# BIDDING DOCUMENTS

## FOR

## INTERNAL ELECTRIFICATION & IT WORKS OF ECSP'S NEW HEAD OFFICE

## ENGINEERING CONSULTANCY SERVICES PUNJAB PRIVATE LIMITED (ECSP)

**(VOLUME 1)**

**- INSTRUCTIONS TO BIDDERS**
**- BID DATA SHEET**
**- LETTERS OF TECHNICAL BID / FINANCIAL BID, AND APPENDICES TO BID**
**- FORMS**
**- CONDITIONS OF CONTRACT**
**- SPECIFICATIONS**

**DECEMBER 2025**

# TABLE OF CONTENTS

# INVITATION FOR E-BIDS

# INVITATION FOR e-BIDS

**Date: _____**

1. The Engineering Consultancy Services Punjab Pvt. Ltd., Lahore (ECSP) ("Employer") through its own resources intends to undertake the Contract for "Internal Electrification & IT Works of ECSP's new Head Office". Bidding is open to all eligible Bidders.

   (Works include Internal Electrification Works of ECSP's new Head Office including installing the complete electrical system, which consists of power distribution through conduits and cables to lighting, fans and other electrical equipment, power outlets, IT works etc. complete in all respects)

2. The Employer invites encrypted e-bids from Eligible Bidders by uploading PDF file in accordance with Regulation 6[4(a)] of Punjab Procurement Regulations 2024, under Single Stage-Two Envelope bidding procedure duly licensed by the Pakistan Engineering Council in the appropriate category for the Works.

3. The Bidding documents are made available to the interested Bidders free of cost. The Bidding documents may be downloaded from the PPRA website, EPADS Portal and Employer's website:

   https://ppra.punjab.gov.pk/, https://punjab.eprocure.gov.pk/ , https://www.ecsp.com.pk/

4. Pre-Bid Meeting shall take place in Head Office of ECSP at 83-A, E/1, Main Boulevard, Gulberg – III, Lahore December 29, 2025 at 11:00 AM.

6. All e-bids must be accompanied by a Bid Security in the amount of Rs. 1,000,000 (Rupees One Million) in the format of pay order/deposit-at-call or an irrevocable bank guarantee issued by a Scheduled Bank of Pakistan in favor of Employer. The original form of Bid security must be delivered to ECSP Head Office, 83-A, E/1, Main Boulevard, Gulberg – III, Lahore before the date and time for Bid opening. Bids must be uploaded on e-PADS at 3:00 PM hours, on January 05, 2026.

7. Technical Bids will be opened at 3:30 PM on the same day, in the presence of bidder's representatives who choose to attend at the address "ECSP Head Office, 83-A, E/1, Main Boulevard, Gulberg – III, Lahore".

8. The retention money is limited to 5% (Five Percent) of the Contract Price and shall be deducted from the running bills.

9. The Works are to be completed within 60 (sixty) calendar days from the date of the Employer's order to commence the Works.

10. The Employer reserves the right to reject all bids prior to acceptance of bids without assigning any reason whatsoever.

11. All conditional bids are liable to be rejected.

**Principal Engineer (Contracts)**
**Engineering Consultancy Services Punjab Pvt. Ltd. (ECSP)**
**83-A, E/1, Main Boulevard, Gulberg – III, Lahore.**
**Telephone No.: (042) 35717681-4**
**Office Hours: 9AM-5PM (Monday to Friday)**

# INSTRUCTIONS TO BIDDERS

# INSTRUCTIONS TO BIDDERS

(Note: These Instructions to Bidders along with Bid data sheet will not be part of the Contract and will cease to have effect once the contract is signed.)

## A. GENERAL

### IB.1 Scope of Bid

1.1 The Employer as defined in the Bid data sheet hereinafter called "the Employer" wishes to receive bids for the construction and completion of works and remedying any defects therein as described in these Bidding Documents and summarized in the Bid data sheet hereinafter referred to as the "Works".

1.2 The successful bidder will be expected to complete the Works within the time specified in Appendix-A to Bid in accordance with the conditions, stipulations and the requirements described and set forth in these bid documents.

1.3 The submission of a bid will imply full acceptance on the part of the Bidder of these instructions, conditions, stipulations and the requirements described and set forth in these bid documents.

### IB.2 Source of Funds

2.1 The Employer has applied for/received a loan/credit/scheme from the source (s) indicated in the Bid data sheet in Pak Rupees/ various currencies towards the cost of the project specified in the Bid data sheet and it is intended that the proceeds of this loan/credit/ scheme will be applied to eligible payments under the Contract for which these Bidding Documents are issued.

### IB.3 Eligible Bidders

3.1 This Invitation for Bids is open to all bidders meeting the following requirements:

a. Duly licensed by the Pakistan Engineering Council (PEC) as specified in Appendix-N.

b. Incorporated with Security and Exchange Commission of Pakistan or Registrar of Firms as the case may be. [NTN Verification along with requisite Affidavit of sole-proprietorship in case of Sole-Proprietor]. Copy of Document defining the constitution and legal status, place of registration, principal place of business of the Company or firm or Partnership.

c. Registered with active status from Tax Authorities

d. Not blacklisted by the Procuring Agency.

e. Foreign firm participating in the JV shall have the nationality of an eligible country. Foreign firms shall be deemed to have the nationality of a country if the foreign firm is a national of that country; or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country. (Not Applicable)

f. A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be Non-Responsive. A Bidder may be considered to have a conflict of interest with one or more parties in this Bidding process, if they:

(i) are associated or have been associated, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consulting services for the preparation of the design and other documents to be used.
(ii) have controlling shareholders in common; or
(iii) receive or have received any direct or indirect subsidy from any of them; or
(iv) have the same legal representative for purposes of this Bid; or
(v) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Agency regarding this Bidding process;

**IB.4 One Bid per Bidder**

4.1 Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who participates in more than one bid (other than alternatives pursuant to Clause IB.16) will be disqualified.

**IB.5 Cost of Bidding**

5.1 The bidders shall bear all costs associated with the preparation and submission of their respective bids and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

**IB.6 Inspection of Site (Site Visit)**

6.1 The bidders are advised to visit and examine the Site of Works and its surroundings and shall obtain all necessary information for themselves before submitting their bids as to the cost, risks, contingencies, quantities and nature of Works, climate conditions, the location, form and nature of the site and the terrain, the requirements and availability of manpower, labor, materials and roads, the means and access to the site, transportation and communication facilities and other circumstances on their own responsibility all information that may be necessary for preparing the bid, which may affect or influence their bids and entering into a contract for construction of the Works. All cost in this respect shall be at the bidder's own expense.

6.2 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.

**B. BIDDING DOCUMENTS**

## IB.7 Contents of Bidding Documents

7.1 The Bidding Documents, in addition to invitation for bids, are those stated below and should be read in conjunction with any Addenda issued in accordance with Clause IB.9.

1. Invitation to Bid
2. Instructions to Bidders.
3. Bid data sheet.
4. General Conditions of Contract, Part-I(GCC).
5. Special Conditions of Contract, Part-II(SCC).
6. Specifications – Special Provisions & Technical Provisions
7. Form of Bid & Appendices to Bid, including a Certificate that the bidder is not currently blacklisted by the Procuring Agency.
8. Bill of Quantities (Appendix-D to Bid).
9. Bid Drawings.
10. Addenda and Corrigenda, if any, issued by the Employer.
11. Form of Bid Security.
12. Form of Contract Agreement.
13. Forms of Performance Security and Mobilization Advance.

7.2 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 Bidder's own risk. Pursuant to Clause IB.26, bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.

7.3 The Employer shall not assume any responsibility for information, interpretation and deductions the Bidders may make from the data furnished by the Employer. No verbal understanding, agreement or conversation with any officer, employee or agent of the Employer, either before, during or after the execution of the Contract, shall affect or modify any of the terms or obligations contained in the Bid Documents.

## IB.8 Clarification of Bidding Documents

8.1 Any prospective bidder requiring any clarification (s) in respect of the Bidding Documents may notify the Employer in writing at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which he receives prior to the deadline for submission of bids. The exact number of days will be mentioned in the Bid Data Sheet keeping in view the time given for submission of bids.

Copies of the Employer's response will be forwarded to all purchasers of the Bidding Documents, including a description of the enquiry but without identifying its source.

## IB.9 Amendment of Bidding Documents

9.1 At any time at least three days 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.

9.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to IB 7.1 hereof and shall be communicated in writing to all purchasers of the Bidding Documents, at least three (03) days prior to the closing date of submission of the bid.

Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer.

9.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids in accordance with Clause IB.20

## C. PREPARATION OF BIDS

### IB.10 Language of Bid

10.1 The bid and all correspondence and documents related to the bid exchanged by a bidder and the Employer shall be in the bid language stipulated in the Bid data sheet and Special Conditions of Contract. Supporting documents and printed literature furnished by the bidders may be in any other language provided the same are accompanied by an accurate translation of the relevant parts in the bid language, in which case, for purposes of evaluation of the bid, the translation in bid language shall prevail.

### IB.11 Documents Comprising the Bid

11.1 The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Bid and the other the Financial Bid, containing the documents listed in Bid data sheet under the heading of IB 11.1 A & B respectively. Both envelopes to be enclosed together in an outer single envelope called the Bid. Each bidder shall furnish all the documents as specified in Bid data sheet 11.1 A & B.

11.2 Bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all partners and submitted with the bid, together with a copy of the proposed agreement. The role to be played by each partner to be specified therein; and, the concerned partner should have the requisite qualification/ experience to successfully execute the assigned task. Bids submitted by a joint venture of two (2) or more firms shall also comply with the following requirements:

(a) In case of a successful bid, the Form of JV Agreement shall be signed so as to be legally binding on all partners within 7 days of the receipt of letter of acceptance failing which the contract and the letter of acceptance shall stand void and redundant.

(b) One of the joint venture partners shall be nominated as being in charge/ lead partner; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the joint venture partners;

(c) The partner-in-charge/ lead partner shall always be duly authorized to deal with the Employer regarding all matters related with and/or incidental to the execution of Works as per the terms and Conditions of JV Agreement and in this regard to incur any and all liabilities, receive instructions, give binding undertakings and receive payments on behalf of the joint venture;

(d) All partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the Contract in accordance with the Contract terms; and, a statement to this effect shall be included in the authorization mentioned under Sub-Para (b) above as well as in the Form of Bid and in the Form of JV Agreement (in case of a successful bid); and

(e) A copy of JV agreement shall be submitted before signing of the Contract, stating the conditions under which JV will function, its period of duration, the persons authorized to represent and obligate it and which persons will be directly responsible for due performance of the Contract and can give valid receipts on behalf of the joint venture, the proportionate participation of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. The JV Agreement shall be made part of the contract. No amendments / modifications whatsoever in the joint venture agreement shall be agreed to between the joint venture partners without prior written consent of the Employer.

11.3 The Bidder shall furnish, as part of the Technical Bid, a Technical Proposal including a statement of work methods, equipment, personnel, schedule, qualification/ experience required to successfully execute the individually assigned tasks and any other information as stipulated in Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time referred to in Sub-Clause 1.2 hereof.

## IB.12 Bid Prices

12.1 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole of the Works as described in IB 1.1 hereof, based on the unit rates and / or prices submitted by the bidder.

12.2 The bidders shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by 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 Bill of Quantities.

12.3 All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date **of opening of the 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 Sub-Clause 70.2 of the General Conditions of Contract Part-I.

12.4 The rates and prices quoted by the bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 70 of the Conditions of Contract. The bidders shall furnish the prescribed information for the price adjustment formulae in Appendix C to Bid and shall submit with the bids such other supporting information as required under the said clause. (Not Applicable)

12.5 No Bidder shall have any right to make any objection, excuse or claim about correctness and sufficiency of his Bid after receipt of his Bid by the Employer.

## IB.13 Currencies of Bid and Payment

13.1 The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country (referred to as the "Foreign Currency Requirements") shall indicate the same in Appendix-B to Bid. However, subject to GCC clause 71.1, payments in foreign currency are not permissible.

13.2 The rates of exchange to be used by the bidder for currency conversion shall be the TT & OD Selling Rates published or authorized by the State Bank of Pakistan prevailing on the date of opening of the bids. For the purpose of payments, the exchange rates used in bid preparation shall apply for the duration of the Contract. Rule 32(2) of PPR-14 shall be applicable for rate of exchange of foreign currencies.

## IB.14 Bid Validity

14.1 Bids shall remain valid for the period stipulated in the Bid data sheet after the Date of Bid Opening specified in Clause IB.23.

14.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period which shall in no case be more than the original bid validity period or 180 days whichever is more. The request and the responses thereto shall be made in writing. A bidder may refuse the request without forfeiting his Bid Security. A bidder agreeing to the request will not be required or permitted to modify his bid, but 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. Rule 28 of PPR-14 shall be applicable for Bid Validity period.

## IB.15 Bid Security

15.1 Each bidder shall furnish, as part of his bid, a Bid Security in the amount stipulated in the Bid data sheet in Pak Rupees.

15.2 The Bid Security shall be, at the option of the bidder, in the form of pay order, Deposit-at-Call or a Bank Guarantee issued by a Scheduled Bank in Pakistan in favor of the Employer valid for a period 30 days beyond the Bid Validity date.

15.3 Any bid not accompanied by an acceptable Bid Security shall be rejected by the Employer as non-responsive.

15.4 The bid securities of unsuccessful bidders will be returned on Employer's signing the agreement with the successful Bidder but not later than 90 days following the date set for the opening of the Bids.

15.5 The Bid Security of the successful bidder will be returned when the bidder has furnished the required Performance Security and signed the Contract Agreement.

15.6 The Bid Security may be forfeited:

(a) If the bidder withdraws his bid except as provided in IB 22.1;
(b) If the bidder does not accept the correction of his Bid Price pursuant to IB 27.2 hereof; or

(c) In the case of successful bidder, if he fails within the specified time limit to:
   (i) Furnish the required Performance Security;
   (ii) Sign the Contract Agreement, or
   (iii) Furnish the required JV agreement within 7 days of the receipt of letter of acceptance, if applicable.

**IB.16 Alternate Proposals by Bidder**

16.1 No alternate proposals are allowed in single stage two envelope method.

**IB.17 Pre-Bid Meeting**

17.1 The Employer may, on his own motion 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, is as stipulated in the Bid data sheet. All prospective bidders or their authorized representatives shall be invited to attend such a pre-bid meeting.

17.2 The bidders are requested to submit questions, if any, in writing so as to reach the Employer not later than seven (7) days before the proposed pre-bid meeting.

17.3 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given, will be transmitted without delay to all purchasers of the Bidding Documents. Any modification of the Bidding Documents listed in IB 7.1 hereof, which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause IB.9 and not through the minutes of the pre-bid meeting.

17.4 Absence at the pre-bid meeting will not be a cause for disqualification of a bidder.

**IB.18 Format and Signing of Bid**

18.1 Bidders are particularly directed that the amount entered on the Letter of Financial Bid shall be for performing the Contract strictly in accordance with the Bidding Documents.

18.2 All appendices to Bid are to be properly completed and signed.

18.3 No alteration is to be made in the Financial Bids and Technical Bids nor in the Appendices thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the bid may be rejected.

18.4 The Bidder shall prepare one original of the Technical Bid and one original of the Financial Bid comprising the Bid as described in Bid data sheet against IB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - FINANCIAL BID". In addition, the Bidder shall submit two (2) copies of the Bid and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

18.5 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the Bid data sheet and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of

the Bid, except for unamended printed literature, shall be signed or initialed by the person signing the bid.

18.6 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

18.7 Bidders shall indicate in the space provided in the Letter of Technical and Financial Bids, 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.

18.8 Bidders should retain a copy of the Bidding Documents as their file copy.

## D. SUBMISSION OF BIDS FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDURE

### IB.19 Sealing and Marking of Bids

19.1 Each bidder shall submit his bid as under:

(a) ORIGINAL and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such.

(b) The envelopes containing the ORIGINAL and copies will be put in one sealed envelope and addressed / identified as given in IB 19.2 hereof.

