated audiences, maximum permissible variation in level is plus or minus 2 dB. In addition, the levels between locations in the same zone and between locations in adjacent zones must not vary more than plus or minus 3 dB.

Power Output Test: Measure electrical power output of each power amplifier at normal gain settings of 50, 1000, and 12,000 Hz. Maximum variation in power output at these frequencies must not exceed plus or minus 1 dB.

Signal Ground Test: Measure and report ground resistance at public address equipment signal ground. Retesting: Correct deficiencies, revising tap settings of speaker-line matching transformers where necessary to optimize volume and uniformity of sound levels, and retest. Prepare a written record of tests.

Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging speaker-line matching transformers.

**16. ADJUSTING**

On-Site engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.

**17. DEMONSTRATION**

Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain public address and music equipment.

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## **INTELLIGENT LED ILLUMINATION SYSTEM: GENERAL SPECIFICATIONS**

The Contractor shall furnish the complete LED-based lighting system as described in the architectural details. It shall be manufactured by Color Kinetics Incorporated, or approved equal.

- The LED system shall be capable of at least 8-bit control of red, green and blue LEDs to produce 16.7 million colors or more.
- The LED system shall be digitally driven using high-speed pulse width modulation (PWM).
- The LED system shall be digitally driven using noise shaping pulse width modulation (PWM) techniques.
- The LED fixture shall be operated at constant and carefully regulated current levels. LEDs shall not be overdriven beyond their specified nominal voltage and current.
- The LED system shall use integral and differential nonlinear control.
- The LED system shall use 14 -bit or greater nonlinear scaling techniques for high-resolution output.
- Constant data transmission rates shall be employed, resulting in the output being independent of distance of cable between power supply and light source within the specified length.
- The LED fixture shall be operated at constant and carefully regulated current levels. LEDs shall not be overdriven beyond their specified nominal voltage and current.
- High power LED fixture shall be thermally protected using one or more of the following thermal management techniques: metal core board, gap pad, and/or internal monitoring firmware.
- For wet and damp use, LED-based fixture itself shall be sealed, rated, and tested for appropriate environmental conditions, not accomplished by using an additional housing or enclosure.
- LED fixture housing shall be designed to transfer heat from the LED board to the outside environment.
- All hardwired connections to LED fixtures shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.
- All LED fixtures and power/data supplies shall be provided by a single manufacturer to ensure compatibility.
- All products associated with installation and control of the LED system, including peripheral devices and software are to be provided by a single manufacturer.
- Power/data supply outputs shall have current limiting protection.
- Power/data supply shall provide misfiring protection.
- Power/data supply shall have power factor correction.
- Power/data supply shall provide connections that are conduit -ready or clamp-style connections for the low -voltage wiring.

- Power/data supply shall come with a housing that meets a minimum IP20 rating for dry location installation
- LED system shall have a selectable means of external control via a data network.
- Each LED fixture and/or node shall have the capability to be set to a unique and individual address. Address shall be selectable through on board switches or by an external hardware or software method.
- The LED system shall be scalable, with every LED fixture/address in the system capable of being controlled by a single, centralized controller.
- The LED system shall support frame rates greater than 30 frames per second.
- All LEDs used in the LED fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
- Manufacturer of LED systems shall utilize an advanced production LED binning process to maintain color consistency.
- LED fixture shall be UL listed or UL classified.
- LED fixture shall be CE certified.
- LED fixtures shall be PSE marked.
- Power/data supply shall be UL listed for Class 1 or Class 2 wiring
- Manufacturer shall be able to provide supporting documentation of the product meeting third party regulatory compliance.
- Manufacturer shall ensure that products undergo and successfully meet appropriate design and manufacturability testing including Design FMEA, Process FMEA, Environmental Engineering Considerations and Laboratory Tests, IEC standards and UL/CE testing.
- All LED fixtures (100% of each lot) shall undergo a minimum eight-hour burn-in test during manufacturing.
- Manufacturer shall provide optical performance, polar diagrams, and relevant luminance and luminance photometric data based on test results from an independent testing lab.
- Manufacturer shall provide photometric data in IES file format in accordance with IES LM-63-2002, based on test results from an independent testing lab.
- Manufacturer shall provide mechanical, electrical, network communication and environmental specifications.
- Manufacturer shall provide installation guides.
- Manufacturer shall provide system wiring diagrams.
- Manufacturer shall provide applications engineering services.
- Manufacturer shall provide the option of a factory -trained applications engineer for on-site supervision of start-up and/or programming.
- LED system shall comply with all relevant patents.
- Manufacturer shall grant a license for use of relevant patents with the purchase of the patented LED lighting system.
- Manufacturer shall have at least five years of experience designing, selling and supporting intelligent LED systems.
- Manufacturer shall be able provide a reference listing of at least 75 installations using its intelligent LED-based systems.

## N. SPLIT AIR CONDITIONING UNITS

### 1. SCOPE.

Supply, installation, testing and commissioning of complete Decorative Wall mounted / Ceiling Suspended split system dc inverter type air conditioning units of capacities as shown in equipment schedule drawings and specified herein and as per instruction of Consultant.

### 2. DESCRIPTION.

The complete supply and installation of the split system dc inverter type air conditioning unit included but not limited to factory charged tested and packed indoor evaporative unit, outdoor condensing unit, thermostat, refrigerant piping, control and power wiring with isolators, foundation, hangers, support, etc.

#### a. OUTDOOR CONDENSING UNIT.

- i. The air cooled condensing unit shall be completely factory assembled for one-piece shipment and rigging leak. The unit shall be pressure and functionally tested at factory to assure a trouble free startup after installation and shall be covered by a manufacturer's warranty.
- ii. The frame of condensing unit shall be made of angle iron, with corrosion resistance treatment, to provide rigid support for shipping, rigging and dependable operation.
- iii. The compressor shall be hermetically sealed reciprocating type mounted on vibration isolators and completely enclosed in compartment to minimize the noise transmission. The compressor shall be dynamically balanced. The compressor shall have complete set of safety suction gas strainer, suction and discharge stop valves, low and high pressure cut out switches, over current relay, compressor thermal protection, self-lubrication, oil filter etc., The compressor shall be suitable for operation with refrigerant R-22.
- iv. The condenser coils should be constructed of copper tube/aluminum fins, mechanically bonded and draw-through types and has adequate face area to meet specified requirements. All coils and fins shall be protected against the marine environment by applying Acra-Clad (Urethane Acrylic) chemical resistant protective coating.
- v. The condenser fan shall be directly driven propeller type. The fan shall draw air from three side and discharge at front.
- vi. The condenser fan motor shall be water proof induction type and equipped with an over current relay for safe operation. The bearings shall be non-lubrication type for a maintenance free operation.

**b. INDOOR EVAPORATIVE UNIT**

- i. The indoor unit shall be wall mounted/exposed ceiling mounted type with configuration as shown on the drawings.
- ii. The blower shall be of centrifugal type and directly coupled to electric motor suitable to deliver required cfm at low sound level. The blower motor shall have three stages control LOW, MEDIUM & HIGH and shall be mounted on rubber isolator.
- iii. The evaporator coils shall be constructed of copper tube/aluminum fins mechanically bonded. The evaporator coil shall be factory leak tested, dehydrated, sealed and supplied with a holding charge at site. The protected plugs should not be removed until final connection of piping to the unit.
- iv. The evaporative unit shall be internally wired and factory tested, dehydrated, sealed and supplied at site with holding charges.
- v. The remote control shall be provided with selector, on-off switch, a built in temperature sensor monitor with temperature & speed selector.

**d. REFRIGERANT PIPING**

Copper pipes conforming to BS 2871 Table X with brazing joints shall be used for the refrigerant (gas + liquid) lines. Both pipes shall be insulated with 10mm thick slip-on expanded foam rubber insulation having the thermal conductance of 0.04 W/m. K.

The indoor insulation shall be covered with PVC self-adhesive finishing tape with 20% overlap. The insulation exposed to the weather shall be further protected with the covering of 26 SWG Aluminum cladding.

The entry points of the refrigerant pipes to the building shall be completely water tight so that rain water should not be entered in the building.

**e. CONDENSATE DRAIN PIPE**

G.I. medium quality pipes confirming to BS1387 with threads joints shall be used for condensate drain from the evaporative unit. Near to the drain tray, a U- trap with min. 50 mm. water seal shall be installed. The entire length of the drain pipe shall be covered with 10mm thick slip-on expanded foam rubber insulation having the thermal conductance of 0.04 W/m. K.

The indoor-insulated drainpipe shall be covered with PVC self-adhesive finishing tape with 20% overlap. The insulation exposed to the weather shall be further protected with the covering of 26 SWG Aluminum cladding.

The exit points of the insulated drain pipes from the building shall be completely water tight so that rain water should not be entered in the building.