(c) The technical bid should comprise of documents listed in IB11.1 (A) & the Financial Bid should comprise of documents listed in IB 11.1 (B) which shall be placed in separate envelopes in accordance with IB 11.1.

19.2 The inner and outer envelopes shall:

(a) Be addressed to the Employer at the address provided in the Bid data sheet;

(b) Bear the name and identification number of the contract as defined in the Bid data sheet; and

(c) Provide a warning not to open before the time and date for bid opening, as specified in the Bid data sheet.

19.3 In addition to the identification required in IB 19.2 hereof, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Clause IB.21

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

### IB.20 Deadline for Submission of Bids

20.1 (a) Bids must be received by the Employer at the address specified no later than the time and date stipulated in the Bid data sheet.

(b) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified.

above. Bidders shall bear all expenses incurred in the preparation and delivery of bids. No claims will be entertained for refund of such expenses.

(c) Where delivery of a bid is by mail and the bidder wishes to receive an acknowledgment of receipt of such bid, he shall make a request for such acknowledgment in a separate letter attached to but not included in the sealed bid package.

(d) Upon request, acknowledgment of receipt of bids will be provided to those making delivery in person or by messenger.

20.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with Clause IB.9, 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.21 Late Bids**

21.1 (a) Any bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.20 will be returned unopened to such bidder.

(b) Delays in the mail, delays of person in transit, or delivery of a bid to the wrong office shall not be accepted as an excuse for failure to deliver a bid at the proper place and time. It shall be the bidder's responsibility to determine the manner in which timely delivery of his bid will be accomplished either in person, by messenger or by mail.

**IB.22 Modification, Substitution and Withdrawal of Bids**

22.1 Any bidder may modify**,** substitute or withdraw his bid after bid submission provided that the modification, substitution or written notice of withdrawal is received by the Employer prior to the deadline for submission of bids.

22.2 The modification, substitution, or notice for withdrawal of any bid shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause IB.19 with the outer and inner envelopes additionally marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" as appropriate.

22.3 No bid may be modified by a bidder after the deadline for submission of bids except in accordance with IB 22.1 and 27.2.

22.4 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in the Form of Bid may result in forfeiture of the Bid Security in pursuance to Clause IB.15.

## E. BID OPENING AND EVALUATION FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDURE

**IB.23 Bid Opening**

23.1 The Employer will open the Technical Bids in public at the address, date and time specified in the Bid data sheet in the presence of Bidders` designated representatives and anyone who choose to attend. The Financial Bids will remain

unopened and will be held in custody of the Employer until the specified time of their opening.

23.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding Withdrawal Notice contains a valid authorization to request the withdrawal and is read out at bid opening.

23.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Financial Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Financial Bid will remain unopened in accordance with IB 23.1. No envelope shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.

23.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Financial Bid shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Financial Bids, both Original and Modification, will remain unopened in accordance with IB 23.1. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

23.5 Other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:

(a) the name of the Bidder;
(b) whether there is a modification or substitution;
(c) the presence of a Bid Security, if required; and
(d) Any other details as the Employer may consider appropriate.

No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with IB 21.1. Only Technical Bids read out and recorded at bid opening, shall be considered for evaluation.

**Preliminary Examination of Technical Bids**

23.6 a) The Employer shall first examine qualification and experience Data as per appendix M and N submitted by the Bidder. The technical proposal examination of those bidders only shall be taken in hand who meet the minimum requirement as mentioned in appendix M and N. Only substantially responsive qualification shall be considered for further evaluation.

b) The Employer shall examine the Technical Bid to confirm that all the documents have been provided, and to determine the completeness of each document submitted.

23.7 The Employer shall confirm that all the documents and information have been provided for evaluation of Technical bid as required under these bidding documents.

23.8 At the end of the evaluation of the Technical Bids, the Employer will invite only those bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Financial Bids.
The date, time, and location of the opening of Financial Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice for the opening of Financial Bids.

23.9 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Document and return their Financial Bids unopened as per rule 38(2)(a)(vii) of PPR-14.

23.10 The Employer shall conduct the opening of Financial Bids of all Bidders who submitted substantially responsive Technical Bids, publicly in the presence of Bidders` representatives who choose to attend at the address, date and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.

23.11 All envelopes containing Financial Bids shall be opened one at a time and the following read out and recorded:

(a) The name of the Bidder;
(b) Whether there is a modification or substitution;
(c) The Bid Prices, including any discounts; and
(d) Any other details as the Employer may consider appropriate.

Only Financial Bids and discounts, read out and recorded during the opening of Financial Bids shall be considered for evaluation. No Bid shall be rejected at the opening of Financial Bids.

23.12 If this Bidding Document allows Bidders to quote separate prices for different contracts, and the award to a single Bidder of multiple contracts, the methodology to determine the lowest evaluated price of the contract combinations is that which is most economical to the Employer. (Not Applicable)

**IB.24 Process to be Confidential**

24.1 Information relating to the examination, clarification, evaluation and comparison of bid and recommendations for the award of a contract shall not be disclosed to bidders or any other person not officially concerned with such process before the announcement of final bid evaluation report which shall be done at least 10 days prior to the award of Contract. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made (if applicable), final evaluated prices and recommendations against all the bids evaluated. Any effort by a bidder to influence the Employer's processing of bids or award decisions may result in the rejection of such bidder's bid. Whereas any bidder feeling aggrieved may lodge a written complaint not later than ten 10 days after the announcement of Technical and Financial Bids. No bidder will be allowed to file grievance petition w.r.t. Technical Evaluation after announcement/ uploading of Financial Evaluation Report.

However mere fact of lodging a complaint shall not warrant suspension of the procurement process.

### IB.25 Clarification of Bids

25.1 To assist in the examination, evaluation and comparison of bids, the Employer may, at his discretion, ask any bidder for clarification of his bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids in accordance with Clause IB.28.

25.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its bid may be rejected. Rule 33 of PPR-14 shall be applicable for clarifications.

### IB.26 Examination of Bids and Determination of Responsiveness

26.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid is substantially responsive to the requirements of the Bidding Documents.

26.2 A substantially responsive bid is one which (i) meets the eligibility criteria; (ii) has been properly signed; (iii) is accompanied by the required Bid Security; (iv) Includes signed Integrity Pact where required as per clause IB.35; and (v) conforms to all the terms, conditions and specifications of the Bidding Documents, without material deviation or reservation (vi) meets the qualification criteria as specified in Appendix-M & N. A material deviation or reservation is one (i) which affects 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; (iii) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids. Only substantially responsive bid shall be considered for further evaluation.

26.3 If a bid is not substantially responsive, it may not subsequently be made responsive by correction or withdrawal of the non-conforming material deviation or reservation. The Employer may, however, seek confirmation/ clarification in writing which shall be responded in writing.

### IB.27 Correction of Errors

27.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

(a) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and

(b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern and the unit rate will be corrected.

27.2 The amount stated in the Letter of Financial Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the

concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected Bid Price, his Bid will be rejected, and the Bid Security shall be forfeited in accordance with IB.15.6 (b) hereof.

### IB.28 Evaluation and Comparison of Bids

28.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.26.

28.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

(a) Making any correction for errors pursuant to Clause IB.27;

(b) Excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including competitively priced Day work; and

(c) Making an appropriate adjustment for any other acceptable variation or deviation.

28.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.

28.4 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 Bill of Quantities 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.32 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.

## F. AWARD OF CONTRACT

### IB.29 Award

29.1 Subject to Clauses IB.30 and IB.34, 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 eligible in accordance with the provisions of Clause IB.3 and qualify pursuant to IB 29.2.

29.2 The Employer, at any stage of the bid evaluation, having credible reasons for or prima facie evidence of any defect in bidder's capacities, may require the bidders 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 in writing. They shall form part of the records of that bid evaluation report.

### IB.30 Employer's Right to Accept any Bid and to Reject any or all Bids

30.1 Notwithstanding Clause IB.29, the Employer reserves the right to accept or reject any Bid by giving reasons, and to annul the bidding process and reject all bids, at any time prior to the acceptance of any bid or proposal, without thereby incurring any liability to the affected bidders or any obligation except that the grounds for rejection of all bids 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.

**IB.31 Notification of Award**

31.1 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 execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the "Contract Price").

31.2 No Negotiation with the bidder having evaluated as lowest responsive or any other bidder shall be permitted. However, the lowest evaluated bidder may further reduce the Bid Price voluntarily without compromising the quality/ quantity.

31.3 The notification of award 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.

31.4 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. No bid security can be returned without exhausting the grievance period or without finally disposing off the complaint of the non-responsive bidder. However, bid security may be returned earlier if any bidder submits affidavit that he is satisfied with the proceedings and hence his bid security may be returned.

**IB.32 Performance Security**

32.1 The successful bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Bid data sheet and the Conditions of Contract within a period of 14 days after the receipt of Letter of Acceptance. On submission of Performance Security, the bid security of the successful bidder may be returned.

32.2 Failure of the successful bidder to comply with the requirements of IB.32.1 or IB.33 or IB.35 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. Rule 56 of PPR-14 shall be applicable for performance Security.

**IB.33 Signing of Contract Agreement**

33.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will send the successful bidder the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the parties.

33.2 The formal Agreement between the Employer and the successful bidder shall be executed within 14 days of the receipt of the Contract Agreement by the successful bidder from the Employer.

## IB.34 General Performance of the Bidders

The Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts/works. The Employer may in case of consistent poor performance of any Bidder as reported by the employers of the previously awarded contracts, interalia, reject his bid and/or refer the case to the concerned forum(s). Upon such reference, the concerned forum(s) 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 blacklisting of such Bidder and debarring him from participation in future bidding for similar works.

## IB.35 Integrity Pact

The Bidder shall sign and stamp the Integrity Pact provided at Appendix-L to Bid in the Bidding Documents for all procurement contracts exceeding Rupees ten Million. Failure to provide such Integrity Pact shall make the bidder non-responsive.

## IB.36 Instructions not Part of Contract

Bids shall be prepared and submitted in accordance with these Instructions which are provided to assist bidders in preparing their bids, and do not constitute part of the Bid or the Contract Documents. Submission of Bids shall be construed as evidence that the bidder has admitted all provisions of the Instruction to the Bidders.

## IB.37 PPRA Act, 2009 and PPR-14 will have over-riding effect

PPRA Act, 2009 and PPR-14 as amended up to date will supersede and will have an over-riding effect in case of any contradiction with these Instructions, the Contract or any other part of the Bidding Documents.

# BID DATA SHEET

# Bid Data Sheet

*Instructions to Bidders*

*Clause Reference*

**1.1 Name and address of the Employer:**

Engineering Consultancy Services Punjab (ECSP) (Pvt.) Limited
Address: 83 A/E-I, Main Boulevard, Gulberg III, Lahore, Pakistan

1.1 Name of the Project: Internal Electrification & IT Works of ECSP's new Head Office

Summary of the Works: Internal Electrification Works of ECSP's new Head Office at Imperium Tower, Gulberg, Lahore including installing the complete electrical system, power distribution through conduits and cables to lighting, fans and other electrical equipment, power outlets, IT works etc. and allied works complete in all respects.

2.1 Name of the Borrower/Source of Financing/Funding Agency:

Source of Financing: Self Financing (through own Resources)

2.1 Amount and Type of financing:

6.3 The following text as 6.3 is added after IB 6.2:

The bidder or his authorized representative shall visit and inspect the site of the Works including the areas and surroundings to be used for Contractor's Camp, on his own responsibility and at his own expense, and obtain all the information from his own sources, which may be necessary for preparing the Bid. The Employer may assist but will not take any responsibility for the supply or correctness of the information.

The Bidder shall, before submitting his Bid, satisfy himself in all respects including the following:

a) The existing facilities in the vicinity of the Site of Work, the hydrological and climatological conditions, the form and nature of the Site of Work.
b) The quantities and nature of the work and materials necessary for completion of the Works.
c) The means of access to the Site of the Work and exit from the Site.
d) The available accommodation on land for Contractor's Camp within or outside the Site of Work.
e) All necessary information as to risks, contingencies and other circumstances, which may influence or affect the tender:
f) The type and nature of soil existing in area of Work.
g) The existing condition at Site.

Each Bidder shall also enquire and satisfy himself as to the source, the quantity of supply, sufficiency of and the means of obtaining and transporting all plant, material, labor, fuel water, electricity and other matters or things required for on in connection with the Works.

In preparing the Bid, Bidders shall also consider his obligation to adequately store all materials and maintain existing facilities and all temporary Works during the period of their usage.

The Bidder must make local inquiries as to the physical conditions prevailing at the site and obtain his own information on all matters and things that may in any way influence him in making a Bid and fixing the rates in the Bill of Quantities. He must also satisfy himself as to the risks, obligations and responsibilities to be undertaken in accordance the Contract to be entered into by him should his Bid be accepted.

The Bidders shall make his own investigations, enquiries and assessments, on all matters, of all conditions of existing constructions at the site and its vicinity, to his satisfaction before submitting his bid.

Prior approval shall be taken by the Bidders for inspection of the Site. The Contact person for the purpose is:

Project Manager
ECSP, Lahore.
Phone No. 042-35717681-84

8.1 Clause IB 8 is deleted and replaced with following:

8.1 Any prospective bidder requiring any clarification (s) in respect of the Bidding Documents may notify the Employer through e-PADS. The Employer will respond to any request for clarification which he receives through e-PADS 7 days prior to the deadline for submission of bids. Employer's response will be uploaded on e-PADS.

9.2 Sub-Clause IB 9.2 is deleted and replaced with following:

Any addendum thus issued shall be part of the Bidding Documents pursuant to IB 7.1 hereof and shall be uploaded on e-PADS, at least three (03) days prior to the closing date of submission of the bid.

10.1 Bid language:

English

11.1 Sub-Clause IB 11.1 is deleted and replaced with following:

The Bid shall comprise two envelopes (encrypted packages) submitted simultaneously, one called the Technical Bid and the other the Financial Bid, containing the documents listed in Bid data sheet under the heading of IB 11.1 A & B respectively. Each bidder shall furnish all the documents as specified in 11.1 A & B below.

11.1(A) The Bidder shall submit with its Technical Bid the following documents:

| | | |
|---|---|---|
| (a) | Letter of Technical Bid | |
| (b) | Bid Security | (IB.15) |
| (c) | Written confirmation authorizing the signatory of the Bid to commit the Bidder | (IB.18.5) |
| (d) | Pending litigation information | |
| (e) | Certificate that the bidder is not currently blacklisted by the Procuring Agency | |
| (f) | Special Stipulations (as filled by the Employer) | (Appendix-A) |
| (g) | Proposed Construction Schedule | (Appendix-E) |
| (h) | Method of Performing the Work | (Appendix-F) |
| (i) | Availability of Critical Equipment | (Appendix-G) |
| (j) | Construction Camp and Housing Facilities | (Appendix-H) |
| (k) | List of Sub-contractors | (Appendix-I) |
| (l) | Organization Chart for Supervisory Staff | (Appendix-K) |
| (m) | Integrity Pact | (Appendix-L) |
| (n) | Financial Competence and Access to financial Resources | (Appendix-M) |
| (o) | Past Performance, Current Commitment, Qualification and Experience | (Appendix-N) |

11.1(B) The Bidder shall submit with its Financial Bid the following documents:

| | | |
|---|---|---|
| (a) | Letter of Financial Bid | |
| (b) | Foreign Currency Requirements (If required and only in case of International Bidding) | (Appendix-B) |
| (c) | Price Adjustment under Clause 70 (Not Applicable) | (Appendix-C) |
| (d) | Bill of Quantities | (Appendix-D) |
| (e) | Estimated Progress Payments | (Appendix-J) |

11.2 Following sub-paragraph (f) is added:

Maximum number of joint venture partners shall be "two (02)". The lead partner of the joint venture (i.e., partner-in-charge) must have financial share of more than 50 % under the JV Agreement.

12.2 Add the following paragraph at the end of IB 12.2:

The bidder, by the act of submitting a bid, acknowledges that he has inspected the Site of Works and determined the general characteristics and conditions. The Employer will not assume any responsibility for information, interpretations and deductions the bidder may make from the information furnished by the Employer. No verbal agreement or conversation with any officer, employee or agent of the

Employer either before, during or after the execution of the Contract, shall affect or modify any of the terms or obligations contained in the Contract.