**3. RELEVANT CODES & STANDARD**

Following are relevant standards and codes are applicable to these sections:

BS 5491	Rating and testing of unit air conditioner
BS 5285	Ventilation fan
BD 5384	Control system for HVAC installation
CP 3	Sound and thermal installation
ASHRAE	American Society of Heating Refrigeration Air Conditioning Engineers
ARI	American Refrigeration Institute

Equivalent to mentioned codes and standards may be approved by the Engineer on the provision of evidence of equivalent by the contractor.

END OF SECTION

Atif Nazar (Pvt.) Ltd.

## 1. WATER SUPPLY SYSTEM (PPR PN-20 / PN-25)

### Applicable Standards

- **DIN 8077 / DIN 8078** – PPR Pipe dimensions & requirements
- **ISO 15874** – Plastic piping systems for hot & cold water
- **BS EN 806** – Specifications for installations inside buildings

### Installation Requirements

- Pipes shall be **PPR PN-20 (Cold Water)** and **PN-25 (Hot Water)**.
- Jointing by **heat fusion welding** strictly as per manufacturer instructions.
- No threaded joints except at valves and fixtures.
- Horizontal pipes properly aligned and supported.

### Supports

- 20–25mm dia: 1.0–1.2m spacing
- 32–50mm dia: 1.5m spacing
- Vertical risers clamped at each floor.

### Testing

- Hydrostatic pressure test at **1.5 times working pressure** for 2 hours.
- No leakage or pressure drop allowed.
- Flushing before commissioning.

### Insulation

- Hot water lines insulated as per **ASHRAE 90.1**.

## 2. SEWERAGE SYSTEM (uPVC Class B)

### Applicable Standards

- **BS EN 1329** – uPVC soil & waste discharge pipes
- **BS 5255** – uPVC pipes (where applicable)
- **BS EN 12056** – Gravity drainage systems inside buildings

### Installation Requirements

- Solvent cement joints properly cleaned before bonding.
- Minimum slope: **1% to 2% gradient**.
- Supports at 1.2–1.5m spacing.

## **Vent Pipes**

- Extended 600mm above roof level.
- Vent cowls provided.

## **Testing**

- Water test prior to concealment.
- Leak-free system required.

## **3. PLUMBING FIXTURES**

### **Applicable Standards**

- **BS EN 997** – WC pans
- **BS EN 14688** – Wash basins
- **BS EN 200** – Taps & mixer valves

### **Installation Requirements**

- Fixtures level and properly aligned.
- Silicone sealant around edges.
- Angle valves at each fixture.
- Functional testing for leakage and flow.

## **4. NATURAL GAS PIPING SYSTEM**

### **Applicable Standards**

- **ASTM A53 / BS 1387** – Steel pipes
- **NFPA 54** – National Fuel Gas Code
- **BS 6891** – Gas pipe installation in buildings

### **Installation Requirements**

- Threaded or welded joints as per design.
- Yellow color coding for gas line.
- Supports at 1.5–2.0m spacing.
- Isolation valve at each appliance.
- Air pressure test before commissioning.
- Soap solution leak test mandatory.

## **5. FIRE EXTINGUISHERS**

### **Applicable Standards**

- **BS EN 3** – Portable fire extinguishers

- **NFPA 10** – Installation of portable fire extinguishers

### **Installation Requirements**

- Wall mounted at 1.0–1.2m above floor.
- Installed near exits and corridors.
- Mounted with approved brackets.
- Inspection tag and hydrostatic test certificate required.

### **SAMPLES**

The Contractor shall submit samples of any and all materials for approval at the instructions of the Consultant/Engineer In-Charge.

1. Samples shall include pipes, fittings, valves, fixtures, insulation materials, and accessories.
2. Each sample shall be clearly labeled with manufacturer name, specification, and standard compliance.
3. Approved samples shall be retained at site for quality comparison.
4. No material shall be installed without prior written approval.

## **Section – 23 05 15: Painting, Coating & Finishing**

### **1.1 General**

All parts of the work installed under this Specification shall be painted with approved first quality enamel paints, except those items specified as being painted by Builder or otherwise exempted from painting in this section of the Specification.

The requirement for painting of all pipe work and ductwork is in addition to the colour coding or banding specified in this Specification.

Paint shall be selected to withstand the temperature on the surface which it is applied, and shall be suitable in all respects for the environmental conditions in which it shall be located.

All metal work exposed to atmosphere e.g. roof mounted plant shall be epoxy coated to withstand the effects of chemical attack as experienced in areas close to cooling towers.

All paint used shall be of one approved manufacture, and finishes shall be full gloss unless otherwise specified.

Before ordering any primer, undercoat and finishing paint, the Contractor shall propose the color scheme to the satisfaction of the Engineer.

Before ordering any painting materials, the Contractor shall advise the Engineer of the type and manufacturer of all materials.

The Contractor shall select all finishing and painting materials from types suitable for the surfaces to which they are applied and for the environmental conditions in each area.

### **1.2 Plant, Machinery & Equipment**

All items of plant, machinery and equipment supplied painted ex-factory shall be given one finishing coat of full gloss enamel, except where the manufacturer's standard finish is approved

### **1.3 Exposed Metalwork**

All exposed metalwork shall be wire-brushed and cleaned from rust, scale, dirt and grease, and shall then be given one priming coat, one undercoat and one finishing coat of full gloss enamel.

The priming coat for exposed galvanized iron shall be an approved galvanized iron primer.

The priming coat for exposed non-ferrous metalwork shall be approved as suitable for the metal to which it will be applied.

#### **1.4 Concealed Metalwork**

All galvanized iron surface concealed in roof spaces, false ceilings, building ducts etc. shall not be painted.

All black iron and steel surface shall be wire brushed and given one coat of zinc chromate or red primer.

Colour banding for identification shall be provided as described elsewhere in this Specification.

#### **1.5 Ductwork & Pipe work & Metal Sheathing**

Un insulated ductwork, internally insulated ductwork, un insulated pipe work and metal sheathing shall be painted as for exposed or concealed metalwork as applicable.

Turned parts of valves, controls etc., shall be cleaned and polished to approval.

#### **1.6 Plastered Finish Insulation Surfaces**

Plastered finish insulation surfaces shall be given one coat of size, one undercoat consisting of two parts of ordinary undercoat to one part of sealer, and one finishing coat of full gloss enamel.

#### **1.7 Calico Finish Insulation**

Exposed insulated surfaces finished in calico, scrim or canvas covering shall be painted with two (2) coats of polyvinyl acetate emulsion. Each coat shall be a different colors.

#### **1.8 Pipe work Identification**

All pipes etc. shall be identified in accordance with BS 1710:1984.

Circumferential bands of standard ground colors shall be not less than 100mm wide on pipes up to 50mm nominal diameter, and not less than 150mm wide on pipes greater than 50mm nominal diameter.

Supplementary colors shall be displayed as bands not less than 25mm wide in the centre of the ground colour bands.

Where lettering is required it shall be painted in contrasting colours in accordance with the standard, in block letters not less than 15mm high

for pipes up to 50mm nominal diameter, and in block letter not less than 40mm high for larger pipes.

Identification bands shall be located where they are clearly visible in each room or compartment through which the pipe runs, and shall be placed at centres not exceeding 6m.

Direction of flow shall be indicated by an arrow painted on the pipe adjacent to each colour band. Arrows shall be 75mm long on pipes up to 50mm nominal diameter, and 150mm long on larger pipes.

### **1.9 Colour Schemes**

The whole of the installation shall be painted in accordance with the requirements indicated in Table 1.

Equipment shall be painted and color coded to BS 381C:1980 as indicated in Table 1

### **1.10 Labelling**

All plant and equipment provided under this Specification is to be labelled in English. All warning signs shall be English as to duty or services, all such labelling to correspond to schedules, diagrams, etc. to be provided as part of the Record Drawings.

Labels are of white Trifoliate with black engraved lettering not less than 20mm high or as otherwise required and approved. Labelling is also required for any Mimic Diagrams. Manufacturers' nameplates shall generally be provided for all plant and equipment and shall show serial and model numbers and date of manufacture.

The following is an indication of specific items requiring labelling. (The list is by no means limited - all items shall be labelled to the intent of this section).

- All valves, motor starters, fans, distribution boards, gauges, contactors, cable terminals in switchboards, circuit breakers.
- Labels to be attached to valves (or pipe adjacent thereto) with a light gauge metal band or alternatively to be screwed to the insulated valve box where provided. These labels shall state the valve number.  
Distribution boards, starters etc. are to be labelled to indicate the circuit number, phase and item controlled.

Label shall be screwed or riveted to sheet metal. Adhesive fixing is not acceptable. Details of exact lettering shall be agreed with the Architect prior to manufacture.

A complete valve schedule shall be incorporated in the as-built drawings and this schedule shall clearly indicate the valve numbers, duty, function, size, flow rate and any

other relevant information necessary to allow the plant operators to safely operate each valve and to subsequently maintain or replace the valve as required.

The valve schedule shall clearly relate to the various system schematics to enable the entire operating sequence and circuitry to be followed.

### **1.11 Application of Painting**

All paints shall be prepared and applied in accordance with the manufacturer's recommendations.

All galvanized metal surfaces shall be properly etch-primed to ensure correct adhesion of the paint to the surface. Materials for etch-priming shall be as recommended by the paint manufacturers. Subsequent painting of galvanized surfaces shall comply with this Specification.

Prior to painting, all metallic surfaces except galvanized surfaces shall be thoroughly scraped and wire brushed as necessary to remove scale, rust and swarf. Surfaces shall then be solvent cleaned to remove all oil, grease and dirt.

When the surfaces to be painted are clean and dry, one coat of an approved primer shall be evenly applied over the entire area.

After surfaces have been primed, the Contractor shall notify the Architect so that an inspection of the primed surfaces can be made prior to the application of the undercoat and the finishing coats.

When the priming coat has been approved, one coat of an approved paint flat undercoat shall be applied. Before applying the finishing coats, the Contractor shall ensure that the undercoated surface is rubbed flat

and smooth. Finally, an approved high gloss finishing paint shall be applied when all dust has been removed.

Each successive coating shall be completely dry prior to the application of the next coat. The minimum thickness of each layer of paint shall be 50 microns.

**END OF SPECIFICATION 23 05 15**

## **Section – 23 05 93: Cleaning, Testing Adjusting & Balancing**

### **1. CLEANING AND ADJUSTING:**

Pipe shall be cleaned free of scale and thoroughly flushed of all foreign matter & further flushed using an approved proprietary chemical used.

Temporary bypass shall be provided for all water coils to prevent flushing water from passing through coils. Strainers and valves shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust before installation of outer faces.

Equipment shall be wiped clean of all traces of oil, dust and paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after all construction dirt has been removed from the building, new filters will be installed. Bearings shall be properly lubricated with oil or grease as per recommendations of the manufacturer.

Belts shall be tightened to proper tension. All control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to speed indicated by the manufacturer to meet the specified conditions.

### **2. BALANCING:**

Water piping system shall be balanced to produce water quantities as indicated with all automatic control valves open. This shall apply to steam piping also. Duct system shall be balanced to produce air quantities within 5% of that INDICATED.

### **3. PERFORMANCE TESTS:**

After cleaning, balancing, and testing operations have been completed, as here in before specified, the system shall be tested as a whole to see that all items perform as an integral part of the system, and that temperature and conditions are evenly controlled throughout the building.

Corrections and adjustments shall be made as necessary to produce the conditions indicated, at no additional cost to the Owner.

### **4. TEST DATA:**

System test-data shall be obtained by an independent testing agency, arranged by the Owner, who shall provide the Consultant with typewritten schedules of readings taken during the balancing and testing operation for the following items. The Contractor shall be responsible to carry out all rectification measures to adjust and balance the system

to provide operation compatible to the design.

**5. AIR BALANCE:**

**a) Fans:**

Size, type, speed in revolutions per minute, static pressure in inches of water, air quantity in cubic feet per minute and motor load in amperes and voltage.

**b) COILS:**

Size, face velocity in feet per minute, air-condition on-and-off uni-wet-bulb and dry-bulb temperature in °F., water temperature drop through heating/ cooling coil, temperatures entering coil in °F.

**c) DUCTS:**

Size, velocity in feet per minute, and air quantity in ft<sup>3</sup>/min. Air Outlets and Inlets:  
Size, velocity in feet per minute, and air quantity in cubic feet per minute.

**6. WATER BALANCE**

Pumps: GPM, suction head, discharge head, rpm, motor load in amperes and voltage.  
chillers: evaporator GPM, evaporator pressure drop, evaporator entering and leaving water temperature, condenser GPM, condenser pressure drop, condenser entering and leaving water temperature; power consumption, suction temperature and pressure; discharge temperature and pressure, oil pressure and temperature.

air handling unit/fan coil unit: GPM through each air handling unit/fan coil unit. Cooling tower: air quantity in cubic feet per minute at full load operation, entering air dry bulb and wet bulb temperature, leaving air dry bulb and wet bulb temperature, motor load in amperes and voltage.

**END OF SPECIFICATION 23 05 93**

## Section – 23 07 00: Thermal Insulation

### 1 General

- a. This section of the specification covers the supply and installation of the thermal and acoustic insulation required for ductwork.
  - b. Preparation of the equipment and application of all insulating materials shall be carried out only by skilled tradesmen, experienced and competent in this type of work.
  - c. In general, insulating materials shall be of best quality in their respective types, and shall have the following properties:
    - High thermal efficiency and low moisture absorption combined with adequate strength to prevent deterioration under normal operating conditions.
    - Resistance to fibre and attack of algae, bacteria, Vermin and the growth of mould and fungi.
    - Free from objectionable smells when dry or wet and shall not cause or promote Fire, corrosion or deterioration when in contact with galvanised metal, steel, iron, copper, bronze, brass, aluminium or PVC.
  - d. All insulating materials shall be delivered to the site in a dry condition and shall be housed in a dry store until drawn up for use.
  - e. Prior to the application of insulation, all surfaces shall be thoroughly cleaned of scale, rust, grease, oil and dirt. The application of the insulating materials to any part of the installation shall not be commenced until all pressure tests on the relevant part have been completed and approved.
  - f. All insulation materials, regardless of the methods of fixing, shall be in close contact with the surfaces to which they are applied. Edges and ends of insulating sections shall be arranged to butt up close to one another over the whole insulating surface.
  - g. Joints of insulation shall be properly sealed. Pressure sensitive tapes shall not be accepted as joints having mechanical strength.
  - h. Allowance for thermal movement shall be provided for in the application of insulation.
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**2 Thermal Insulation**

- a. Thermal insulation shall be of material & characteristics as mentioned in insulation schedule section 23 07 00.01.
  - b. As required, the insulation shall be wrapped with vapour barrier. All joints in the aluminium foil shall be vapour seals.
  - c. Ductwork shall be insulated from hangers and supports generally as indicated in DW/142: latest revision (HVAC).
  - d. Fibreglas shall be adhered to duct with fire resistant and non-water based adhesive. Adhesive shall be applied so that insulation conforms to duct surfaces uniformly and firmly.
  - e. Closed Cell insulation shall be provided with self-adhesive coating to attach to duct work
  - f. For ducts up to 450mm wide, the insulation shall be wrapped around the duct. For horizontal ducts with any side over 450mm, metal pins or nylon pins shall be stud welded using the capacitor discharge method without damaging the galvanizing on the bottom surface at 400mm maximum centres then insulation shall be wrapped around.
  - g. For vertical ducts with any side over 450mm, the pins shall be located on all sides of the duct at approximately 300mm centres. Protruding ends of pins shall be cut off flush after clips have been applied. The vapour barrier facing shall be thoroughly sealed with a vapour-barrier mastic or tape where the pins have pierced through.
  - h. All joints shall be sealed with at least 75mm wide vapour barrier tape to provide a continuous external vapour seal.
  - i. Prior to the application of tape all contact surfaces of vapour barrier foil shall be wiped clean of dust and grease using cloth and suitable solvent all in accordance with the manufacturer's recommendation.
  - j. All ductwork insulation shall extend over external flanges and stiffening.
  - k. Insulation shall be applied so as to form a continuous heat barrier without gaps, cavities and openings.
  - l. Care shall be exercised to ensure that the minimum thickness specified is maintained at corners, protrusions, etc.
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- m. At the point of support, specially prepared blocks of hardwood or Styrofoam material must be positioned to ensure integrity of vapour barrier by bonding the supports to the insulation.
- n. As reflected in insulation schedule, all externally insulated ductwork exposed in plant rooms, corridors and other areas subject to normal usage traffic shall be sheathed externally by means of 0.5 mm galvanized steel with all joints lapped and secured by self tapping screws at 100 mm centres.
- o. All insulation shall be applied so as to give a smooth, homogeneous and line able surface. All rigid sections shall be concentric, and accurately matched for thickness. Steps and undulations in the surfaces shall not be acceptable.
- p. Any sections or slabs having damaged ends or edges shall be rejected.
- q. All insulation shall fit tight to surfaces to be covered, and all slabs and sections shall be built up close, butting edges being mitred, chamfered or shaped as necessary. Any minor interstices left in insulation shall be filled and sealed.
- r. The vapour barrier shall be sealed around all hangers or other projections through the insulation.
- s. Continuous insulation shall be provided through all sleeves and insulation joins shall be staggered with respect to joints on the associated ductwork system.
- t. Where ducts pass through walls and slabs, suitable fire stop system shall be provided for the duct including the fire damper. The continuity of the insulation shall be maintained throughout.