12.3 Add the following paragraph at the end of IB 12.3:

The attention of the Bidder is drawn to the fact that local regulations require special formalities to be complied with in connection with the ordering, purchasing and importing of materials from outside Pakistan. Bidder will be deemed to have obtained full information about all such matters and to have allowed in his Bid for all delays, additional costs and financing charges that may arise directly or indirectly there from. Any neglect or failures on the part of the Bidder to obtain reliable information on the spot or elsewhere upon the foregoing or any other matters affecting the execution and completion of the Works, the rates, total amount and the Contract shall not relieve the Bidder whose Bid is accepted from any risks or liabilities or from the responsibility of completing and handing over the works.

The rates and prices set down by the Bidders against all the items in the Bill of Quantities are to be the full inclusive value of the finished work described there under and shall be deemed to include all costs of performing the Works including all taxes and duties, profits and costs of accepting the general risks, liabilities and obligations of every kind set forth or implied in the Contract.

13 Text under IB 13.1 and 13.2 is deleted in entirety and replaced with following:

13.1 The bid price shall be quoted by the bidder entirely in Pak rupees. All payments under the Contract shall be made in Pak rupees only.

14.1 Period of Bid Validity:

90 days after the Date of Technical Bid Opening

15.1 Amount of Bid Security:

As stated in the Invitation for e-Bids

15.1 Following is added in continuation of Sub-Clause IB 15.1

The bidder shall upload soft copy of the Bid Security on e-PADS and shall submit hard copy of the Bid Security at the Employer's address stated in the Invitation for e-Bids in conformity with Regulation 8(6) of Punjab Procurement Regulations 2024.

17.1 Venue, time, and date of the pre-Bid meeting:

As stated in the Invitation for e-Bids

18.4 Sub-Clause IB 18.4 is deleted and replaced with following:

The Bidder shall prepare the Technical Bid and the Financial Bid comprising the Bid as described in Bid data sheet against IB 11 and clearly mark it "TECHNICAL BID" and "FINANCIAL BID".

19 Clause IB 19 is deleted and replaced with following:

19.1 Each bidder shall submit his bid in "pdf format" on e-PADS through the system and the bidders shall encrypt those entries electronically separately in the form of two encrypted packages i.e technical bid and price bid respectively.

19.2 The technical bid should comprise of documents listed in IB11.1 (A) & the price bid should comprise of documents listed in IB 11.1 (B).

20.1 Sub-Clause IB 20.1 is deleted and replaced with following:

Bids must be uploaded by the Bidders online through e-PADS no later than the deadline for submission of Bids as stated in the Invitation for e-Bids.

21 Clause IB 21 is deleted and replaced with following:

21.1 Bid cannot be uploaded on e-PADS after the deadline for the submission of bids.

22.1 Sub-Clause IB 22.1 is deleted and replaced with following:

The Bidders shall have the option to modify or withdraw the Bid after electronic submission provided that such modification or withdrawal is done through e-PADS prior to the deadline for submission of e-bids.

22.2 Sub-Clause IB 22.2 is deleted
23.1 Venue, time, and date of Bid opening: As stated in the Invitation for e-Bids
23.2 Sub-Clause IB 23.2 is deleted
23.3 Sub-Clause IB 23.3 is deleted
23.4 Sub-Clause IB 23.4 is deleted
23.5 Sub-Clause 23.5 is deleted and replaced with following

The Technical Bids shall be opened one at a time, and the following read out and recorded:

(a) the name of the Bidder;
(b) the presence of a Bid Security, if required; and
(c) Any other details as the Employer may consider appropriate.

Only Technical Bids read out and recorded at bid opening, shall be considered for evaluation.
In case e-Bid including entries and record submitted on e-PADS found corrupt, un-readable or contains virus, then such e-Bid shall be rejected pursuant to Regulation 8 (4) of Punjab Procurement Regulations 2024.

23.9 Sub-Clause 23.9 is deleted and replaced with following

The Employer shall upload the technical evaluation report at least 5 days prior to the opening of Financial Bids on the e-PADS and PPRA website. The Financial Bid of the technically non-responsive bidders shall remain unopened in the e-PADS as per rule 38(2)(a)(vii) of PPR-14.

23.11 Sub-Clause 23.11 is deleted and replaced with following

All encrypted envelopes containing Financial Bids shall be opened one at a time and the following read out and recorded:

(a) The name of the Bidder;
(b) The Bid Prices, including any discounts; and
(c) Any other details as the Employer may consider appropriate.

Only Financial Bids and discounts, read out and recorded during the opening of Financial Bids shall be considered for evaluation.

In case e-Bid including entries and record submitted on e-PADS found corrupt, un-readable or contains virus, then such e-Bid shall be rejected pursuant to Regulation 8 (4) of Punjab Procurement Regulations 2024.

32.1 Text "14 days" stated in the first paragraph of IB 32.1 is deleted and replaced with "7 days"

32.1 Standard form and amount of Performance Security:

The Performance Security shall be equal to an amount of 10% of the Contract Price stated in the Letter of Acceptance in the favour of the Employer. Such Security shall be in the form acceptable to the Employer of either (a) unconditional, irrevocable Bank Guarantee from any Scheduled Bank of Pakistan acceptable to the Employer or (b) CDR or Demand Draft from a scheduled Bank in Pakistan to the Employer valid for a period till 28 days after the date of issue of Defect Liability Certificate.

# LETTERS OF TECHNICAL BID / FINANCIAL BID, AND APPENDICES TO BID

## Letter of Technical Bid

Date: .....

Bid Reference: Internal Electrification & IT Works of ECSP's new Head Office

To:.....

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB). Complete bidding document is binding upon us and we fully understand that the PPRA Act, 2009 and the PPR-14 and Punjab Procurement Regulations 2024 as amended up to date supersede this bidding document, in case of any contradiction, and the same are also binding upon us;

(b) We, including any Subcontractors for any part of the Contract, have no conflict of interest, and are not debarred/ blacklisted by the Employer, any Government/Semi Government/Public Department in Pakistan or foreign country, international organizations or other foreign institutions.

(c) We offer to execute and complete in conformity with the Bidding Documents the following Works:

(d) Our Bid consisting of the Technical Bid and the Financial Bid shall be valid for a period of …… days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(e) As security for due performance of the undertakings and obligations of our bid, we submit herewith a Bid security, in the amount specified in Bid data sheet, which is valid (at least) 30 days beyond validity of Bid itself.

(f) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process.

(g) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bid data sheet.

Name .....

In the capacity of .....

Signed .....

.....

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

Date .....

Address……..

## Letter of Financial Bid

Date: .....

Bid Reference: Internal Electrification & IT Works of ECSP's new Head Office

To:.....

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB.9);

(b) The total price of our Bid, excluding any discounts offered in item (c) below is:……

(c) The discounts offered and the methodology for their application are:……..

(d) Our Bid shall be valid for a period of …….. days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(e) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;

(f) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed and we do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.

(g) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

(h) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bid data sheet.

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

Name .....

In the capacity of .....

Signed .....

.....

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

Date .....

Address……..

**BA-1**

## Appendix-A to Bid
## Special Stipulations
## Clause
## Conditions of Contract

The stipulations outlined hereunder in the form of a table summarize certain terms and conditions which are set forth in the General Conditions of Contract and special provisions and these stipulations form an integral part of the Contract.

| | | | |
|---|---|---|---|
| 1. | Engineer's Authority to issue Variation in emergency | 2.1 | 2% of the Contract Price stated in the Letter of Acceptance. |
| 2 | Variation | 2.1(b) (viii)(b) | No approval is required by the engineer if the amount needed is up to or less than Rs.2,000,000 (Two million only) |
| 3. | Law applicable | 5.1(b) | The relevant laws applied in the province of the Punjab, Pakistan |
| 4. | Amount of Performance Security | 10.1 | 10% of Contract Price stated in the Letter of Acceptance. |
| 5. | Time for Furnishing Program | 14.1 | Within 07 days from the date of receipt of Letter of Acceptance. |
| 6. | Minimum amount of Third Party Insurance | 23.2 | As stipulated in Sub-Clause 23.2 of the Particular Conditions of Contract. |
| 7. | Time for Commencement | 41.1 | Within five days from the date of receipt of Engineer's Notice to Commence which shall be issued within seven (07) days after signing of Contract Agreement. |
| 8. | Time for Completion | 43.1,<br><br>48.2 | 60 calendar days from the date of receipt of Engineer's Notice to Commence.<br><br>Not Applicable |
| 9. | a) Amount of Liquidated Damages | 47.1 | 0.1 % of the Contract Price stated in the Letter of Acceptance for each day of delay in completion of the Works subject to a maximum of 10% of Contract Price stated in the Letter of Acceptance. |
| | b) Amount of Bonus | 47.3 | Not Applicable |
| 10. | Defects Liability Period | 49.1 | 180 Days from the effective date of Taking Over Certificate. |
| 11. | Percentage of Retention Money | 60.2 | 5 % of the verified amount of Interim Payment Certificates/running bills made to the Contractor(s). |
| 12. | Limit of Retention Money | 60.2 | 5 % of Contract Price stated in the Letter of Acceptance or the value of the total work done. |
| 13. | Minimum amount of Interim Payment Certificates (Running Bills) | 60.2 | PKR 3,000,000/- Rupees three million after verification by the Engineer |

| | | | |
|---|---|---|---|
| 14. | Time of Payment from delivery of Engineer's Interim Payment Certificate to the Employer. | 60.10 | 10 calendar days |
| 15. | Mobilization Advance (Interest Free) | 60.12 | Interest free Mobilization advance equivalent to ten (10) % of the Contract Price stated in the Letter of Acceptance in single installment, against bank guarantee(s) from a scheduled bank in Pakistan |
| 16. | Deductions | - | The following shall be deducted from the payments made to the Contractor(s):<br>i. Mobilization Advance (if applicable)<br>ii. Retention money<br>iii. All government taxes as required by the law. |

Signature of the Bidder:_____ Company's Seal:_____
with date

**BB-1**

## Appendix-B to Bid
## Foreign Currency Requirements

Not Applicable

## Appendix-C to Bid
## Price Adjustment Under Clause 70 of Conditions of Contract

Not Applicable

## Appendix-D to Bid
## General Preamble and Bill of Quantities

Refer to Volume 2 (Bill of Quantities)

GENERAL PREAMBLE

1. The Bill of Quantities shall be read with the Form of Bid (Technical & Financial), Instructions for Bidders, Conditions of Contract, Specification, Drawings and other documents forming part of the Bidding Documents.
2. The quantities in the Bill of Quantities are estimated only. They are given so that Bidders bids can both be made out and compared on an equal basis with absolutely no guarantee that such quantities will in fact be required. The Employer reserves the right to either reduce or increase the quantities of work under the Contract and any such reduction or increment in quantities shall not vitiate the Contract. Payment under the Contract will be made on the actual quantity of Work Done at the Unit rates entered into the Bill of Quantities.
3. The prices and rates inserted by the Bidders shall be deemed to be the full inclusive value of the work described under several items in the Bill of Quantities including all direct and indirect costs, expenses, custom duties, sales taxes, local and federal taxes, insurance, port and octroi charges, that may be required for the execution, completion and maintenance of Works referred to herein-before, together with all risks, Government taxes, liabilities, contingencies and obligations imposed or implied by each and every one of the Bidding Documents, except for where explicitly mentioned otherwise.
4. The rates quoted in the Bill of Quantities shall be fixed and unchangeable.
5. Proprietary items and trade names are used for the purpose of establishing a standard of "kind, quality and function". Equal, equivalent, acceptable, satisfactory, proper or other general qualifying terms used will not mean "similar" but express "conforming to, of like kind, quality and function". It shall be understood to mean that the reference is made to the ruling and the judgment of the Employer.
6. A rate or price shall be quoted against each item in the Bill of Quantities whether quantities are stated or not. Items against which no rate or price is entered shall be deemed to be covered by other rates or prices in the Bill of Quantities.
7. The quantity of each item of work in the Bill of Quantities executed by the Contractor according to the Contract shall be measured NET in the unit given in the Bill of Quantities relating to such quantity.
8. If some of the manufactured materials are produced in Metric System in which case nearest dimension in inches will be acceptable.
9. Water and electricity for the execution of Works shall be arranged by the Contractor at his own cost and expense.
10. No material, required for execution of the Works shall be supplied or arranged by the Employer. It shall be the responsibility of the Bidder to procure all materials required for the timely completion of the Works.
11. The rates and prices inserted in the Bill of Quantities include, the following: -

    i. All the liabilities, obligations, contingencies and risks imposed by Bidding Documents. Strict compliance with the technical specifications, general option of work and materials.
    ii. The cost and expenses of all works and of all services necessary for the due execution and completion of the Works and remedying of any defects therein.
    iii. These shall include temporary works, erection and supply and use of plant and provision of appliances, materials, and fuel etc., transport, labor and supervision. setting out and for cleaning roads within and adjacent to the Site.
    iv. The Temporary diversion of mains, services, apparatus and appurtenances, if any.
    v. Making due allowance for the effect on the phasing of the work of diversions and alterations to the satisfaction of the Employer.
    vi. Protecting and supporting during the progress of the Works all pipes, ducts, mains, cables, other apparatus and appurtenances, whether shown on the Drawings or not.

which may be endangered by construction activity.

## Appendix-E to Bid
## Proposed Construction Schedule

Pursuant to Sub-Clause 43.1 of the General Conditions of Contract, the Works shall be completed on or before the date stated in Appendix-A to Bid. The Bidder shall provide as Appendix-E to Bid, the Construction Schedule in the bar chart showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and parts of the Works may meet Employer's completion targets in days noted below and counted from the date of receipt of Engineer's Notice to Commence (Attach sheets as required for the specified form of Construction Schedule):

| **Description** | | **Time for Completion** |
|---|---|---|
| a) | Whole Works | 60 calendar days |

## Appendix-F to Bid
## Method of Performing the Work

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

1. Organization Chart for which the Bidder propose to create for satisfactory execution of the Works. The shall indicate the details of personnel employed or proposed to be employed on site by the Bidder for completion of the Works.

2. Site Mobilization, the type of facilities including personnel accommodation, provision for maintenance and for storage, communications, security and other services to be used.

3. The method of executing the Works and transportation of equipment and materials to the site.

4. Quality control / Quality assurance measures to be adopted including procedures to be followed for carrying out all tests required under specifications.

## Appendix-G to Bid
## List of Major Equipment – Related Items

The Bidder will provide a list of all major equipment and related items, which the Bidder proposes to use for satisfactory and timely execution of the Works.

### LIST OF MAJOR EQUIPMENT

| Sr. No. | Description of Unit | Condition | Date of Delivery at Site | Period of Work on Project |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | | | | |
| 2 | | | | |
| ….. | | | | |

## Appendix-H to Bid
## Construction Camp and Housing Facilities

The Contractor in accordance with Clause 34 of the Conditions of Contract 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.

The Bidder shall list or explain his plans for providing these facilities for the service of the Contract as follows:

1. Site Preparation

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. (area required, type of construction and layout).

    b) Warehouses and Storage Areas (area required, type of construction and layout).

4. Other Items Proposed (Security services, etc.). The Contractor should follow environmental measures for the project as per EPA rules.