**END OF SPECIFICATION 23 07 00**

## **Section – 23 31 00: Duct work, Fitting & Accessories**

### **1 .1. GENERAL**

- a) This section of the Specification covers the general requirements for ductwork, ductwork accessories, and associated air control devices, unless the general requirements are abrogated by specific requirements elsewhere in the Specification or Drawings.
  - b) The Contractor shall supply and install all ductwork and accessories for the correct and satisfactory operation of the air systems covered by this Specification.
  - c) Where standards are referred to, the equivalent local standard shall be used if such exists. In all cases, the latest edition shall be followed.
  - d) Prior to ordering any materials, the Contractor shall submit to the Architect for review manufacturer's data for all dampers, actuators, supply, return, intake and exhaust air fittings, proprietary brand jointing systems or materials, and for any other equipment as may be requested by the Architect.
  - e) In the case of supply, return, intake and exhaust air fittings, the submission shall include one finished sample in an approved colour and finish of each type of air fitting to be provided under the contract. No fittings may be ordered until the Architect has reviewed the sample in writing including the finish and colour. Samples shall include mounting frames, fixings, etc., so that the entire fitting assembly may be reviewed.
  - f) All ductwork, fittings, accessories, joints and jointing materials shall be suitable for the service and shall not deteriorate due to atmospheric action.
  - g) All fire dampers and casings shall be manufactured and installed in accordance with the Local Authorities' requirements and CP13 Fire Damper specification.
  - h) All ductwork and materials including linings, adhesives, flexible ducts, flexible connections, gaskets, sealants, fibreglass boards, etc., shall fully comply with all requirements of the Local Authorities and shall satisfy all local codes in respect of resistance to penetration of fire and spread of flame and smoke.
  - i) The materials, construction and installation of all sheet metal ductwork and fittings shall be in accordance with the Specification for sheet metal ductwork, DW/142: latest edition (HVCA).
  - j) Where any part of the installation is not covered by the HVCA Specifications, then the standard of the Sheet Metal and Air Conditioning Contractor's National
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Association of U.S.A. (SMACNA) latest edition shall apply for either high velocity or low velocity systems. Where any part of the installation shown on the drawings is not covered by either the HVCA or SMACNA Standard, then reference shall be made to the Architect for endorsement of materials and methods prior to installation.

- k) The ductwork installation shall be leakage tested in accordance with Ductwork leakage testing, DW/143 : latest edition (HVCA). A complete record of the test shall be submitted to the Architect on approved forms for review. The Contractor shall provide all necessary equipment for the tests. Should any test indicate leakage rates in excess of that specified by DW/142, the section of ductwork shall be dismantled, joints cleaned down and re-assembled and test repeated.

**1.2 SHEET METAL DUCT MATERIALS**

- a. Generally, all ductwork shall be of hot dipped galvanised steel sheet to BS 2989: latest edition, Grade Z2, coating type 'C' as specified in DW/142.
- b. Galvanised steel ductwork shall be fabricated from new, best quality, full sized galvanised flat steel sheets.
- c. The pressure class and air leakage limit shall be as defined in DW/142.

**1.3 SHEET METAL DUCT CONSTRUCTION**

- a. All sheet metal ductwork shall be constructed free of waves or buckles to the size shown on the plans. Rectangular ducts exceeding 300 mm longest side shall be cross broken between adjacent stiffeners, or alternatively shall be constructed of one size heavier material than scheduled. Internally insulated ducts shall not be cross broken,
- b. Longitudinal joints shall be made with Pittsburgh Lock or grooved seams, closed for tightness and appearance. Clip lock or Snap lock button punched joints may be used with tack soldering or self tapping screws at maximum 750 mm centres.
- c. All flange and stiffener angles shall be solid riveted at centres not exceeding 100 mm. Mating flanges shall be match drilled and bolted by 5 mm diameter cadmium plated nuts and bolts at 150 mm centres, using 4 mm thick rubber or equal approved insertion gaskets. Standing seams will not be permitted.
- d. All joint exposed to weather, other than angle flanged joints, shall be soldered water tight.
- e. All transverse duct joints shall be taped with approved duct tape.

<u>Longest Side</u>	<u>Galvanised Steel (mm)</u>	<u>Intermediate Stiffening (mm)</u>	<u>Transverse Joint</u>
1-300	0.5	None	Drive Slip at 2400 crs
301-450	0.6	None	Drive Slip at 2500 crs

451-750	0.6	25x25x3 angles at 1200mm crs on all sides over 450 mm	25mm standing seam
751-1050	0.8	25x25x3 angles at 1200mm crs on all sides over 450 mm	25mm standing seam
1050-1350	0.8	38x38x3 angles at 1200mm crs on all sides over 750 mm	38x38x3 angle flange
1351-1500	1.0	38x38x3 angles at 750 mm crs.	38x38x3 angle flange
1501-2100	1.0	38x38x3 angles at 750 mm crs.	38x38x3 angle flange
2101-2400	1.2	50x50x6 angles at 600mm crs.	50x50x6 angle flange
Over 2400	1.2	50x50x8 angles at 600mm crs.	50x50x8 angle flange

The low pressure ducting with static pressures up to 50mm wg and velocities up to 10mps, shall be fabricated according to the following schedule:

Rectangular Ducting

Up to 8" larger dimension	26 gauge (all four sides)
9"-27" larger dimension	24 " "
28"-51" " "	22 " "
52"-81" " "	20 " "
Above 81" " "	18 " "

The ducts shall be fabricated with following type of joints or as approved:

- (a) Longitudinal  
Pittsburgh lock, double seam, or grooved seam.
- (b) Circumferential (all four sides):

Duct larger dimension

To 23"	Drive slip
24" - 42"	1" high pocket lock or standing seam
43" - 72"	1-1/2" high pocket lock or standing seam
73" - 96"	1-1/2" high reinforced pocket lock or standing seam

The bracing for ducting shall be as follows:

Duct larger dimension Size of bracing MS angle

to 23"	None
24"-30"	Joints at 4' centres without bracing or joints at 8' centres with 25x25x3mm bracing between joints.
31" - 42"	25x25x3mm bracing @ 4ft centres
43" - 72"	40x40x3mm " @ 4 "
73" - 84"	40x40x3mm " @ 2 "
85" - 96"	40x40x5mm " @ 2 "

The 2' centres bracing would be located at joints and between joints.

The bracing shall be carried around all four sides, bracing angle frame welded at 4 corners and riveted with the ducts at maximum 150mm centres.

Special joints, bracing and hangers as specified by the Consultant shall be used for ducts with larger dimension over 96"

The medium pressure ducting with static pressures up to 150mm wg and velocities upto 15mps, shall be fabricated according to the following schedule:

Rectangular Ducting

To 18" larger dimension	24 gauge (all four sides)
19"-45" larger dimension	22 " "
46"-69" " "	20 " "
Above 69" " "	18 " "

The ducts shall be fabricated with following type of joints or as approved:

- (a) Longitudinal  
Pittsburgh lock, double seam, or grooved seam.
- (b) Circumferential (all four sides)

Duct larger dimension

To 18"	1" high pocket lock, standing seam or bar slip.
19" - 36"	1-1/2" high pocket lock or standing seam.
37" - 48"	Reinforced standing seam with 40x40x3 mm angle or 32x32x3 mm companion angle flanged joint.
49" - 60"	40x40x3 mm companion angle flanged joint.
61" - 84"	50x50x5 mm companion angle flanged joint.

The companion angle flanged joints shall have neoprene gasket to make the joint air tight.

The bracing for ducting joints at 4 ft centre shall be as follows:

Duct larger dimension	Size of bracing MS angle
to 12"	None
13" - 24"	25x25x3mm bracing between joints.
25" - 36"	32x32x3mm " @ 2 ft centres
37" - 48"	40x40x3mm " @ 2 "
49" - 60"	50x50x3mm " @ 2 "
61" - 84"	75x75x5mm " @ 2 "

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**1.4 SHEET METAL DUCT BENDS & ELBOWS**

- a. Where possible, changes in direction shall be made with the internal throat radius of the air passage equal to the duct width. Where space does not permit this throat radius, bends of smaller radius may be used with approved stream splitters in accordance with the following schedule

Throat Radius (mm)	Duct Width (mm)	No of Stream Splitters
100 - 200	200 - 700	2
	701-1300	3
Over 200	300 - 600	1
	601 – 1500	2
	Over 1500	3

- b. The radius of each splitter shall be approved by the Engineer.
- c. Stream splitters shall be constructed of 1.2 mm galvanised steel or 1.6 mm aluminium secured both edges by folding.
- d.
- e. The entering and leaving edges of stream splitters will be folded to form a hem not less than 15mm long, which will be supported by approved stays at intervals not exceeding 600 mm for galvanised steel or 400 mm for aluminium
- f. Where radius bends are impractical and where shown on the drawings, square throat elbows shall be employed, which shall be fitted with approved aerofoil section air turns at maximum 30 mm centres, fixed in runners and secured tot the duct as for stream splitters.

### 1.5 SHEET METAL DUCT TRANSITIONS & FITTINGS

- a. Duct surfaces which diverge from the centres line of the air flow shall not diverge at a ration greater than 1:7, and converging surfaces shall do so at a ratio not greater than 1:4. Where space prohibits such ratios, stream splitters shall be provided so that the required ratios are maintained relative to the centre line between adjacent surfaces.
- b. Where it is impossible to offset ductwork around obstructions, the obstruction within the duct shall enclosed in a fairing which shall be semi-circular on the entering air slide and which shall converge equally on the leaving air side to form an angle not greater than 60 degrees. The duct dimensions shall be increased around the obstruction to maintain the same net free area.
- c. Branch take-offs from main ducts shall be made with an inside radius 0.75 x branch duct width, and shall be provided with an adjustable splitter damper the length of which shall be 1.5 x the internal take-off width.
- d. Where air diffusers take-off directly from a duct, they shall be provided with stream splitters 80 mm long at 50 mm centres in the take-off adjacent to the duct and with a full size adjustable damper. Stream splitters may be omitted if the length of straight
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take-off duct attached to the diffuser exceeds 4 times the take-off diameter or 4 times the longest duct side.

## **1.6 ROUND FLEXIBLE DUCTS**

- a. All flexible ductwork shall be of the patent pre-insulated type and shall be by suitable for the duties and pressures as required for the particular system.
- b. All bends made in flexible ducting shall be formed to manufacturer's recommendations and shall have a centre-line radius of not less than 1.5 time the diameter of the ducts. Bends shall remain at full diameter throughout the length of the bend.
- c. All joints between lengths of flexible ductwork shall be made with short spigots of galvanised sheet metal circular duct to form a slip joint. Similarly, all connections to fittings and terminal boxes etc. shall be of the spigot slip joint type.
- d. Duct connections shall be taped and provided with bands as follows.
- e. All joints shall be sealed with shrink-on type duct bands. These shall be continuous screw type metal or PVC bands similar to "Jubilee" hose clips or approved equivalent may be used. Self tapping metal screws and rivets shall not be used.
- f. All flexible ducts shall be adequately supported with hanger straps located, at a minimum of 2000 centres, to prevent undue sagging and strictly in accordance with the manufacturer's recommendations.
- g. Circular flexible acoustic ductwork shall be of the metal helix type incorporating perforated acoustic reinforced aluminium internal liner 25mm thick flexible fibreglass insulation as specified and reinforced external vapour barrier.
- h. The ductwork shall have the following minimum acoustic performance.

## **1.7 FITTING**

### **1.7.1 Joints And Fittings**

- i) All cross joints, longitudinal joints, take-offs, bends, transitions and other fittings shall be in accordance with DW/142: latest edition for the appropriate class.
- ii) All flanges and steel works for jointing and supporting members shall be hot-dipped galvanised to BS729:1971, Part 1 or BS2989 G275 whichever is applicable.

### **1.7.2 Ductwork Jointing Sealant**

Jointing for flanged cross joints shall be formed from a lead impregnated gasket or other approved material to thickness not less than 4mm. Sealant shall be suitable for the type of fluid and temperature encountered

### **1.7.3 Vanes and Deflectors**

Vanes or deflectors shall be provided inside ducts where required. In particular, such vanes or deflectors shall be provided at all bends having an internal radius less than the width of the duct and also where the included angle exceeds 30° at changes of section.

Vanes and deflectors shall be of special profile to ensure complete change of direction of flow at the point, with extended leading and trailing edges, and with radii and spacing selected to achieve uniform velocity at the bend.

### **1.7.4 Flexible Joints**

- i) All flexible connections for use at temperatures up to a maximum of 90°C shall be of neoprene coated glass fabric having a density of not less than 1 kg/m<sup>2</sup>.
- ii) All flexible connections for use with temperatures in excess of 90°C and in car park, smoke exhaust and other high temperature applications shall be of non-combustible woven glass fabric type capable of withstanding 250°C under continuous operation for at least 2 hours.
- iii) All flexible connections exposed to the weather shall be cover with prime quality galvanised sheet steel or fibreglass weather shields arranged to form a complete weatherproof jacket.
- iv) All flexible connections shall be fixed over mild steel angle flanges at both ends and secured to same with not less than 2.5mm thick x 25mm wide mild steel bands. For circular ducts flexible connections shall be of the split semi-circular type drawn up tight with bolts at the split points. Flat bars for rectangular ducts shall be fixed with bolts or screws at not more than 150mm centres. The flanges to take the connections shall be not less than that specified for the ducts and the "free" space between flanges shall not be less than 50mm. The flexible connections shall be installed with not less than 25mm additional slack length between the flanges to prevent transmission of vibration.
- v) Flexible connections shall not be used to correct misalignment of fan and duct.

### **1.7.5 Access Panels**

- a. Access panels shall be provided at every point in the ductwork systems where access for checking, servicing and cleaning of equipment is required. Such equipment shall include all fire dampers, plenums, motorised dampers, fan chambers, air chambers, etc.

Where additional access panels are required for checking, servicing and cleaning of equipment not mentioned above, these shall be provided by this Contractor.

- b. Submit required location and sizes of any access panel in finished building surfaces and exposed areas for approval in time to enable them to be incorporated into the construction.
- c. Access panels in building surfaces will be supplied by other trades Contractors. The exact location shall be shown on shop drawings.
- d. Access panels in ductwork, casings, or sheet metal partitions shall be of G.I. double construction with insulation of the same general character as adjacent sections of ductwork of not less than 0.8 mm sheet metal and shall have gaskets around their entire perimeter to ensure a seal conforming to DW/142 leakage class specification as required by the system.
- e. For rectangular or square duct, minimum size shall be 450 mm x 450 mm or 50 mm narrower than the duct whichever is smaller.
- f. For circular duct, access panels shall be "duct mate" or approved equivalent, minimum size 250 x 150mm for duct up to 450mm diameter, 400 x 300mm for ducts up to 1200mm dia. and 600 x 450mm for ducts up to 2000mm dia. Access panels shall be fully removable but secured with sufficient steel cable to ensure panels are not lost but can be removed to provide adequate room for proper access.

#### **1.7.6 Motorized Dampers**

- a. Motorized damper actuators shall be of the electric type and sized to provide smooth modulating control under design temperature and pressure conditions. Actuators shall be site interchangeable for direct or reverse action and be suitable for on/off or modulating operation. Dampers shall be suitable for both vertical and horizontal installation. Damper actuator shall be installed outside the air stream.
  - b. Each motorized air damper assembly shall be fitted with an adjustable crank arm and ball joint, through which it will be connected to the damper actuator by an aluminium rod of not less than 6mm diameter.
  - c. Positive positioning devices shall be furnished where required. Dampers shall be furnished for all sequencing applications.
  - d. All damper actuators shall be externally mounted to the damper frame via a single linkage.
  - e. All electric operated dampers shall be of the low leakage type averaging approximately 100 liters/sec. per m<sup>2</sup> of opening when a pressure difference of 1000 Pa is applied across them.
  - f. Dampers shall consist of a formed channel section frame containing linked aerofoil section blades. The units shall be of the opposed blade type operated by electric
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regulating motors where damper assemblies of area greater than  $2\text{m}^2$  are required, they shall be made up of individual damper units fitted to a suitably braced steel sub-frame

- g. Damper, frames and supports shall be able to withstand a differential pressure of 2000 Pa in fully closed position.
- h. Motorized fire damper shall be of a design and construction that will provide the required fire resisting rating of 2 hours or more tested and certified by PSB or other local authority. Installation shall comply with CP13 requirements and other local authority requirement.
- i. Damper blade and frame seals shall be of flexible material suitable for the type of fluid handled and have the required high temperature resistant at  $250^{\circ}\text{C}$  or more for continuous operation to handle high temperature application such as car park and smoke exhaust.
- j. Spring return shall be provided to drive the damper into failsafe open or close position as required during power failure.
- k. Circuit switches for remote monitoring of damper position shall be provided as specified and installed outside the air stream.

#### **1.7.7 Self-Closing (Non-Return) Dampers**

Self-closing dampers shall present a minimum resistance to air flow under running conditions and take up a stable position in operation.

Maximum resistance shall be presented under reverse air flow conditions such that they will be forced to close and remain so. Resilient strips or other purpose made devices shall be provided to prevent the damper rattling and as an aid to air sealing under reverse flow conditions

#### **1.8 TEST POINTS**

- a. Test holes for measuring air flow shall be provided at the following locations:
  - i) At all fans (in the straightest section of duct near to the outlet).
  - ii) At main branches after regulating dampers.
  - iii) At cooling coils, heater batteries (both before and after the coil or battery).
  - iv) Any other position indicated on the Drawings.
- b. The location of these holes shall be confirmed by the Architect.