## Appendix-I to Bid
## List of Subcontractors

I/We intend to subcontract the following parts of the Work to subcontractors. In my/our opinion, the subcontractors named hereunder are reliable and competent to perform that part of the work for which each is listed.

| **Part of Works**<br>**(Give Details)** | **Subcontractor**<br>**(With Bio-data, Detailed Particulars, Complete Address)** |
|---|---|
| 1 | 2 |
| | |

## Appendix-J to Bid
## Estimated Progress Payments (To be submitted with Financial Bid only)

Bidder's estimate of the value of work which would be executed by him during each of the periods stated below, based on his Program of the Works and the Rates in the Bill of Quantities, expressed in thousands of Pakistani Rupees:

| **Period** | **Amounts (Million PKR.)** |
|---|---|
| **1** | **2** |
| 1st Month | |
| 2nd Month | |
| **Bid Price** | |

## Appendix-K to Bid
## Organization Chart for The Supervisory Staff and Labour

The Bidder to provide details of the required key personnel specified in Appendix-N using the following forms:

**Form PER – 1: Proposed Personnel**

Bidder should provide the details of the proposed personnel and their experience record in the relevant Information Forms below for each candidate:

| | |
|---|---|
| **1.** | Project Manager |
| | **Name** |
| **2.** | Site In charge (Electrical/Mechanical) |
| | **Name** |
| **3.** | Supervisor (Electrical/Mechanical) |
| | **Name** |
| **4.** | Quantity Surveyor |
| | **Name** |
| **5.** | Surveyor |
| | **Name** |

## Form PER – 2: Resume of Proposed Personnel

The Bidder shall provide all the information requested below. Use one form for each position.

| | | |
|---|---|---|
| **Position** | | |
| **Personnel information** | **Name** | **Date of birth** |
| | **Professional qualifications** | |
| **Present employment** | **Name of employer** | |
| | **Address of employer** | |
| | **Telephone** | **Contact (manager / personnel officer)** |
| | **Fax** | **E-mail** |
| | **Job title** | **Years with present employer** |

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

| From | To | Company/Project/Position/Relevant Technical and Management Experience |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

**Appendix-L to Bid**
**Integrity Pact (To be submitted with Financial Bid only)**

**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._____ Dated _____
Contract Value: _____
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 the Punjab (GoPb) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoPb 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 GoPb, 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 GoPb 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 GoPb under any law, contract or other instrument, be voidable at the option of GoPb.

Notwithstanding any rights and remedies exercised by GoPb in this regard, [name of Supplier] agrees to indemnify GoPb for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoPb in an amount equivalent to ten time 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 GoPb.

| | |
|---|---|
| Name of Employer: …… | Name of Contractor: …… |
| Signature: …….. | Signature: …… |
| [Seal] | [Seal] |

**Appendix-M to Bid**
**Financial Competence and Access to Financial Resources**

The financial position of the bidder shall be checked as per following details:

**1. SOUNDNESS AND ACCESS TO FINANCIAL RESOURCES:**

"The Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credits, and other financial means, other than any contractual advance payments, to meet the financial requirements of the contract in the amount of his bid. As a minimum, the Bidder must show that his resources, in terms of at least his latest year working capital and line of credits, will be adequate to cover an amount equivalent to estimated Price of the works and current work commitments i.e.

[5 x working capital + General lines of credit– 40% of current contract commitments] ≥ Estimated Price of the works/PC-1 (PKR 50,770,055).

**Working capital** is the difference between current assets and current liabilities and measures the firm's ability to generate cash in the short term." Bidder shall submit last three years (2024-2022) Audited financial statement (audited by independent Chartered Accountant firm).

**Any line of credit indicated for this (tendered) project needs to have been certified by the Bank.*

**2. AVERAGE ANNUAL TURNOVER**

| **Criteria** | **Bidders' to list their certified yearly turnover for last three years** (Audited financial statements for last three years to be uploaded on e-PADS) |
|---|---|
| Minimum average **annual turnover** of Pak Rupees [51 million] Calculated as total certified payments received for contracts in progress or completed, within the last three years. | |

**Note:- In case of JV, all Partners combined shall be evaluated against the criteria requirement of SOUNDNESS AND ACCESS TO FINANCIAL RESOURCES and AVERAGE ANNUAL TURNOVER.**

## Appendix-N to Bid
## Past Performance, Current Commitment, Qualification and Experience

### 1 Eligibility Criteria & Requirements:

| Sr. No | Criteria | Requirement | Compliance Requirement | | | | Documentation Uploading Requirements on e-PADS |
|---|---|---|---|---|---|---|---|
| | | | Single Entity | Joint Venture | | | |
| | | | | All Members Combined | Each Member | One Member | |
| 1 | PEC Registration | Registration with Pakistan Engineering Council in Category C-5 or above with specialized codes in EE-04 & EE-02. | Must meet requirement | Must meet requirement of specialized codes in EE-04 & EE-02 | Each Member must be registered with PEC | Lead Member must be registered with PEC in Category C-5 or above with specialized codes in EE-04. | PEC Valid Registration License/Certificate |
| 2 | Non-Blacklisting | The bidder must not be blacklisted by the procuring agency | Must meet requirement | Must meet requirement | Must meet requirement | Must meet requirement | Letter of Technical Bid |
| 3 | Company/ Firm Registration | Incorporation with Security and Exchange Commission of Pakistan or Registrar of Firms as the case may be [NTN Verification along with requisite Affidavit of sole-proprietorship in case of Sole-Proprietor.] | Must meet requirement | Must meet requirement | Must meet requirement | Must meet requirement | Certificate from SECP/ Registrar of Firms/ NTN Verification along with requisite affidavit |
| 4 | Registration with Tax Authorities | Registration and active status with Tax Authorities (FBR & PRA) in Pakistan | Must meet requirement | Must meet requirement | Must meet requirement | Must meet requirement | Certificate and current status from Tax Authorities |
| 5 | Conflict of Interest | No conflict of Interest as per IB.3 | Must meet requirement | Must meet requirement | Must meet requirement | Must meet requirement | Letter of Technical Bid |
| 6 | One Bidder | Each Bidder shall submit only | Must meet | Must meet | Must meet | Must meet | |

| Sr. No | Criteria | Requirement | Compliance Requirement | | | | Documentation Uploading Requirements on e-PADS |
|---|---|---|---|---|---|---|---|
| | | | Single Entity | Joint Venture | | | |
| | | | | All Members Combined | Each Member | One Member | |
| | per Bid | one Bid either by himself, or as a partner in a joint venture. | requirement | requirement | requirement | requirement | |

The Bidder must meet the Eligibility Criteria & Requirement to be declared responsive.

## 2 Detailed Qualification Criteria & Requirements

The Bidders to be substantially responsive must score at least 65 marks overall and minimum 50 % score in each category as specified below:

| Sr. No. | Category | Weightage/Marks | Minimum Required Score |
|---|---|---|---|
| 1. | Working Experience | 60 | 30 |
| 2. | Personnel Capabilities | 40 | 20 |
| | **Total:** | **100** | **65** |

**Note:** The qualifications of other firms such as the bidder's subsidiaries, parent entities, affiliates or subcontractors shall not be permitted

### 2.1 Working Experience (Total 60 Marks)

Credit Marks for working experience shall be awarded on the basis of following qualifications:

| Sr. No. | Criteria | Requirement | Maximum Points | Documentation Submission Requirements |
|---|---|---|---|---|

| Sr. No. | Criteria | Requirement | Maximum Points | Documentation Submission Requirements |
|---|---|---|---|---|
| 1 | Contracts of Similar Nature and Complexity | 02 number of successfully executed contracts, each of value of at least PKR (40 Million), completed after January 01, 2018 for the Internal Electrification Works of Commercial & Residential Buildings.<br>Note: In case the bidder is a Joint Venture, the working experience of leader of the Joint Venture shall be evaluated. | 60 marks<br>(30 marks for each successfully executed contract) | Completed attached Form For Contracts of Similar Nature and Complexity.<br>The bidder must upload Project Award Letter, Work Orders or Contract Agreement & completion Certificates and other documents necessary for confirming scope of works.<br>The bidder must upload joint venture agreement in case of projects completed as a partner of joint venture clearly showing scope of works and percentage share of all partners of joint venture. To comply with the criteria, the share of bidder under the joint venture for similar works must be equal or exceeding the qualification criteria and requirement. |
| | | **Sub-total:** | **60 marks** | |
| Note;<br>• In case of contracts executed by the bidder in form of JV or subcontractor, the role of the bidder based on scope and financial share shall be considered to evaluate the criteria requirement. | | | | |

## 2.2 Personnel Capabilities (Total 40 Marks)

| Sr. No. | Personnel | Required Number | Maximum Marks | Criteria for Evaluation | Documentation Submission Requirements |
|---|---|---|---|---|---|
| 1 | **Project Manager**<br>• BSc Electrical/Mechanical Engineering<br>• registration with PEC as Registered Engineer | 01 | 15 marks | Marks for a personnel shall be pro-rated. | Details of each personnel to be provided on specified format under Appendix-K of the Bidding |

| Sr. No. | Personnel | Required Number | Maximum Marks | Criteria for Evaluation | Documentation Submission Requirements |
|---|---|---|---|---|---|
| | • At least 8 years' of professional experience of infrastructure works | | | No marks will be awarded for a personnel not fully meeting any of the corresponding criteria requirement. | Documents<br><br>Documentary evidence of relevant PEC registration, qualification and experience |
| 2 | **Site Incharge (Electrical/Mechanical)**<br>• DAE Electrical/Mechanical<br>• At least 5 years' of professional experience of infrastructure works | 01 | 10 marks | | |
| 3. | **Supervisor (Electrical/Mechanical)**<br>• Diploma in Electrical/Mechanical (DAE)<br>• at least 5 years' experience of infrastructure works | 01 | 05 marks | | |
| 4. | **Quantity Surveyor**<br>• Diploma (DAE)/Relevant Certification<br>• at least 5 years' experience of infrastructure works estimation | 01 | 05 marks | | |
| 5. | **Surveyor**<br>• Diploma (DAE)/Relevant Certification<br>• at least 5 years' experience of infrastructure works | 01 | 05 marks | | |
| | | **Sub-total:** | **40 marks** | | |
| Note;<br>• In case the bidder is a Joint Venture, the personnel capabilities of all members combined shall be evaluated. | | | | | |

The Bidder must meet the Qualification Criteria & Requirements to be declared responsive.

## Form for Contracts of Similar Nature and Complexity

| Name of Bidder or partner of a joint venture |
|---|

Use a separate sheet for each contract.

| | |
|---|---|
| 1 | Name of Contract |
| | Country |
| 2 | Name of Employer |
| 3 | Employer Address<br>---------- |
| 4 | Nature of works and special features relevant to the contract<br>---------- |
| 5 | Contract Role (Tick One)<br>(a) Sole Contractor (b) Sub- Contractor (c) Partner in a Joint Venture |
| 6 | Value of the total contract (in specified currencies) at completion, for current contract<br>Currency: PKR |
| 7 | Contract cost at completion in Pak/Rs……. |
| 8 | Date of Award…… |
| 9 | Date of Completion…….. |
| 10 | Contract Duration (Years and Months) _____Years _____Months |

## Form for Annual Construction Turnover

| Annual Construction Turnover | |
|---|---|
| **Year** | **Turnover (PKR)** |
| 2024-2023 | |
| 2023-2022 | |
| 2022-2021 | |

**Note:** In case of Joint Venture, each member shall provide separate form.

## Form for Current Commitment

| **Present Commitment** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sr No.** | **Name of ongoing project(s)** | **Name of Employer** | **Date of** | | **Progress** | | **Remarks regarding delays if applicable** | **Satisfactory performance certificate from employer (Minimum requirement)** |
| | | | **Start** | **Completion** | **%Age as planned** | **%Age at actual** | | |
| 1. | | | | | | | | |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| | | | | | | | | |

**Note:** In case of Joint Venture, each member shall provide separate form.

# FORMS

**BID SECURITY**

**PERFORMANCE SECURITY**

**CONTRACT AGREEMENT**

**MOBILIZATION ADVANCE GUARANTEE/BOND**

**AND**

**INDEMNITY BOND FOR SECURED ADVANCE**

## BID SECURITY

(**Bank Guarantee)**

Security Executed on _____
(Date)

Name of Surety (Bank) with Address: _____
(Scheduled Bank in Pakistan)

Name of Principal (Bidder) with Address _____

_____

Penal Sum of Security Rupees . _____(Rs. _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto _____
(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 Bidder has submitted the accompanying Bid dated _____ for Bid No. _____ for_____(Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum from a Scheduled Bank in Pakistan, to the Employer, conditioned as under:

(1) that the Bid Security shall remain in force up to and including the date 30 days after the deadline for validity of bids as stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived;

(2) that the Bid Security of unsuccessful Bidders will be returned by the Employer after expiry of its validity or upon signing of the Contract Agreement; and

(3) that in the event of failure of the successful Bidder to execute the proposed Contract Agreement for such work and furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to Clause 15.6 of the Instruction to Bidders for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefore, 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 fourteen (14) 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 Surety shall forthwith pay the Employer, the said sum 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 Surety at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Bidder) 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 Surety shall pay without objection the said sum upon demand from the Employer forthwith and without any reference to the Principal (Bidder) or any other person.

IN WITNESS WHEREOF, the above bounden Surety has executed the instrument under its seal on the date indicated above, the name and seal of the Surety being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

SURETY (Bank)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address

**FORM OF PERFORMANCE SECURITY**
**(Bank Guarantee)**

Guarantee No._____

Executed on _____

Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address:_____
(Scheduled Bank in Pakistan)

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 49, Defects Liability, 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 defences 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. _____

_____
Corporate Secretary (Seal)

Signature _____

Name _____

Title _____

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 / Clarification as agreed or otherwise, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Contract, viz:

   (a) The Contract Agreement;
   (b) The Letter of Acceptance;
   (c) The completed Form of Bid (Technical & Financial);
   (d) Special Stipulations (Appendix-A to Bid);
   (e) The Special Conditions of Contract – Part II;
   (f) The General Conditions – Part I;
   (g) The General Preamble and priced Bill of Quantities (Appendix-D to Bid);
   (h) The Specifications;
   (i) The Drawings;
   (j) The Addenda (if any)
   (k) The completed Appendices to Bid (B, C, E to N);
   (l) The Joint Venture Agreement (if applicable)

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.

5. The Employer reserves the right to issue any change, modification, or revision to the drawings, specifications, or scope of work, as may be deemed necessary during execution. In the event that any item or work not included in the Bill of Quantities (BOQ) is required to be executed, the Contractor shall immediately notify the Employer in writing and obtain prior written approval before execution.

   The rates for such additional or substituted items shall, as far as practicable, be determined based on the analogous items in the BOQ. Where no such rates exist, the Contractor shall submit a detailed rate analysis for Employer's approval.

No claim for additional payment shall be entertained for any work carried out without prior written approval of the Employer.

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 | Signature of Employer |
| _____ | _____ |
| Designation:_____ | Designation:_____ |
| (Seal) | (Seal) |
| Signed, Sealed and Delivered in the presence of: | |
| Witness: | Witness: |
| _____ | _____ |
| (Name, Title and Address) | (Name, Title and Address) |

## MOBILIZATION ADVANCE GUARANTEE

(Unconditional Bank Guarantee)

Guarantee No._____ Date _____

WHEREAS _____(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 Rupees _____ (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 the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____
(Scheduled Bank in Pakistan acceptable to the Employer)
(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 fulfilment 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, 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 remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____whichever is earlier.
(Date)
The Guarantor's liability under this Guarantee shall not in any case exceed the sum of Rupees _____(Rs _____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

GUARANTOR

1. Signature _____
2. Name _____
3. Title _____

WITNESS

1. _____
_____
Corporate Secretary (Seal)

2. _____ _____
(Name Title & Address) Corporate Guarantor(Seal)

## INDEMNITY BOND FOR SECURED ADVANCE AGAINST MATERIALS BROUGHT AT SITE

Not Applicable

# CONDITIONS OF CONTRACT

## PART I: GENERAL CONDITIONS

**FIDIC**

**4th Edition 1987**
**Reprinted 1988 with Editorial Amendments**
**Reprinted 1992 with Further Amendments**

**(To be procured by the Contractor)**

**Copies of the FIDIC Conditions of Contract can be obtained from:**

**FIDIC Secretariat– International Federation of Consulting Engineers Secretariat Switzerland**

**International Federation of Consulting Engineers (FIDIC)**
FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland
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# PART II: SPECIAL CONDITIONS OF CONTRACT

## 1.1 Definitions

(a) (i) The Employer is: Engineering Consultancy Services Punjab (ECSP) (Pvt.) Limited

(a) (iv) The Engineer is: Project Manager, Internal Electrification & IT Works of ECSP's new Head Office

, or any other competent person appointed by the Employer, and notified to the Contractor, to act in replacement of the Engineer. Provided always that except in cases of professional misconduct, the outgoing Engineers is to formulate his certifications/ recommendations in relation to all outstanding matters, disputes and claims relating to the execution of the Works during his tenure.