- c. On insulated ductwork, these holes shall be boxed out for the thickness of the insulation
- d. Test holes shall be 25mm diameter and fitted with an effective removable seal.
- e. For circular ducts up to 1200mm diameter, provide two holes on perpendicular centreline. For circular ducts above 1200mm diameter, provide four holes on two perpendicular centrelines at 45 degrees to each other
- f. For rectangular ducts, provide the following:
  - i) Four ducts having diagonal dimensions up to 450mm provide six (6) openings, located on two perpendicular sides, three per side. Openings to be located at 1/6, 1/2 and 5/6 locations on both duct faces.
  - ii) For ducts having diagonal dimensions up to 900mm provide eight (8) openings located on two perpendicular sides, four per side. Openings to be located at 1/8, 3/8, 5/8 and 7/8 locations on both duct faces.
  - iii) For ducts having diagonal dimensions up to 2300mm provide ten (10) openings, located on two perpendicular sides, five per side.
  - iv) Openings to be located at 1/10, 3/10, 5/10, 7/10 and 9/10 locations on both duct faces.

#### **1.10 LEAK TESTING**

- a. All low pressure supply and exhaust systems shall be tested by hand feel and audio checking of all joints and sealing all obvious leaks with a synthetic rubber sealing compound to approval.
  - b. All medium and high pressure systems shall be pressure tested to not less than 2000 Pa static pressure or 1.25 times the maximum operating pressure of the system whichever is greater.
  - c. Ductwork carrying air at less than 10 m/s and pressures less than 500 Pa is low pressure. For velocities above 10 m/s and pressures greater than 500 Pa but less than 1500 Pa, ductwork is medium pressure. For velocities over 10 m/s and pressures greater than 1,500 Pa but up to 2,500 Pa, ductwork is high pressure
  - d.
  - e. Regardless of the actual air velocity and pressure, the following systems shall be tested in accordance with medium pressure ductwork :
    - i) All VAV systems
    - ii) Smoke control/purging system
    - iii) Kitchen exhaust system
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- iv) Underground car park ventilation
- f. The test apparatus, test procedure, detection and repairs of leaks shall comply with the Sheet Metal and Air-Conditioning Contractors National Association Inc. of America (SMACNA) Manual for the Balancing and Adjustment of Air Distribution Systems AIA File No. 30-D-4 Chapter 8 (Latest Edition) or other approved standard, except where the following requirements supervene.
- g. Testing shall be done in short convenient lengths and shall include all branch ducts, riser ducts, flexible connections and fittings from the fan discharge up to the terminal equipment and shall be completed prior to the insulation being applied.
- h. On completion of the installation of all medium and high pressure ductwork, all joints between the pre-tested sections shall be tested by the brush and soap bubble method at the maximum available system pressure and all leakage made good.
- i. Notifications of tests shall be given at least 48 hours prior to testing of each section so that a representative may observe the test.
- j. The method of testing, sections of ducts and the test procedure shall be clearly indicated on shop drawings so that site personnel involved in the testing are fully aware of testing criteria.
- k. Alternative methods and procedures of testing may be used provided that full approval has been obtained prior to proceeding.

## **1.11 PRE-INSULATED DUCT WORK**

### **1.11.1 Materials**

- a. The pre-insulated duct work panel manufacturer shall European origin.
  - b. The duct work shall be made of pre-insulated aluminium sandwich panels with aluminium foil both sides of the sandwich panel filled with expanded polyurethane rigid foam insulation.
  - c. Both sides of the aluminium foils shall be lacquered with a 3 g/sq.m weather proof and ultraviolet rays protection polyester lacquer.
  - d. All the panels shall be embossed with the name of the manufacturer and production date.
  - e. Minimum thermal insulation characteristics shall be as follows:
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- Insulating material: Close cell rigid expanded polyurethane foam, CFC, HCFC and HFC free.
- Density 45-48 kg/m<sup>3</sup>,
- Thermal Conductivity
  - Initial 0.0206 W/m-K
  - After aging 0.0226 W/m-K
- Fire Reaction – Class B European Standard
- Pressure: 2000 Pa – operating
- Pressure: 5000 Pa – 1 Hr.
- Air Tightness - Compliance with EN 1507, EN 14239 Class B and C
- Water vapour Transmission: > 2000 m<sup>2</sup>.h Pa/mg
- Max. Velocity: 35 m/s
- Working Temperature: -35deg C. to +110 °C

#### **1.11.2 INSTALLATIONS**

- a. To be generally in accordance with manufacturer's guidelines, under the supervision. Certified professional/manufacturer's local agent.
  - b. Duct shall site delivered ready to install, and fabricated in the local agent's workshop.
  - c. The pre-insulated duct work supplier shall be the sole authorized dealer/agent by the manufacturer.
  - d. The local agent must have his own fabrication workshop completely equipped with all necessary manufacturer's recommended tools and instruments.
  - e. The ducts shall be fabricated completely in accordance with the manufacturer's guidelines/recommendations.
  - f. Duct shall be joining using manufacturer's recommended flange/slide-in-channels. And connected to the duct panels using self-extinguishing adhesive composed of special resin provided by the manufacturer.
  - g. Application of gasket in Teflon between the joining system to provide proper air tightness, both on negative or positive, complying to EN 13403 Class b and C.
  - h. Duct section and the internal pressure the duct work must be provided with stiffening devices composed of aluminium stiffening rods (approx. min. 14 mm dia) connected with a cross fixing device, applied to the duct by means of PVC plates approx. 120 mm dia. for indoor application and steel plates (approx. min. 170mm dia. for outdoor/heavy application.
  - i. All the duct s shall be as per approved shop drawings prepared by the Contractor.
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- j. Flanging: Anti-condensation polymer flange profile, invisible/flush type, external corners of the ducts shall be provided with aluminium self adhesive tape of same finish as of the duct.
- k. Tee Connection: large branches exceeding 900 W x 450 H (any direction), using dedicated Tee-connector profile.
- l. Damper shall be of same material as of pre-insulated duct, with mild steel/aluminium blades.
- m. Damper Connection: Special flanged connector shall be used.
- n. Flexible Duct Connection: Use spin collars/special bands arrangements.

**1.11.3 WARRANTY**

- a. Manufacturer/agent shall warrant the system against manufacturing defects and/deterioration for 10 years from the date of commissioning.
- b. Contractor's installation shall be deemed as acceptable by the Engineer/Employer, after manufacturer/agent certified that it is in conform to standards and has been inspected in course of execution.

**END OF SPECIFICATION 23 31 00**

**Section – 23 33 13: Dampers****Volume Dampers**

- a. The Contractor shall provide and install hand operated dampers where required for the proper regulation of the ventilating and air conditioning systems. In general, dampers shall be provided as follows:
    - i) In all main supply and exhaust air ducts, branches, outside air connections to fan coil units and all outside air supply outlets.
    - ii) Behind all supply and exhaust air diffusers/grilles/linear diffusers or supply connection to grilles.
  - b. All volume dampers shall comply with DW/142 and shall be provided in separate purpose-made flanged casings of rigid construction conforming to the same standards of air-tightness.
  - c. Materials for dampers in all cases are to be mild steel galvanised or aluminium.
  - d. The damper spindles shall be provided with suitable seals when passing through the casing and penetrations shall be limited by the use of internal linkages.
  - e. Dampers up to width of 300mm in the plane of rotation shall be of butterfly type having blades of double construction fitted round a square mild steel spindle and the edges of blades folded and left smooth. Sides of blades shall be folded, left smooth, and in all cases shall be felt lined to give a good fit against sides of duct.
  - f. The spindle shall be turned down at each end and be carried in substantial bronze bosses fixed to the sides of duct, with substantial cast quadrant piece in an accessible position and with means of clamping after adjustment. Spindles shall be of sufficient length to ensure easy access to the quadrant after installation of insulation.
  - g. Dampers larger than 300mm shall be of multi-leaf opposite blade type, mounted in built-up frames inserted in the ductwork and bolted thereto. Individual blades shall be as specified for butterfly dampers; each shall be carried on solid spindle with ends housed in bronze or nylon bushes. The group of blades forming the damper shall be linked to a hand-operated mechanism, which shall be controlled by a quadrant in cases where the damper is accessible from ordinary working level and in all other
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cases, shall be provided with screw-operate remote-control gear with the winder at an accessible point.