The following paragraph is added:

(a) (vi) "Bidder or Tenderer" means any person or persons, company, corporation, firm or Joint venture submitting a Bid or Tender.

(b) (v) The following is added at the end of the paragraph:

The word "Tender" is synonymous with "Bid" and the word "Tender Documents" with "Bidding Documents".

The following paragraph is added:

(b) (ix) "Programme" means the programme to be submitted by the Contractor in accordance with Sub-Clause 14.1 and any approved revisions thereto.

(e) (i) The text is deleted and substituted with the following:

"Contract Price" means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works subject to such additions thereto or deductions there from as may be made and remedying of any defects therein in accordance with the provisions of the Contract.

## 2.1 Engineer's Duties and Authority

With reference to Sub-Clause 2.1(b), the following provisions shall also apply:
The Engineer shall obtain the specific approval of the Employer before carrying out his duties in accordance with the following Clauses. The Employer may further vary according to need of the project;

(i) Consenting to the sub-letting of any part of the Works under Sub-Clause 4.1 "Subcontracting".

(ii) Certifying additional cost determined under Sub-Clauses 12.2 "Not Foreseeable Physical Obstructions or conditions"

(iii) Any action under Clause 10 "Performance Security" and Clauses 21,23,24 & 25 " Insurance" of sorts.

(iv) Any action under Clause 40 "Suspension"

(v) Any action under Clause 44 "Extension of Time for Completion"

(vi) Any action under Clause 47 "Liquidated Damages for Delay" or payment of Bonus for Early Completion of Works (SCC Sub-Clause 47.3)

(vii) Issuance of "Taking over Certificate" under Clause 48.

(viii) Issuing a Variation Order under Clause 51 except:

a) in an emergency* situation, as stated here below, or

b) if such variation would increase the Contract Price by the amount stated in the Appendix-A to Bid.

(ix) Fixing rates or prices under Clause 52.

(x) Extra payment as a result of Contractor's claims Clause

(xi) Release of Retention Money to the Contractor under Sub-Clause 60.3 "Payment of Retention Money".

(xii) Issuance of "Final Payment Certificate" under Sub-Clause 60.8.

(xiii) Issuance of "Defect Liability Certificate" under Sub-Clause 62.1.

(xiv) Any change in the ratios of Contract currency proportions and payments thereof under clause 72 "Currency and Rate of Exchange".

* (If in the opinion of the Engineer an emergency occurs affecting the safety of life or of the Works or of adjoining property, the Engineer may, without relieving the Contractor of any of his duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.)

## 2.2 Engineer's Representative

Add the following paragraph:
The Employer shall ensure that the Engineer's Representative is a professional engineer as defined in the Pakistan Engineering Council Act 1975 (V of 1976).

The following Sub-Clauses 2.7 and 2.8 are added:

## 2.7 Engineer Not Liable

Approval, reviews and inspection by the Engineer of any part of the Works does not relieve the Contractor from his sole responsibility and liability for the supply of materials, plant and equipment for construction of the Works and their parts in accordance with the Contract and neither the Engineer's authority to act nor any decision made by him in good faith as provided for under the Contract whether to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their representatives or

employees or any other person performing any portion of the Works. However, the Engineer shall also be held responsible for his unlawful, non-factual and unreasonable decisions.

**2.8 Replacement of the Engineer**

"If the Employer intends to replace the Engineer, the Employer shall, not less than 14 days before the intended date of replacement, give notice to the Contractor, of the name, address and relevant experience of the intended replacement Engineer."

**5.1 Language(s) and Law**

(a) The Contract Documents shall be drawn up in the English language.
(b) The Contract shall be subjected to the Laws of Islamic Republic of Pakistan

**5.2 Priority of Contract Documents**

The documents listed at (1) to (6) of the Sub-Clause are deleted and substituted with the following:

(1) The Contract Agreement;
(2) The Letter of Acceptance;
(3) The completed Forms of Bid (technical & Financial);
(4) Special Stipulations (Appendix-A to Bid);
(5) The Special Conditions of Contract – Part II;
(6) The General Conditions – Part I;
(7) The priced Bill of Quantities (Appendix-D to Bid);
(8) The Drawings;
(9) The completed Appendices to Bid (B, C, E to L);
(10) The Specifications; and
(11) The Joint Venture Agreement, if applicable.

In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by a drawing of later date regardless of scale. All Drawings and Specifications shall be interpreted in conformity with the Contract and these Conditions. Addendum, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

The following Sub-Clauses 6.6 and 6.7 are added

**6.6 Shop Drawings**

The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.

Review and approval by the 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 Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

**6.7 As-Built Drawings**

At the completion of the Works under the Contract, the Contractor shall furnish to the Engineer 6 copies and one reproducible of all drawings amended to conform with the Works as built. The price of such Drawings shall be deemed to be included in the Contract Price.

**10.1 Performance Security**

The text is deleted and substituted with the following:

The Contractor shall provide Performance Security to the Employer in the prescribed form. The said Security shall be furnished or caused to be furnished by the Contractor within 30 days after the receipt of the Letter of Acceptance. The Performance Security shall be of an amount equal to 10% of the Contract Price stated in the Letter of Acceptance. Such Security shall, at the option of the bidder, be in the form of either (a) bank guarantee of the specified form from any Scheduled Bank in Pakistan or (b) CDR/ Demand Draft from any Scheduled Bank in Pakistan.
The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

The following Sub-Clause10.4 is added:

**10.4 Performance Security Binding on Variations and Changes**

The Performance Security shall be binding irrespective of changes in the quantities or variations in the Works or extensions in Time for Completion of the Works which are granted or agreed upon under the provisions of the Contract.

**14.1 Programme to be Submitted**

The programme shall be submitted within 07 days from the date of receipt of Letter of Acceptance, which shall be in the form of approve by the Engineer:

i) a CPM identifying the critical path/activities.

**14.3 Cash Flow Estimate to be Submitted**

The detailed Cash Flow Estimate shall be submitted within 7 days from the date of receipt of Letter of Acceptance.

The following Sub-Clause 14.5 is added:

**14.5 Detailed Programme and Monthly Progress Report**

a) For purposes of Sub-Clause 14.1, the Contractor shall submit to the Engineer and the Employer, the detailed programme for the following:

(1) Execution of Works;
(2) Labour Employment;
(3) Local Material Procurement;
(4) Material Imports, if any; and
(5) Other details as required by the Engineer.

(b) During the period of the Contract, the Contractor shall submit to the Engineer, the Employer and the Administrative Department, not later than the 8th day of the

following month, 03 copies each of Monthly Progress Reports covering with a copy to the employer:

(1) A Construction Schedule indicating the monthly progress in percentage;
(2) Description of all work carried out since the last report;
(3) Description of the work planned for the next 56 days sufficiently detailed to enable the Engineer to determine his programme of inspection and testing;
(4) Monthly summary of daily job record;
(5) Photographs to illustrate progress; and
(6) Information about problems and difficulties encountered, if any, and proposals to overcome the same.

(c) During the period of the Contract, the Contractor shall keep a daily record of the work progress, which shall be made available to the Engineer, the Employer and the Administrative Department, as and when requested. The daily record shall include particulars of weather conditions, number of men working, deliveries of materials, quantity, location and assignment of Contractor's equipment.

The following Sub-Clauses 15.2 and 15.3 are added:

**15.2 Language Ability of Contractor's Representative**

The Contractor's authorized representative shall be fluent in the English language. Alternately an interpreter with ability of English language shall be provided by the Contractor on full time basis.

**15.3 Contractor's Representative**

The Contractor's authorised representative and his other professional engineers working at Site shall register themselves with the Pakistan Engineering Council.

The Contractor's authorised representative at Site shall be authorised to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.

The following Sub-Clauses 16.3 and 16.4 are added:

**16.3 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. If the Contractor's superintending staff are not fluent in English language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.

**16.4 Employment of Local Personnel**

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour from sources within Pakistan.
The following Sub-Clauses 19.3 and 19.4 are added:

**19.3 Safety Precautions**

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 Engineer may authorise or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose.

The Contractor shall make, maintain and submit reports to the Engineer concerning safety, health and welfare of persons and damage to property, as the Engineer may from time to time prescribe.

### 19.4 Lighting Work at Night

In the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night-work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer's Representative.

### 20.4 Employer's Risks

The Employer's risks are:

Delete the text and substitute with the following:

(a) insofar as they directly affect the execution of the Works in Pakistan:

- (i) war and hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (ii) rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (iii) ionizing radiations, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof,
- (iv) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (v) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors and arising from the conduct of the Works;

(b) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;

(c) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible; [For all those projects where funding is available, the Design Consultants shall be made responsible for any design faults. It shall be ensured that the Design Consultants remain available for Top Supervision and rectification of any subsequent faults/ issues till the successful completion of the project/ closing of the contract including defect liability period if any];

(d) any operation of the forces of nature (insofar as it occurs on the Site) which an experienced contractor:

(i) could not have reasonably foreseen, or
(ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:
  (a) prevent loss or damage to physical property from occurring by taking appropriate measures, or
  (b) insure against.

**21.1 Insurance of Works and Contractor's Equipment**

In the first line of Sub-Clause 21.1 add "prior to Commencement of the Works" after "The Contractor shall", and add "in the joint names" after "insure" in second line.

After paragraph (c), add new paragraph (d) as follows:

d) Such insurance shall provide for compensation to be payable in the types and proportions of currencies needed to cover the loss or damage incurred.

**21.4 Exclusions**

The text is deleted and substituted with the following:

There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by the risks listed under Sub-Clause 20.4 paras (a) (i) to (iv).

The following Sub-Clause 25.5 is added:

**25.5 Insurance Company**

The Contractor shall be obliged to place all insurances relating to the Contract (including, but not limited to, the insurances referred to in Clauses 21, 23 and 24) with either National Insurance Company of Pakistan or any other insurance company having at least AA rating from PACRA/JCR operating in Pakistan and acceptable to the Engineer/Employer.

Costs of such insurances shall be borne by the Contractor.

The following Sub-Clause 31.3 is added:

**31.3 Co-operation with other Contractors**

During the execution of the Works, the Contractor shall co-operate fully with other contractors working for the Employer at and in the vicinity of the Site and also shall provide adequate precautionary facilities not to make himself a nuisance to local residents and other contractors.

The following Sub-Clauses 34.2 to 34.12 are added:

**34.2 Rates of Wages and Conditions of Labour**

The Contractor shall pay rates of' wages and observe conditions of labour not less favourable than those established for the trade or industry where the work is carried out. In the absence of any rates of wages or conditions of labour so established, the Contractor shall pay rates of wages and observe conditions of labour which are not

less favourable than the general level of wages and conditions observed by other employers whose general circumstances in the trade or in industry in which the Contractor is engaged are similar.

### 34.3 Employment of Persons in the Service of Others

The Contractor shall not recruit his staff and labour from amongst the persons in the services of the Employer or the Engineer; except with the prior written consent of the Employer or the Engineer, as the case may be.

### 34.4 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 Engineer.

### 34.5 Health and Safety

Due precautions shall be taken by the Contractor, and at his own cost, to ensure the safety of his staff and labour at all times throughout the period of the Contract. The Contractor shall further ensure that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.

### 34.6 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.

### 34.7 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 Engineer or his representative, adequate supply of drinking and other water for the use of his staff and labour.

### 34.8 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, staff or labour.

### 34.9 Arms and Ammunition

The Contractor shall not give, or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

### 34.10 Festivals and Religious Customs

The Contractor shall in all dealings with his staff and labor have due regard to all recognized festivals, days of rest and religious and other customs.

### 34.11 Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst staff and labor and for the preservation of peace and protection of persons and property in the neighborhood of the Works against the same.

### 34.12 Compliance by Subcontractors

The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.

The following Sub-Clauses 35.2 and 35.3 are added:

### 35.2 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 Engineer may from time to time prescribe.

### 35.3 Reporting of Accidents

The Contractor shall report to the 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, notify the Engineer immediately by the quickest available means.

The following Sub-Clause 36.6 is added:

### 36.6 Use of Pakistani Materials and Services

The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services, available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.

### 41.1 Commencement of Works

The text is deleted and substituted with the following:

The Contractor shall commence the Works on Site within the period named in Appendix-A to Bid from the date of receipt by him from the Engineer of a written Notice to Commence. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

The following Sub-Clause 47.3 is added:

### 47.3 Bonus for Early Completion of Works (Not Applicable)

The Contractor may, in case of earlier completion for either whole or part(s) of the Works pursuant to Sub-Clauses 48.1 and 48.2(a) respectively of the General Conditions of Contract, be paid bonus up-to a limit and at a rate equivalent to 50% of the relevant limit and rate of liquidated damages prescribed in Appendix-A to Bid "Special Stipulations"; provided such provision is given in project approval documents/Appendix-A to Bid "Special Stipulations".

**48.2 Taking Over of Sections or Parts (Not Applicable)**

For the purposes of para (a) of this Sub-Clause, separate Times for Completion shall be provided in the Appendix-A to Bid "Special Stipulations".

**51.2 Instructions for Variations**

At the end of the first sentence, after the word "Engineer", the words "in writing" are added.

**52.1 Valuation of Variations**

In the tenth line, after the words "Engineer shall" the following is added:
Within a period not exceeding one-eighth of the completion time subject to a minimum of 56 days from the date of disagreement whichever is later.

**53.4 Failure to Comply**

This Sub-Clause is deleted in its entirety.

**54.5 Conditions of Hire of Contractor's Equipment**

The following paragraph is added:

The Contractor shall, upon request by the Engineer at any time in relation to any item of hired Contractor's Equipment, forthwith notify the Engineer in writing the name and address of the Owner of the equipment and shall certify that the agreement for the hire thereof contains a provision in accordance with the requirements set forth above.

The following Sub-Clauses 59.4 & 59.5 are added:

**59.4 Payments to Nominated Subcontractors**

The Contractor shall pay to the nominated Subcontractor the amounts which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with Clause 58 [Provisional Sums], except as stated in Sub-Clause 59.5 [Certification of Payments].

**59.5 Certification of Payments & Nominated Subcontractors**

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

a) submits reasonable evidence to the Engineer, or

b) i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and

ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,

then the Employer may (at his sole discretion) pay direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has failed to submit the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

**60.1 Monthly Statements**

In the first line after the word "shall", the following is added:

"on the basis of the joint measurement of work done under Clause 56.1,"

In Para (c) the words "the Appendix to Tender" are deleted and substituted with the words "Sub-Cause 60.11 (a)(6) hereof".

(in case Clause 60.11 is applicable)

**60.2 Monthly Payments**

In the first line, "28" is substituted by "14".

**60.10 Time for Payment**

The text is deleted and substituted with the following:

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other terms of the Contract, shall , subject to Clause 47, be paid by the Employer to the Contractor within 14 days after such Interim Payment Certificate has been jointly verified by Employer and Contractor, or, in the case of the Final Certificate referred to in Sub Clause 60.8, within 45 days after such Final Payment Certificate has been jointly verified by Employer and Contractor.

The following Sub-Clause 60.11 and 60.12 are added:

**60.11 Secured Advance on Materials**

Not applicable

**60.12 Financial Assistance to Contractor**

(a) Financial Assistance shall be made available to The Contractor by The Employer as follows:

**MOBILIZATION ADVANCE**

(a) An interest-free Mobilization Advance shall be limited to the maximum of ten (10) % of the sum of the Accepted Contract price stated in the Letter of Acceptance

shall be paid by The Employer to The Contractor in single installment upon submission by The Contractor of a Mobilization Advance Guarantee for the full amount of the Advance in the specified form from a Scheduled Bank in Pakistan acceptable to The Employer within 14 days after signing of the Contract Agreement or date of receipt of The Engineer's Notice to Commence, whichever is earlier;

(b) This Advance shall be recovered from the Interim Payment Certificates in such proportion as directed by The Engineer so that full amount is recovered before the Final payment certificate and the date of completion of the Works as per Clause 43 hereof.

**63.1 Default of Contractor**

The following para is added at the end of the Sub-Clause:

Provided further that in addition to the action taken by the Employer against the Contractor under this Clause, the Employer may also refer the case of default of the Contractor to Pakistan Engineering Council for punitive action under the Construction and Operation of Engineering Works Bye-Laws 1987, as amended from time to time.

**65.2 Special Risks**

The text is deleted and substituted with the following:

The Special Risks are the risks defined under Sub-Clause 20.4 sub paragraphs (a) (i) to (a) (v).

**67. 3 Arbitration**

In the sixth to eight lines, the words "shall be finally settled ..... appointed under such Rules" are deleted and substituted with the following:

shall be finally settled under the provisions of the Arbitration Act, 1940 as amended or any statutory modification or re-enactment thereof for the time being in force.

The following paragraph is added:

The place of arbitration shall be Lahore, Pakistan.

**68.1 Notice to Contractor**

The following paragraph is added:

For the purposes of this Sub-Clause, the Contractor shall, immediately after receipt of Letter of Acceptance, intimate in writing to the Employer and the Engineer by registered post, the address of his principal place of business or any change in such address during the period of the Contract.

**68.2 Notice to Employer and Engineer**

For the purposes of this Sub-Clause, the respective address are:

**a)** The Employer : To be notified later

**b)** The Engineer: To be notified later

### 70.1 Increase or Decrease of Cost

Sub-Clause 70.1 is deleted in its entirety. There is no Price Adjustment under this Contract.

The following Sub-Clauses 73.1, 73.2, 74.1, 75.1, 76.1, 77.1and 78.1 are added:

### 73.1 Payment of all taxes/ rates/ fees: Income Tax, Sales tax etc.

The Contractor, Subcontractors and their employees shall be responsible for payment of all applicable (federal & provincial) taxes/ rates/ fees: income tax, sales tax and other taxes/ rates/ fees etc. arising out of the Contract and the rates and prices stated in the Contract shall be deemed to cover all such expenses till the closing of contract, including the defect liability period if any.

### 73.2 Customs Duty & Taxes

The prices tendered by the Contractor shall include all import license fees, custom duties, excise duties, sales taxes, surcharges, business taxes, income and other taxes that are levied according to the laws and regulations of Pakistan on the Contractor's Equipment, material and supplies (both permanent, temporary and consumable) acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve The Contractor from his responsibility to pay any tax that may be levied in the country on profits made by him in respect of the Contract.

### 74.1 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 Appendix-L 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 63.1 to 63.4 and the payment under Sub-Clause 63.3 shall be made after having deducted the amounts due to the Employer under Sub-Para (a) and (c) of this Sub-Clause.

### 75.1 Termination of Contract for Employer's Convenience

The Employer shall be entitled to terminate the Contract at any time for the Employer's convenience after giving 56 days prior notice to the Contractor, with a copy to the Engineer. In the event of such termination, the Contractor :

(a) shall proceed as provided in Sub-Clause 65.7 hereof; and

(b) shall be paid by the Employer as provided in Sub-Clause 65.8 hereof.

**76.1 Liability of 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 assigns and the labour employed by them.

**77.1 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.

**78.1 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 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 Engineer whose award shall be final.

# SPECIFICATIONS -
# SPECIAL PROVISIONS & TECHNICAL PROVISIONS

Table of Contents

# 1 SECTION – 1 - GENERAL

## General

This document sets out the duties to be performed by the Contractor and the Deliverables required from the Contractor.

The Contractor shall be responsible for the construction of all utilities or services essential for the Project as well as the diversion/protection of the existing services (if any) impacted by the project. Contractor shall be responsible for revalidating all the necessary permits/approvals of all utilities from relevant stakeholders prior to start of any construction activities. Utilities and services include but are not limited to the utilities and services provided by

a) LESCO
b) Public Health Department.
c) PTCL or any other ISP Network.
d) Other specialized utilities installations required for site's complete function.

The Contractor shall liaise with all stakeholders and municipal authorities to locate and identify latest existing and planned services within the Project area. The Contractor shall also liaise with any public or private body or individual that may be affected by any proposals resulting from the design to validate NOCs. The Contractor shall verify the line and level of all existing utility apparatuses by electronic radio detection methods, trial holes, and any other method as appropriate, prior to start construction.

The Contractor shall coordinate all interfaces with existing and proposed utilities within the Project boundary.

Contractor shall prepare and submit a plan for all Stakeholders and Third Parties' approval from all stakeholders, agencies or any other private of government entities; as required during the construction phase of the project. - The dry services scope of services shall be provided for the following major elements but not limited to

i. Electrical Infrastructure Network
ii. Outdoor Lighting
iii. Communications – Civil Infrastructure

### 1.1.1 Applicable Design Standards

Design & Build contractor shall carry out all works in accordance with below authority requirements which are referenced for information and are considered while developing various Infrastructure & utility works at Preliminary Engineering Design stage. This list is not considered exhaustive and provides only the key elements for consideration.

All works, equipment and materials shall conform to the specification recommended practices, official standards and codes the non - restrictive list of which is given below. In the event of conflict between standards, the most stringent shall prevail.

Whenever the electrical equipment to be installed, does not hold national standards, the Contractor shall take into account the specific standards chosen by the Owner and make sure that the equipment he has to install, meets these standards.

In addition, even if no mention is stipulated in this specification, it is implied that the equipment be tropicalized, if required, by the conditions of the site of installation.

In any case, the standards and codes to be taken into consideration are those in force at the date of delivery.

In the absence of local standard for any work the internationally recognized codes are to be followed

- NEC - National Electrical Code (NEC)
- IEC - International Electrotechnical Commission
- IEEE - Institute of Electrical and Electronics Engineers
- IET Wiring Regulations
- British Standards Code of Practice for Earthing
- British Standards Code of Practice for the protection of Structure against lightning (BSEN 62305)
- British standards for Lightning Protection Components (LPC) – Part 1 Requirements for connection components and Part 2 Requirements for conductors and earth electrodes-(BS EN 50164).

### 1.1.2 General Scope of Work

Contractor shall carry out all construction works of the Project including, but not limited to, any and all associated labor, materials, equipment, QA/QC, supervision, tools, transportation, testing, and commissioning to complete the Work in accordance with the requirements of the Contract Documents and as per authority requirements.

Contractor shall furnish all working, and shop drawings, associated trade literature, engineering calculations, schedules, manuals and other similar documents required to fully define and detail any and all portions of the work. Contractor is deemed to have visited and familiarized himself with the Project Site including, but not limited to, any and all utilities, subsoil conditions, permits, etc.; and shall be liable and responsible for all unknowns and/or differing Site conditions of any nature.

Contractor to liaise with the consultant and Client to ensure that the proposed electrical infrastructure for the electrical buses is well coordinated with the overall bus depot's electrical power distribution design.

The proposed distribution network shall be in strict accordance with LESCO latest regulations and standards.

Contractor to clear site from any existing utilities or diversion and protection as agreed with the relevant authorities & stakeholders. At the completion of same stage contractor shall submit a site clearance report with all necessary attachments. These attachments in form of Editable PDF, CAD formats shall show all diverted locations for all services. Unless otherwise specified, all costs necessary for the satisfactory delivery and acceptance of the work defined in the Contract shall be borne by the Contractor.

Any apparatus, appliance, materials or works not shown on the contract drawings but mentioned in the specification or vice versa, or any incidental accessories or work necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified shall be supplied and installed or carried out by the Contractor without any additional costs to the contract sum.

If the Contractor wishes to use installations or equipment other than those specified and conforming to different standards, then a written approval from the consultant shall be obtained. However, the consultant reserves the right to reject any applications for such approvals without the right to appeal.

Clarification shall be obtained at the tendering stage by the Contractor from the Consultant in writing for any installations where it is perceived that the extent of specified installations and the expected content or works are not clear. In case of any discrepancy arises afterwards or during the construction, the Consultant's decision shall be final and binding on all such matters.

The Contractor shall provide all resources and management necessary to fulfil contractual obligations in accordance with the specific requirements established in this document and as stipulated in the Contract Terms and Conditions. The Contractor shall provide an on-site management structure with the authority, capacity and capability to monitor and ensure contractual service standards are achieved.

Contractor shall construct based on tender drawings of bus parking general arrangement, and under no condition same shall be altered without prior written approval from Engineer In charge.

Any design, for any of the relevant systems, detailed on this scope of works and/or Tender drawings (If applicable), that require amendments or differs from that available at the time of construction, due to the change in the manufacturer's range of production or availability etc., then the Contractor shall discuss the matter with the Consultant and obtain an approved readily available alternative. Accordingly, the Contractor shall make a fresh submittal based on the Consultant's advice and obtain approval to provide the revised system.

In all above said cases, no cost consideration will be applicable, as the Contractor is deemed to have studied the drawings and scope of works/specifications thoroughly as well as obtained clarifications during the tender stage, before submitting his quotation for the execution.

This document is to describe the minimum requirements for the equipment and installations and to ensure that the Contractor is fully aware of his duties to perform the required works, in accordance with the terms of the Contract.

All material and equipment supplied by the Contractor shall be new and, in all respects, conform to the high standards of Engineering design, workmanship, performance and function as here in specified and fully meet the quality level and rugged requirements of the specifications. The Contractor shall also be responsible to supply any other equipment not specifically mentioned in these documents but which is necessary for proper operation of the works / system, shall be considered to have been so specified and accordingly shall be provided by the Contractor as part of the Contract.

The Contractor shall be solely responsible for ensuring proper functional requirements of various equipment and shall also be responsible for furnishing any additional piece of equipment and for making modification in the equipment as desired and / or approved by the Owner or his representative, to achieve proper coordination with various equipment offered in the bid and also those installed by others.

Approval of the Contractor's supplied equipment / installation works shall not relieve the Contractor of any of his obligations or liabilities under the Contract, except insofar as provided under the conditions of the Contract.

The Contractor shall supply, install, test, commission and handover the complete electrical services installations in strict accordance with WAPDA and Contract preliminaries and conditions and as described within this specification, general technical preliminaries specification, and applicable sections of the standard specification for electrical engineering services as outlined on the Tender drawings (If applicable). The contractor shall propose systems and solutions as listed in approved vendor list of consultant. Any system other than listed ones from different country of origin will require pre-qualification approval from the Consultant.

The Contractor shall include for specialist equipment and systems to be detailed designed and commissioned by relevant specialist vendors and suppliers. This shall include internal and external equipment/system but not be limited to

- External and Internal Electrification
- Structured Cabling System.
- Street Lighting Systems.
- Earthing & Lightning Protection Systems.

The Contractor shall provide complete installations for the project and other associated works such as supporting structures, ancillary works etc.

### 1.1.3 RULES AND REGULATIONS

The entire electrical installation / work shall be carried out by licensed contractor, authorized to undertake such work under the provisions of Electricity Act 1910 and The Electricity Rules 1937 as adopted and modified up to date by the Government of Pakistan.

All works shall be carried out in accordance with the latest edition of the Regulations of the Electrical Equipment of Buildings issued by the Institute of Electrical Engineers - London, the Contract documents, the Electricity Rules 1937 and bye-laws that are in force from time to time.

Any discrepancy between these specifications and any other rules and regulations shall be brought to the notice of Owner or his representative, and his decision shall be final and conclusive.

The Contractor shall be responsible for completing all formalities and submitting the test certificates as per prevailing rules and regulations and shall have the installation passed by the Government Electric Inspector of that region.

All requirements of the Electric Inspector and the Electric Company shall be complied with.

### 1.1.4 Site Conditions

All material and equipment supplied and installed shall be designed, manufactured and tested to meet the following ambient conditions unless specifically stated otherwise for any material / equipment

- Maximum outdoor ambient temperature 41 degree C
- Minimum outdoor ambient temperature 5 degree C
- Relative humidity 33 %

### 1.1.5 MAIN ELECTRICAL CHARACTERISTICS

Unless otherwise specified elsewhere, all equipment and material shall be designed to operate and function satisfactorily with the following minimum requirements without any de-rating

- Voltage (11000 & 400) ±10%
- Phase 3, 4 wire system
- Frequency 50 Hz. ±2 Hz

For indoor enclosures, IP44 minimum degree of ingress protection of the enclosures against contact with line or moving parts and against ingress of solid foreign bodies or liquids, shall be selected, in accordance with IEC 60529. For outdoor, IP 55 minimum degree of ingress protection of the enclosures shall be provided.

### 1.1.6 GUARANTEE

The Contractor shall furnish written grantee which should clearly state that the works he will carry out as well as the materials he will supply, meet with this specification and that compliance thereto constitutes an official clause, added by implication to the general conditions of his offer when signing the Contract. Guarantee shall also be for replacement and repair of part or whole of the equipment which may be found defective in material or workmanship.

The grantee shall cover the duration of Maintenance Period as defined in the conditions of the Contract. This guarantee shall not relieve the Contractor of his obligations and he will fully be responsible for the repair or replacement of any defective material in time, so as not to cause any undue delay in carrying out the repairs and/ or replacements.

The Contractor shall acquaint himself fully with the existing conditions and limitations at site and all works necessary to complete the project under the Contract, to be carried out by the Contractor.

### 1.1.7 EXCEPTIONS TO SPECIFICATION

Any exception or deviation from this specification or the codes and standards shall be listed separately in the Contractor's "List of Deviations".

Any exception, which shall not be listed, shall not be considered later.

### 1.1.8 AVAILABILITY OF SPECIFICATIONS, DRAWINGS AT SITE

The Contractor shall assume at his own cost the permanent availability of this specification and drawings on site where applicable.

### 1.1.9 DISCREPANCIES IN TENDER DOCUMENTS AND DRAWINGS

The Contractor shall carefully examine the documents and drawings and if he finds any discrepancies or omissions from the specifications, bill of quantities or drawings, or is in doubt as to the meaning, he shall at once notify the Owner or his representative for receiving his instructions before proceeding with the works. If such defective or modified work is carried out by the Contractor on his own, he shall rectify the same at his own cost.

The electrical tender drawings related to this project have been listed in the Schedule of Drawings enclosed with the specifications. The tender drawings have been prepared to show the bidder the principal equipment and general arrangement required for the project.

These drawings do not indicate every detail of the work and as such are not to be interpreted as working drawings. It is the Contractor's responsibility to check the positions / locations at site. All dimensions are tentative and shall be checked against other disciplines drawings. Any discrepancy found shall be brought to the attention of the consultant in writing at the time of tender.

Particular attention shall be paid to the positioning electrical equipment in relation to the general arrangement of the bus depot. The Contractor is deemed to have studied the services drawings based on all the local regulations and have included in his prices for all the necessary installations and builder`s work associated with these drawings.

### 1.1.10 INSTALLATIONS DETAILS

The locations, routings, installation heights, detail etc. for electrical equipment are indicated on the drawings. If any information is not stated on the drawings or wherever modifications are required the Contractor shall obtain prior instructions from the Owner or his representative.

### 1.1.11 DRAWINGS AND DATA

The Contractor shall provide dimensional outline drawings, arrangement drawings and technical data for the equipment offered, for the approval of Owner or his representative.

### 1.1.12 PRIOR APPROVAL OF SHOP DRAWINGS, MATERIALS AND EQUIPMENT

The Contractor shall provide shop drawings for the electrical installations showing the exact routes of all underground LSZH Cables and ducts, the exact run of all conduits and trunking, draw-in and junction boxes, the number and size of wires in each conduit, the final connection arrangements at distribution boards and the details of ducts for the approval of consultant / Owner's representative before commencing any portion of the works.

All such working drawings shall be submitted in suitable number of copies as indicated in the particular conditions and within the periods stipulated below. Cable entry ducts into buildings. Working drawings shall be submitted within two weeks of handing over the site. All other working drawings shall be submitted to the Engineer against signed receipt and dated within two months of signing the Contract. Should however the Contractor be obliged to install electrical conduits prior to this period then he shall submit the relevant working drawings at least two weeks prior to the proposed date of commencement of the work. The Contractor shall submit the program indicating the dates on which coordination in different sections will take place, together with the submission of the working drawings. The Engineer shall arrange to return to the Contractor at least one week prior to the commencement of concreting of the section, his comments or approval of the working drawings.