- h. In all cases, the adjusting gear shall be accessible after installation of insulation. Dampers in circular ducts up to 250mm in diameter shall be of butterfly type as for dampers up to width of 300mm specified above, except that edges of blades are not required to be folded.
- i. After final testing and adjustment, all dampers are to be clamped in their correct positions which are to be marked on the quadrant in a permanent manner and stops fitted. All damper quadrants are to be covered with wooden or steel boxes with hinge lid for access.
- j. Where fitted directly behind supply and exhaust air diffusers or grilles, dampers shall be adjustable through the face, without the need to remove the diffuser or grille face.
- k. Dampers required to control areas larger than 1.6m<sup>2</sup> shall be divided into multiple sections each of 1.6m<sup>2</sup> maximum area with individual drive motors for each section.
- l. Take off's or spigots for connection of circular flexible ductwork to main ducts which are 200mm diameter or smaller shall be aluminium spun cone type complete with volume control damper as specified above.
- m. For larger sizes take off's shall be of sheet metal to the same thickness as the main duct. In all cases, the take off's shall provide at least 25mm overlap surface for proper connection of the flexible duct.

#### **1.8.8 Motorized Dampers**

- a. Motorized damper actuators shall be of the electric type and sized to provide smooth modulating control under design temperature and pressure conditions. Actuators shall be site interchangeable for direct or reverse action and be suitable for on/off or modulating operation. Dampers shall be suitable for both vertical and horizontal installation. Damper actuator shall be installed outside the air stream.
  - b. Each motorized air damper assembly shall be fitted with an adjustable crank arm and ball joint, through which it will be connected to the damper actuator by an aluminium rod of not less than 6mm diameter.
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- c. Positive positioning devices shall be furnished where required. Petitioners shall be furnished for all sequencing applications.
- d. All damper actuators shall be externally mounted to the damper frame via a single linkage.
- e. All electric operated dampers shall be of the low leakage type averaging approximately 100 litres/sec. per m<sup>2</sup> of opening when a pressure difference of 1000 Pa is applied across them.
- f. Dampers shall consist of a formed channel section frame containing linked aerofoil section blades. The units shall be of the opposed blade type operated by electric regulating motors where damper assemblies of area greater than 2m<sup>2</sup> are required, they shall be made up of individual damper units fitted to a suitably braced steel sub-frame.
- g. Damper, frames and supports shall be able to withstand a differential pressure of 2000 Pa in fully closed position.
- h. Motorized fire damper shall be of a design and construction that will provide the required fire resisting rating of 2 hours or more tested and certified by PSB or other local authority. Installation shall comply with CP13 requirements and other local authority requirement.
- i. Damper blade and frame seals shall be of flexible material suitable for the type of fluid handled and have the required high temperature resistant at 250°C or more for continuous operation to handle high temperature application such as car park and smoke exhaust.
- j. Spring return shall be provided to drive the damper into failsafe open or close position as required during power failure.
- k. Circuit switches for remote monitoring of damper position shall be provided as specified and installed outside the air stream

**END OF SPECIFICATION 23 33 13**

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## Section – 23 81 29: Variable Refrigerant Flow HVAC Systems

### 1. Scope

Supply, rigging, lifting, installation, testing and commissioning of complete variable refrigerant flow air conditioning units of types and capacities as shown in equipment schedule drawings and specified herein and as per instruction of Consultant.

### 2. Description

The complete supply and installation of the VRF system air conditioning unit included but not limited to factory charged tested and packed indoor evaporative unit, outdoor condensing unit, thermostat, refrigerant piping, control and power wiring with isolators, foundation, hangers, support, etc.

#### 2.1 Outdoor Condensing Unit

The air cooled condensing unit shall be completely factory assembled for one-piece shipment and rigging leak. The unit shall be pressure and functionally tested at factory to assure a trouble free start up after installation and shall be covered by a manufacturer's warranty.

The frame of condensing unit shall be made of angle iron, with corrosion resistance treatment, to provide rigid support for shipping, rigging and dependable operation.

The compressor shall be hermetically sealed reciprocating type mounted on vibration isolators and completely enclosed in compartment to minimize the noise transmission. The compressor shall be dynamically balanced. The compressor shall have complete set of safety suction gas strainer, suction and discharge stop valves, low and high pressure cut out switches, over current relay, compressor thermal protection, self-lubrication, oil filter etc., The compressor shall be suitable for operation with refrigerant R410-A, R407c.

The condenser coils should be constructed of copper tube/aluminium fins, mechanically bonded and draw-through types and has adequate face area to meet specified requirements. All coils and fins shall be protected against the marine environment by applying chemical resistant protective coating.

The condenser fan shall be directly driven propeller type. The fan shall draw air from three side and discharge at top.

The condenser fan motor shall be water proof induction type and equipped with an over current relay for safe operation. The bearings shall be non-lubrication type for a maintenance free operation.

Access to the units for routine service and maintenance shall be through the front panel only. For installation purposes only, access to the units shall be via removable panels.

Units shall be installed making provision for the minimum space requirements between adjacent units or obstructions, as specified by manufacturer.

## **2.2 Indoor Evaporative Unit**

The indoor unit shall be different type and capacity with configuration as shown on the drawings/schedule.

The blower shall be of centrifugal type and directly coupled to electric motor suitable to deliver required cfm at low sound level. The blower motor shall have three stages control LOW, MEDIUM & HIGH and shall be mounted on rubber isolator.

The evaporator coils shall be constructed of copper tube/aluminum fins mechanically bonded. The evaporator coil shall be factory leak tested, dehydrated, sealed and supplied with a holding charge at site. The protected plugs should not be removed until final connection of piping to the unit.

The evaporative unit shall be internally wired and factory tested, dehydrated, sealed and supplied at site with holding charges.

The remote control shall be provided with selector, on-off switch, a built in temperature sensor monitor with temperature & speed selector.

The indoor unit shall incorporate a return air filter. Filters shall be removable via the front, or underside of the unit, without removing any screwed panels. Filters shall be of the washable type unless otherwise specified.

## **3. Refrigerant Piping**

Copper pipes conforming to ASTM standard B88 type K, L & M with brazing joints shall be used for the refrigerant (gas + liquid) lines. Both pipes shall be insulated with 12mm thick slip-on expanded foam rubber insulation having the thermal conductance of 0.04 W/m.k.

The indoor insulation shall be covered with PVC self-adhesive finishing tape with 20% overlap. The insulation exposed to the weather shall be further protected with the covering of 26 SWG GI cladding.

The entry points of the refrigerant pipes to the building shall be completely water tight so that rain water should not be entered in the building.

## **4. Condensate Drain Pipe**

UPVC Sch. 40 pipes with solvent cement joints shall be used for condensate drain from the evaporative unit. Near to the drain outlet from evaporative unit, a U- trap with min. 50 mm. water seal shall be installed. The entire length of the drain pipe shall be covered with 10mm thick slip-on expanded foam rubber insulation having the thermal conductance of 0.04 W/m. K.

The indoor-insulated drainpipe shall be covered with PVC self-adhesive finishing tape with 20% overlap. The insulation exposed to the weather shall be further protected with the covering of 26 SWG Aluminum cladding.

The exit points of the insulated drain pipes from the building shall be completely water tight so that rain water should not be entered in the building.

#### **5. Relevant Codes & Standard**

Following are relevant standards and codes are applicable to these sections:

- BS 5491      Rating and testing of unit air conditioner
- BS 5285      Ventilation fan
- BD 5384      Control system for HVAC installation
- CP 3          Sound and thermal installation
- ASHRAE      American Society of Heating Refrigeration Air Conditioning Engineers
- ARI          American Refrigeration Institute

Equivalent to mentioned codes and standards may be approved by the Engineer on the provision of evidence of equivalent by the contractor.

#### **6. Commissioning & Testing:**

Contractor shall commission the entire air conditioning system through an authorized representative as recommended by the manufacturer and commissioning reports shall be provided to the Consultant for his approval.

The contractor shall be responsible for commission the air conditioning unit in accordance with manufacturer's recommendations.

All VRF systems will have a guarantee/warranty period of 12 months from the date of commissioning the units, on top of the standard manufacturer guarantee/warranty, and should any defects arise during this period which can be attributed to poor workmanship, improper material, or defective manufacture of the air conditioning units, for which the Consultant shall be the judge, the Contractor shall be required to replace or repair all defective parts, except compressors (burnt or otherwise) which shall be replaced with new compressors. All repairs and replacement shall be as directed by the Consultant.

If the Noise Level from the unit create any nuisance or-its NC level (35) is not maintained, then it is the responsibility of the contractor to meet the specification as stated in the schedule.