The Contractor shall supply detailed specifications, dimensional drawings, etc., of equipment that he proposes to supply and install.

Where this Contract requires the approval of Engineer to material and goods, the Contractor must seek to obtain this approval within eight weeks after signing of the Contract. No extension of time shall be granted for non- availability of material or goods if this clause is not complied with. Approval of the Engineer does not relieve the Contractor of placing his orders in due time for the materials he needs to complete the Contract on time. The approved samples shall be retained on site for comparison with commodities used in works and removed when no longer required.

### 1.1.13 MATERIAL ORIGIN AND QUALITY

The material and equipment shall be purchased from Consultant / Owner's agreed suppliers.

The consultant / owner shall retain the right to demand, at any time, the indication of origin of the materials, and to eventually refuse products, the origin of manufacturing of which have not been previously agreed to without consideration of quality.

On specific agreement of the Owner, the materials may be delivered progressively to the field, but in such a manner as to allow sufficient time for their reception.

When choice of manufacturer is allowed for any particular commodity, the Contractor shall obtain the whole quality required to complete the work from one manufacturer or obtain approval of any change in source of supply.

He shall produce written evidence of sources of supply when requested to do so by the Engineer.

### 1.1.14 FACTORY TESTS

All equipment supplied by and installed as part of the Contract such as distribution boards, IT and allied equipment shall be fully tested at the manufacturer's works to the requirements of appropriate standards. Type Test Reports shall be attached in the submittals and serial numbers shall be provided at the time of FAT. Manufacturers Authorization Letters shall be provided in the submittals for all equipment.

The Contractor shall inform the Engineer in writing about the date and time of test of each equipment at least two weeks in advance.

The witnessing of test by the Owner or his representative shall not absolve the Contractor from his responsibility for the proper functioning of the equipment and for furnishing the guarantees referred herein.

All test results in the form of certificate of test / test record certificates, signed by all the witnesses, for each item in the scope of Contractor's supply shall be supplied to the Engineer within seven days of the test date, and in any event before delivery to the site.

All expenses for carrying out the tests and witness by the Owner or his representative shall be borne by the Contractor and deemed to have been included in the tender bid.

### 1.1.15 STORAGE

The Contractor shall store the equipment in such conditions that it cannot be damaged, i.e., in a dry warehouse. As particular concerns; fragile components, these shall be stored on shelves in their original packing, fitted with identification labels so as to avoid unnecessary manipulation or handling.

The Contractor shall handle, store and fix each commodity in accordance with the manufacturer's recommendations.

He shall inform the Engineer if these conflicts with any other specified requirement and submit copies of manufacturer's recommendations to the Engineer when requested to do so.

### 1.1.16 LABOR AND STAFF OF CONTRACTOR

The Contractor shall provide / furnish and arrange for

- Skilled and unskilled labor required for performing the works in accordance with the technical specifications and drawings within the agreed time schedule.
- Supervisory technical staff with appropriate experience and requisite expertise to ensure quality of work performed.
- Supervisory administration and clerical staff to ensure smooth functioning of the activities at site.
- Construction equipment, meggers, tools, etc.

The Contractor shall supply all labor, materials and equipment necessary for the installation of low voltage distribution boards, LSZH Cables, lighting and power equipment, together with all other apparatus shown on the drawings and as detailed in the Particular specification.

### 1.1.17 SMALL INSTALLATION MATERIAL

The Contractor shall supply all small installation and consumable materials such as nuts, bolts, washers, shims, angles, leveling materials, insulation tape, solder, EMT strap-on or heat shrinkable type cable tags, cable ties, bushes, sealing compound, Avometer, electrical testing and measuring instruments, etc., and all such other material not listed in BOQ, required for complete installation as intended by the specification and scope of works.

### 1.1.18 INSTALLATION INSTRUCTIONS - GENERAL

The Contractor shall set out the works himself as per specifications and drawings and shall properly position the equipment on specified foundation / location. In general, the manufacturer's instructions for installation shall be followed. Any defect or faulty operation of equipment due to Contractor not following the manufacturer's instructions shall be corrected and repaired by the Contractor at his own cost.

### 1.1.19 ASSOCIATED CIVIL WORKS

The expression `Associated Civil Works' shall mean civil work to be carried out by the Contractor under the direction of the Engineer in connection with the Electrical Service.

The Contractor shall prepare accurate drawings giving details of all holes, fixings, bases and other civil work requirements and shall be responsible for their accuracy. The cost of preparing shop drawings shall be considered to have been so specified in the tender price.

The following is a summary of the work to be carried out by the Contractor

- The cutting and forming of holes for conduits or pipes, or conduit or pipe fixings through walls, floors, ceilings, partitions, roofs, etc., and making good after the work is sufficiently advanced.
- The building of concrete and / or brick ducts in floors, walls, etc.
- The formation of concrete bases, etc., for equipment
- Excavation forming for underground services of ducts and courses and then covers it.
- The cutting or forming of chases, recesses, etc., in floors, walls, etc., for conduits and fittings in and making good.
- Excavation for and laying of cable carrying pipes.
- The building in of brackets and supporting bars or other form of conduit or pipe suspensions.
- The painting of all pipes, tube and conduits etc. after fixing unless specified to the contrary.
- The providing and building in of sleeves through slabs and walls.

In general, all required holes through walls, floors and beams for pipes and ducts will be left out by the Contractor during the process of building.

Where conduits, pipes or fittings are fixed to concrete or woodwork by means of saddles or clips, the Contractor shall himself execute the work necessary and the cost of such work shall be considered to have been so specified in the price.

Cutting, fitting, repairing, patching or plastering and finishing of carpentry work shall be done by craftsmen skilled in their respective trades, when cutting is required it shall be done in such a manner as not to weaken structure, partitions or floors. The holes required to be cut must be directed without breaking out around the holes. Where patching is necessary in finished areas of building, the Engineer shall determine the extent of such patching or refinishing.

### 1.1.20 TESTING

Upon completion of installation, at least seven days' notice is to be given of intention to perform any test.

The Contractor shall perform all static, semi- dynamic (by simulation), and dynamic field testing on all the equipment and systems.

All tests shall be conducted in the presence of the Consultant for the purpose of demonstrating equipment or system compliance with specifications. The Contractor shall submit for Consultant's approval complete details of tests to be performed describing the test procedure, test observations and expected results.

The Contractor shall furnish all tools, instruments, test equipment, materials, etc., and all qualified personnel required for the testing, setting and adjustment of all electrical equipment and material including putting the same into operation.

All tests shall be made with proper regard for the protection of the personnel and equipment and the Contractor shall be responsible for adequate protection of all personnel and equipment during such tests. The cost of any damages or rectification work due to any accident during the tests shall be the sole responsibility of Contractor.

The Contractor shall record all test values of the tests made by him on all equipment. Four copies of all test data and results certified by the Engineer shall be given to the Engineer for record purposes. These shall also include details of testing method, testing equipment, diagrams, etc.

The witnessing of any tests by the Engineer does not relieve the Contractor of his guarantees for materials, equipment and workmanship, or as any obligations of Contract.

In addition to installation testing, the Contractor is to carry out operation testing of all sections and is to clean, set, calibrate and fully commission, demonstrate and hand over to the Owner the entire Contract works in a thoroughly complete and operational state to the satisfaction of the Engineer.

The acceptance - provisional or final- shall be made by the Owner. This reserves him the right to be represented or assisted by a representative or an organization (whether official or not) of his choice, which may decide on his behalf any repairs deemed necessary resulting from lack of observations of this specification, or of the rules and standards. In addition, he may judge the quality of the works and the materials supplied.

This remains in force in case of sub-contracting. The Contractor shall formally engage his direct responsibilities to the Owner or his representative, and likewise, shall assume all responsibility for work performed by sub-contractors and materials he has supplied and installed.

### 1.1.21 Insulation Resistance Test

Insulation resistance test shall be made on electrical equipment by using a megger of 1000 volts for circuits between 250 and 500 volts. The insulation resistance of distribution boards, LSZH Cables, etc., shall be as per IEC, IEEE, BSS and Pakistan Electricity Rules.

The distribution boards shall be given an insulation resistance measurement test after installation, but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches and between each phase and earth.

If the insulation resistance of the circuit under test is less than specified value, the cause of the low reading shall be determined and removed. Corrective measures shall include dry-out procedure by means of heaters, if equipment is found to contain moisture. Where corrective measures are carried out, the insulation resistance readings shall be taken after the correction has been made and repeated twice at 12 hours interval. The maximum range for each reading in the three successive tests shall not exceed 20% of the average value.

After all tests have been made, the equipment shall be reconnected as required.

### 1.1.22 Earth Resistance Test

Earth resistance tests shall be made by contractor on the earthing system, separating and reconnecting each earth connection as may be required by the Engineer. If it is indicated that soil treatment or other corrective measures are required to lower the ground resistance values, the Engineer will determine the extent of such corrective measures.

The electrical resistance of the E.C.C. together with the resistance of the earthing lead measured from the connection with earth electrode to any other position in the completed installation shall not exceed one ohm.

Earth resistance test shall be performed as per Electrical Inspector's requirements. Where more than one earthing sets are installed, the earth resistance test between two sets shall be measured by means of Resistance Bridge Instrument. The earth resistance between two sets shall not exceed one ohm.

### 1.1.23 Switchgear

Each circuit breaker shall be operated electrically and mechanically. All interlocks and control circuits shall be checked for proper connections in accordance with the wiring diagrams given by the manufacturer.

The Contractor shall properly identify the phases of all switchgear and LSZH Cables for connections to give proper phase sequence.

Trip circuits shall be checked for correct operation and rating of equipment served. The correct size and function of fuses, disconnect switches, number of interlocks, indicating lights and alarms shall be in accordance with approved manufacturer drawings. Nameplates shall be checked for proper designation of equipment served.

Protective relays shall be tested and set at site prior to commissioning of the equipment.

### 1.1.24 Complete Tests

After any equipment has been tested, checked for operation, etc., and is accepted by the Engineer, the Contractor shall be responsible for the proper protection of that equipment so that subsequent testing of other equipment does not cause any damage to the already tested equipment.

### 1.1.25 AS BUILT DRAWINGS AND SERVICE MANUALS

A record shall be kept as the work proceeds of any work not in accordance with the working drawings, and upon completion of the work.

The Contractor shall prepare the following drawings and forward them to the Engineer for approval

- Duplicate prints of as built single line diagram of the main and sub main distribution network, indicating all LSZH Cables, their size and type, and the rating of all protection devices such as circuit breakers, fuses, etc.
- Duplicate prints of as built drawings of lighting, power, telephone, fire alarm, as applicable.
- Duplicate prints of as fixed control and wiring diagrams for the equipment installed as part of the Electrical Contractor works.

After these drawings have been approved, the Contractor shall supply two prints on paper of each and insert these in the operating and maintenance manual specified below.

The Contractor shall submit, to Consultant, for approval a sample of manufacturer instructions for installation, testing, commissioning, operation and maintenance manuals including manuals of spare parts and tools of the equipment. Upon acceptance, the Contractor shall supply three copies to the Engineer for forwarding to the Owner. These manuals should be in properly bound form. At least two copies of the documents shall be submitted in original.

The installation instruction shall be submitted two weeks prior to commencement of installation of each equipment, and operation and maintenance instruction at the time of commissioning. If the Contractor fails to provide the documents, the Engineer shall withhold issuance of requisite certificates and deduct suitable amount from the payments to the Contractor.

### 1.1.26 WORK COMPLETION

The Contractor shall further make good, repair, replace all defective works and clear away on completion and leave all installations in perfect working order and to the satisfaction of the Owner or his representative.

The following details outline the information which the Contractor shall provide during the course of the Contract.

- Shop Drawings / Working Drawings for all aspects of the installation.
- Detailed shop drawings and equipment schedules for specialist systems as quoted and defined in this specification
- External ducting and cable routes.
- Service Connection layouts
- Earthing/Lightning protection requirements for structural detailing.
- Builder's work information for holes, plinths, chases, etc.
- Setting out details and mounting heights
- Samples and material submittals
- Site mark-ups indicating installation details
- Record drawings, operating and maintenance manual, training documentation, logbooks, schematics, mimic diagrams.
- Staff training.
- Warranty and maintenance period
- Method Statements, where required
- Required spares, accessories and appurtenances
- Special tools and tackles.
- Coordination and obtaining approvals from local authorities having jurisdiction
- Ensure that all the working drawings are properly coordinated before submitting to the consultant for approval. All the services shall be installed in such a manner so as to avoid conflict with each other and maintain the clearances required between each of them as per the Consultant recommendations.

The Contractor is responsible for detailed builder's work and coordination of structure penetrations including dimensioned drawings showing coordinated setting out including full coordination with all facets of the Contract.

# 2 SECTION – 2 - LV NETWORK

## LV Network

This section together with its appending document covers the minimum requirement for the design, construction and performance of factory-built assemblies of MV/LV switchboard.

### 2.1.1 Scope of Work

The work under this scope consists of supplying, installation, testing, connecting and commissioning of all material and services of the complete switchboard 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 lines and equipment.

### 2.1.2 Standards

Switchboards shall comply with following Amended to date, all parts of standards

- IEC 60027 Letter symbols to be used in Electrical technology.
- IEC 60051 Direct setting electrical measuring instruments.
- IEC 60073 Color for indicator lights and push bottoms
- IEC 60158 LV Switch gear and control gear.
- IEC 60185 Current Transformers.
- IEC 60186 Voltage Transformers.
- IEC 60269 LV fuses.
- IEC 61439 Low-voltage switchgear and control gear assemblies. (All Parts)
- IEC 60529 Degree of protection provided by enclosures.
- IEC 60617 Graphic symbols for diagrams.
- IEC 60947-2 LV Switch gear and Control gear.
- 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 EMT Insulated LSZH Cables.
- CP 1013 Earthing

Any other standard referred to in above standards or these specifications.

### 2.1.3 Installation and Service Conditions

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 as stated in Section -1.

Transient voltage depression down to 80% of rated voltage shall not affect the performance of the equipment and dip voltage must be within permissible limit.

### 2.1.4 Main Electrical Characteristics

Main characteristics of power supply system applicable to all switchboards are

- Voltage 415 V + 10%
- Phase 3, 4 Wire.
- Frequency 50 Hz. + 2 Hz.
- Neutral system Solidly grounded.
- Peak asymmetrical SCC to be specified by the bidders.
- RMS symmetrical SCC to be specified by the bidders.

Main characteristics of auxiliary supply system are

- Control / Command system 24 VDC.
- Space heater system 230 VAC.

### 2.1.5 Ratings

The equipment shall be capable of carrying the specified current on a continuous basis of 24 hours. Per day, without exceeding the permitted temperature.

The current ratings of all equipment 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 10 Amp Minimum.

### 2.1.6 General Requirements

**A. Concept**

The Switchboard shall be of standard, prefabricated metal clad cubicle(s), floor mounting type/wall mounted, totally enclosed, dead front, dust tight and vermin proof requiring 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.

The Switchboard with all components and accessories shall be suitable for front operation only and shall

- have a rated service short service breaking capacity, Ics at 400 VAC, conforming to IEC 60947-2 unless otherwise stated on the drawings.
- be provided with adequate clearance from live parts so that flash over cannot be caused by switching, vermin, pests, etc.
- have all components rated for insulation class 600-volt minimum.
- be designed for flush mounting of all instruments on the front side.
- have all incoming or outgoing connections from the top or bottom as required. Have the components mounted so as to facilitate ease of maintenance from the front. Have common lamp test facility for all lamps.
- have wiring diagram on the inside of door of the switchboard. Be labeled with nameplate on the front side of door.
- have arrangements for extension of switchboard in future.

Provide the LV Panels within the Sub-Station (as required based on the demand load & future load), inclusive of the main LSZH Cables and connections to the associated Sub Main Distribution Boards, fixed loads and Distribution Boards.

The main LV panel shall be procured, constructed, installed, tested and commissioned as per latest WAPDA regulations. Contractor to ensure that for each of main LV panel a dedicated APFC is provided to correct the power factor from 0.90 to 0.95. The APFC shall be inclusive of necessary and appropriate detune reactors etc.