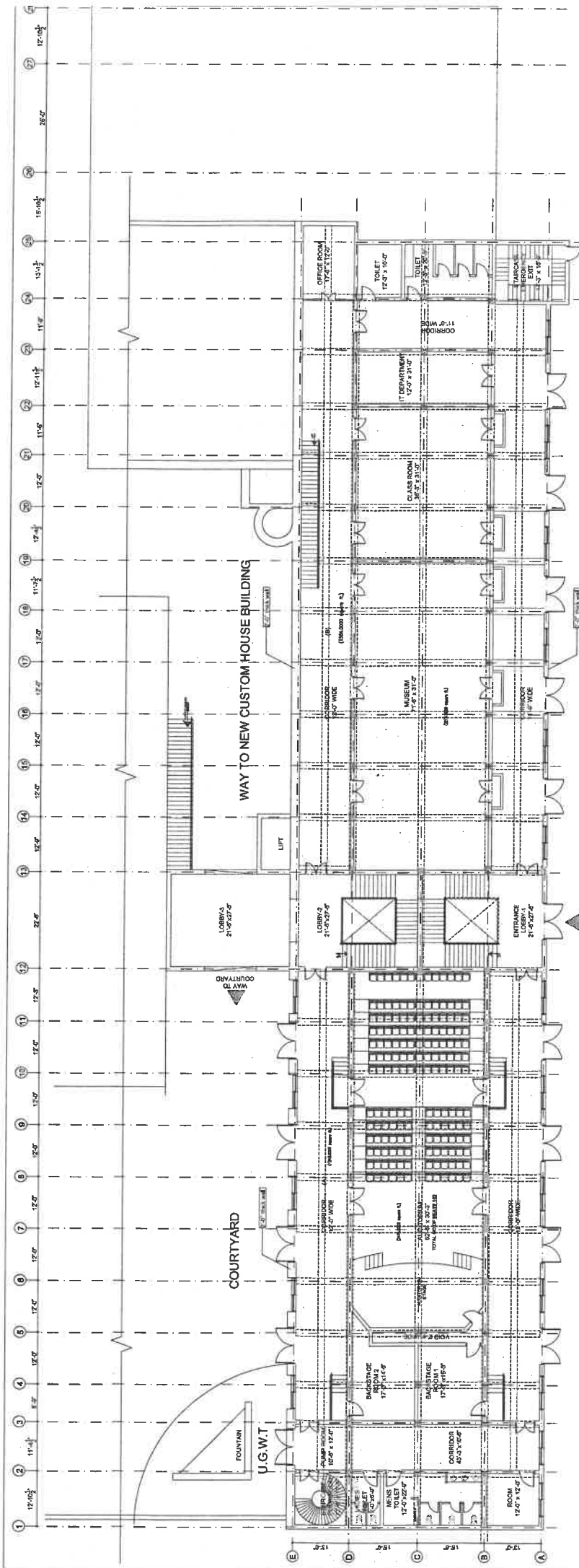
No additional charges shall be paid to the contractor for above specified works

**END OF SPECIFICATIONS 23 81 29**

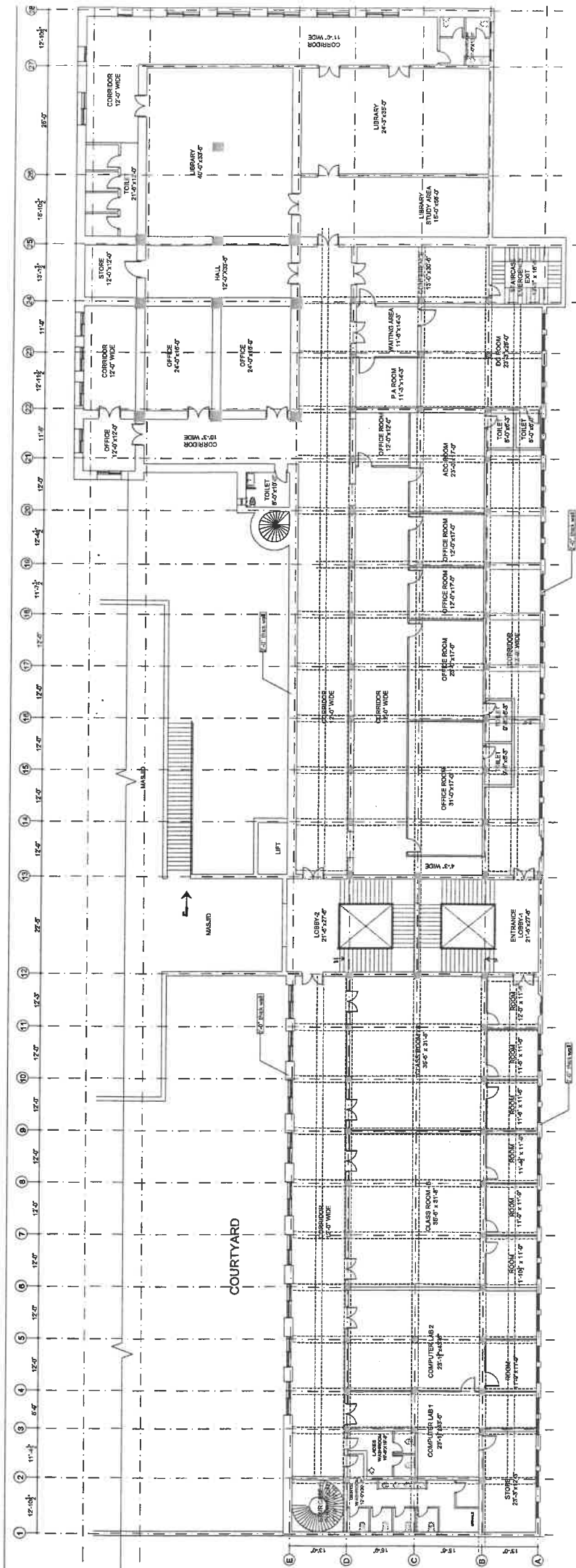
## **STANDARD BIDDING DOCUMENT**

### **Existing & Proposed Drawings**

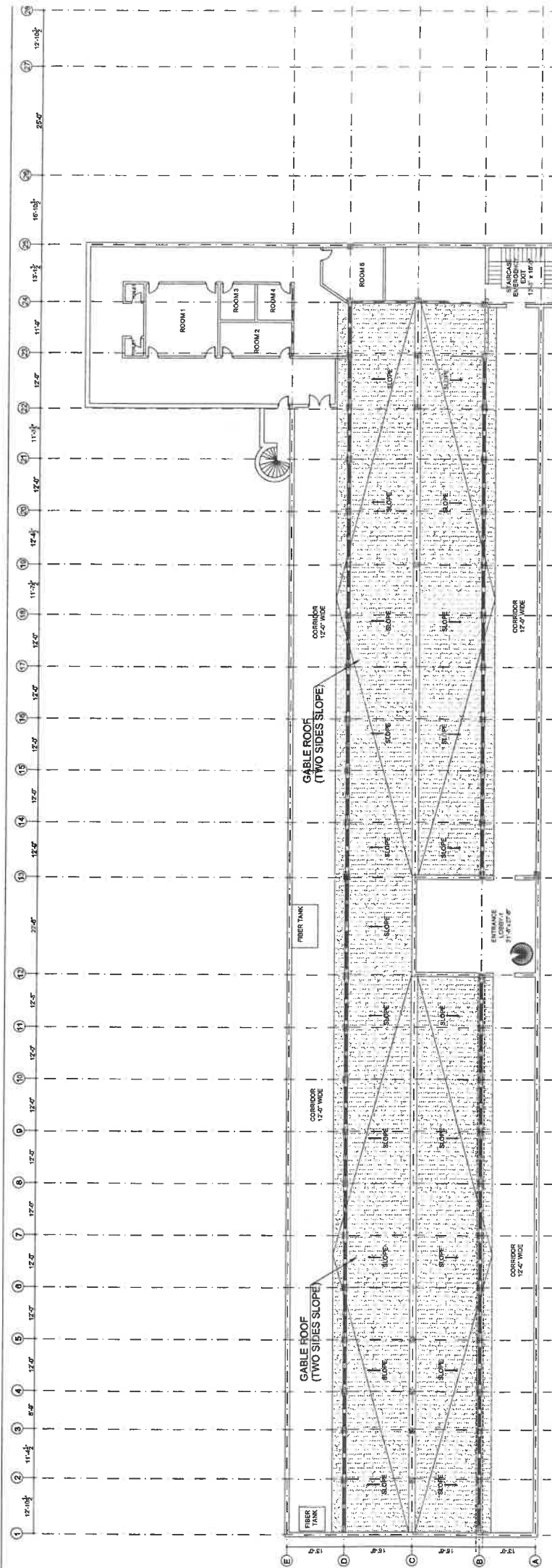
The existing and proposed plans are attached as part of this tender document for detailed reference. These drawings are provided to give bidders a clear understanding of the current site conditions and the proposed scope of work. All quantities, specifications, layouts, and quality standards shall be derived and interpreted in accordance with these drawings.



**ASBUILT:  
GROUND FLOOR PLAN  
OLD CUSTOM HOUSE**



**ASBUILT:**  
**FIRST FLOOR PLAN**  
**OLD CUSTOM HOUSE**



ASBUILT:  
**ROOF PLAN**  
 OLD CUSTOM HOUSE