The harmonic content at point of common supply shall be in strict accordance with IEEE519 and ER G5/4. Each LV panels shall be procured based on issued set of tender drawings and must consider additional 25% spare breakers for each used type.

Each LV panel shall have a dedicated incomer same size as of transformer for future connectivity of portable generator, the portable generator box and pad location shall be finalized and constructed by contractor at site. All LV panels shall have surge protections.

**B. 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 LSZH Cables inside the cable compartment. Position of terminals and LSZH 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 LSZH 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.

**C. 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 traffolyte 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.

### 2.1.7 Mechanical Design

**A. General Construction**

The switchboard shall be fabricated, welded; grinded, finished with angle iron framework and cladded with 14 SWG 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 unarmored and armored LSZH 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 EMT 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.

**B. Bus Bars**

Complete phase and neutral Bus bars to be provided 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 their respective 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.

Neutral Bus bar should be of same ampere rating as phase bar.

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 connectors shall be tinned plated connections and joints. Horizontal bus bars shall be of the same current rating throughout their length.

**C. 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 the 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.

### 2.1.8 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 16 SWG sheet steel recess mounting. All components shall be installed on a common component mounting plate made of 14 SWG sheet steel inside the enclosure and protected from the front with screwed sheet steel front plate. The door and dead front covers shall be made of 14 SWG sheet steel. 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 distribution board shall be supplied complete with all installation materials as recommended by the manufacturer. The incoming and outgoing cable connections shall be according to the wiring requirements. If required, an adapter box for accommodating the LSZH Cables and conduits may be provided. The box shall be of the same material and finish as the Distribution Boards.

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 of Distribution Board.

Neutral bus assembly shall consist of outgoing screw terminals with one terminal for each MCB. All holes, cutouts, etc., shall be free from burrs and rough edges. Removable gland plates shall be provided at both the top and / or 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 EMT 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 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.

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 of the electrical system.

**A. Molded Case Circuit Breaker**

These shall be three pole 400 / 500 volts rating shown on the drawings. The breakers shall have both time delay over current and instantaneous short circuit protection.

The MCCBs 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 conspicuously marked to facilitate connection and maintenance. The breaker shall have quick make - quick break toggle mechanism with positive 'ON', 'OFF' 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 MCBs with current rating from 3 to 100 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 tropicalized. The MCBs 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/TRIP positions. 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 MCBs shall be provided with bimetallic thermal element for overload protection and a magnetic element for short circuit protection.

**C. Load Break Switch and Contactor**

Load Break Switches and contactors shall be of AC3 type for motor loads.

Air circuit breakers above 630A shall be housed in separate cubicles. Aluminium plate shall be provided for cable entry to ACBs / MCCBs cubicles of 630A and above rating.

### 2.1.9 Power Factor Improvement Plant

The power factor improvement plant shall be used for improving the power factor of the system. The plant shall be automatic-cum-manual.

The power factor improvement 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 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 EMT insulated LSZH 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.

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.

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 transformer 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 brake contactor with auxiliary contacts (2 N.0+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 of the contractor.

### 2.1.10 Motor Control Centres

Motor control centers shall be provided as per project and QCS specifications (as required based on the demand load & future load). All motor below 7.5kW shall be started on DOL, whereas all motors between 7.5kW to 35.0kW shall be started in Star Delta arrangement. Please refer to individual single line diagrams for specifics; if designer has specified any other starting method for same ratings as mentioned; then starting method as shown in SLDs takes precedence. All motor which are 35.0kW and above shall be started with reduced current starting method, and must be fed from dedicated MCC starter panel, wherein all controls for this motor must be in same starter cubicle.

The contractor to perform motor acceleration studies after final selection of motor and MCC panels and ensure that harmonic content, starting current, power factor and terminal voltage at motor is with in stipulated limits. If any of these parameters is not achieved contractor shall install test and commission appropriate correction equipment. The type of starter panel shall be in strict compliance with QCS's latest edition. The MCC shall be intelligent type with provisions for future SCADA and remote communications.

### 2.1.11 Variable Speed Drives

For all sizes above 75.0kW contractor shall propose a dedicated VFD panel, but any onsite limitations such as reduced ventilation in existing LV panel may result in need of a dedicated VFD panel as well. Hence contractor to submit detailed calculations, all set of drawings along with selected vendor's product data sheets and cut sheets to engineer for his review and approval.

The selected VFDs shall meet IEC 61800 amended to date, IEEE519 amended to date requirements.

The contractor shall submit harmonic analysis for project and ensure that THD is below 5%; failing which contractor shall propose a suitable mitigation measure and must take approval of same from Consultant. If required contractor shall propose active harmonic filters to limit the THD to percentage value as required by Consultant or as set forth in IEEE519.

### 2.1.12 LT Panels

Provide LT Panels along with each charger/Inverter for local isolation and protection of upstream network. The panel shall be free standing type with minimum IP 55rated for outdoor installations as per WAPDA specifications.

Similarly, the LPCP to be provided with all the pumps and the equipment for protection.

The equipment (Isolators & breakers) are to be selected based on the rating of selected equipment being procured. Accordingly, contractor to submit set of drawings along with selected vendor's product data sheets and cut sheets to engineer for his review and approval.

Provide the LV cabling network for entire site. LSZH Cables to be selected to the required demand load and voltage drop. Its' contractor's responsibility to ensure that no LSZH Cables
are de-rated beyond IEC and BS designate ampacities for infrastructure power LSZH Cables. The type of cable to be selected according to the type of installation. The LSZH Cables could be directly buried when installed externally whereas internal LSZH Cables shall be either lay through ducts or above cable trays. The LV networks shall include the following but not limited to

- LV cabling for all the buildings, MDB, MCC, DB etc.
- LV Cabling for all the pump stations etc.
- Video Surveillance Service Cabinets
- Outdoor lighting feeder pillars
- Electric Buses chargers etc.

Where the LV feeders shall be directly buried, and all the LV LSZH Cables will be spaced at 25-30cm with cover level of 50-60cm from center to center as per latest IEC Standards.

For Electrical chargers' LSZH Cables shall be direct buried in two layers in staggered arrangement, contractor must lay these LSZH Cables from substations to main AC/DC inverter as shown in tender drawings.

Furthermore, contractor shall achieve soil thermal resistivities as per design inside each trench and must re-validate de-rated ampacities for entire LV LSZH Cables for each charger. This re validation shall be studied in ETAP, CYMCAP software and report for all direct buried trench sections and concrete encased duct banks shall be submitted to client, for review and approval.

All LV LSZH Cables; that is two sets of 4/C-300 mm-sq. CU/XLPE/SWA laid in direct buried trench in double layer in staggered arrangement with customized backfill with thermal resistivity of 1.2 Km/W (min), contractor shall ensure that this minimum value is maintained throughout the trench where LV LSZH Cables for -Chargers are direct buried.

Power and control LSZH Cables from these DC stations to electric chargers will be in scope of charger supplier. Currently design has included multiple uEMT sleeves. contractor after the award of contract shall coordinate with charging equipment supplier to get confirmation about the adequacy of number and sizes of ducts. If current provision is not sufficient contractor shall construct more easement as per selected charger supplier. As such the number same information shall be updated and re-submitted to engineer for his review and approval.

Contractor must coordinate with the selected electric buses manufacturer and charging equipment vendor, site supervision consultant before the commencement of electrical infrastructure construction.

The Contractor is required to construct and commission the requisite charging infrastructure, which is universal in its characteristics for charging of the electric Buses at each of these bus depots. The Contractor shall carry out the study for determining the location, quantity of charging stations and the types of chargers to be used after thoroughly understanding the routes/specifications of the buses and its charging stations.

The Contractor shall validate and construct electric buses electrical infrastructure in such a way that in future there will be no disruption in electric buses operations.

### 2.1.13 Particular Component Requirements

**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 / IA 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 the same accuracy class as Current Transformers.

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 Ql 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 Lineup 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.

### 2.1.14 Installation

The LV Switchboard shall be installed at location shown on the drawing. The Contractor shall ensure coordination with civil works for providing any openings, holes, etc. to avoid any breakage to completed works.

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 LSZH Cables shall be connected as recommended by cable manufacturer. The cable armor shall be connected effectively to ground.

The Switchboard body shall be connected to earth as per instructions given in section "Earthing" of these specifications. The Switchboard shall be tested and commissioned in the presence of the Engineer. The tests to be carried out shall be tested before energizing as per instructions contained in these specifications.

# 3 SECTION – 3 - LOW VOLTAGE LSZH CABLES AND WIRES

## SCOPE OF WORK

The work under this scope consists of supplying, installation, testing, connecting and commissioning of all material and services of low voltage LSZH 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 the Engineer and coordinate at site with others for exact route, location and positions of electrical lines and equipment.

The LV LSZH Cables and wires with accessories shall also comply with the General Specifications for Electrical Works, Section - I and with other relevant provisions of the Tender document.

## GENERAL

All multicore 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 LSZH Cables shall be of minimum 450 / 750-volt grade. Power LSZH Cables for main feeders, main to submain feeders, power equipment, etc., armored or unarmored shall be of 600 / 1000 volts grade. Armoring of LSZH 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 LSZH Cables shall be circular, whereas of multicore LSZH Cables may be circular or shaped according to standard practices and codes. The EMT insulation shall be extruded with a EMT compound having good flexibility, resistance to aging and ability to withstand the ambient temperatures as given in General Specifications for Electrical Works, Section -1 of these specifications. Cable should be capable of running 125% of full load current without any damage.

All power cabling used for external power distribution shall be armored type.

## STANDARDS

LV LSZH Cables and Wires shall comply with following up to date standards

- IEC 60228: Defines the characteristics of conductors used in insulated LSZH Cables.
- IEC 60502-1: Covers power LSZH Cables with extruded insulation and their accessories for rated voltages from 1 kV up to 30 kV.
- IEC 60502-2: Specifies requirements for power LSZH Cables with extruded insulation for rated voltages from 6 kV (Um = 7.2 kV) up to 30 kV (Um = 36 kV).
- IEC 60332: Tests for electrical LSZH Cables under fire conditions, including fire resistance tests.
- IEC 61034: Specifies methods for measuring smoke density of burning LSZH Cables.
- IEC 60754: Deals with tests on gases evolved during combustion of electric LSZH Cables.
- IEC 60092: Covers electrical installations in ships, including LSZH Cables.
- IEC 60364: Series covers electrical installations in buildings with voltages up to 1000V AC or 1500V DC.
- BS 5467: Specifies thermoset insulated, armored, low voltage LSZH Cables for fixed installations.
- BS 6724: Covers cross-linked polyethylene (XLPE) insulated, low smoke zero halogen (LSZH) LSZH Cables, often used in buildings for fire safety.
- BS 7835: Specifies requirements for MV LSZH Cables with LSZH insulation, often used in similar applications to BS 6724 for fire safety.
- BS 7846: Covers thermosetting insulated, armored, fire-resistant LSZH Cables with rated voltage of 600/1000V.

Any other standard referred to in above standards or these specifications.

## MATERIAL

### 3.1.1 General

The power, lighting and control LSZH Cables shall be furnished and installed in accordance with the routes and requirements shown on the drawings.

All LSZH 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 phase conductors and black for neutral conductor. Where insulated earth conductor is installed, it shall have green color insulation.

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 multicore armored or unarmored LSZH Cables shall be properly marked for clock-wise and anti-clock-wise sequence of core colors.

### 3.1.2 LSZH Cables for Conduit Wiring

All LSZH Cables / wiring in concealed or surface mounted EMT or steel conduits shall be single core EMT insulated of specified grade and size, unless specifically shown on the drawings or given in BOQ.

### 3.1.3 LSZH Cables on Surface / Concrete Trenches

LSZH Cables for distribution system to be installed on surface, in cable ducts, in concrete trenches or on trays shall be single or multicore EMT insulated and EMT sheathed of specified voltage grade and size, unless specifically shown on the drawings or given in BOQ.

### 3.1.4 Underground Installation

LSZH Cables for laying directly underground shall be EMT insulated, EMT sheathed and armoured with galvanized steel wire. LSZH Cables fully installed in underground ducts / pipes and mechanically protected from end to end shall be EMT insulated and EMT sheathed unless specifically shown on the drawings or given in BOQ. The installation work of underground cabling shall be done completely as per the prevailing standards or as per the drawings.

### 3.1.5 Cable Accessories

All cable accessories shall be provided for the complete cabling and wiring system without any additional cost unless specifically mentioned in BOQ. These shall include but not limited to the items such as saddles, clamps, fixing channels, connectors, cable joints (where necessary and approved by the Engineer), clips, lugs, tapes, solder, identification tags, bushes, glands, etc.

## INSTALLATION

### 3.1.6 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 LSZH 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 LSZH 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.

### 3.1.7 Conduit Wiring

The wiring through 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%. LSZH Cables directly embedded in the masonry are not accepted.

The wires shall be pulled in conduit with care, preferably without the use of any lubricant. 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 EMT 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.

### 3.1.8 LSZH Cables on Surface / Trenches

All LSZH 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 LSZH 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. LSZH Cables shall be fixed throughout their length by means of approved saddles, clips, etc., at every 600 mm vertically and 900 mm horizontally.

LSZH 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., or alternatively by means of suitable fixing devices cast at site, e.g., concrete inserts.

Contractor shall be responsible for all drilling of steel work, brick work and masonry where necessary for fixing clamps and brackets for supports.

LSZH Cables shall not be pulled into conduit until the conduit system has been completed, cleared and free from obstruction and sharp edges.

It shall be ensured that conduit system is clear before cable is drawn in. LSZH 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 LSZH Cables in defined condition of the surface of wall etc.

Grease or other injurious lubricants shall not be used in pulling LSZH 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 LSZH 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 LSZH 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.

### 3.1.9 Underground LSZH Cables

The Contractor shall plan and take special care to prevent any damage to existing underground facilities such as underground piping, LSZH 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 LSZH Cables for this purpose that cut lengths of LSZH Cables shall allow about 3% more in the measured lengths between terminations.

The RCC chamber of appropriate size shall be provided at every joint of LSZH Cables as per standards and actual site requirements. The details of RCC chamber shall be provided by contractor prior to commissioning of works.

LSZH 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 LSZH 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, EMT, 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 LSZH Cables.

LSZH Cables entering the buildings shall also be laid in protective pipes. The protective pipe ends, after installation of LSZH Cables, shall be plugged water tight by means of polyurethane foam / bituminized Hessian or equivalent method as approved by the Engineer.

## Cable Termination and Joints

LSZH 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 Owner or his representative before use.

The Contractor shall be responsible for all drilling and if necessary, tapping entries where these have not been provided by others.

When preparing LSZH Cables prior to fitting glands, the gland manufacturer's instructions for cable preparation shall be observed. In all cases where armored LSZH 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 LSZH 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 LSZH 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.

LSZH Cables of AC circuits, installed in EMT or steel conduit shall always be so bunched that the LSZH Cables of all phases and the neutral conductor (if any) are contained in the same circuit. The outdoor apparatus shall normally be connected by means of LSZH 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.

### 3.1.10 INSTALLATION

LSZH Cables of 1,000 volts grade and up to 15,000 volts grad laid direct in the ground shall be at a minimum depth of 900 mm measured from the top of the LSZH Cables to the general ground level. For this purpose, a trench shall be excavated, cleaned and the floor of the trench shall be covered with a minimum of 100 mm of clean sand or sifted soil before laying the cable.

After laying the LSZH Cables they shall be covered with additional clean sand or sifted soil, well punned over and around the LSZH Cables to a level of 100 mm above the uppermost cable. Protective cable tiles shall be carefully placed over each cable. As per requirements of site conditions the buried depth may be changed with due approval of the Engineer.

In addition to the proactive cable tiles all LSZH Cables buried direct shall be marked throughout their length by polyethylene cable warning tape colored yellow. Such tape shall be laid 300 mm above the cable tiles during the backfilling of the trenches and where required two or more tapes shall be laid side by side to ensure full width cover. The tapes shall read "Danger – 400 volts or Danger – 11,000 volts" as the case may be.

# 4 SECTION – 4 - EMT CONDUITS AND PIPES

## SCOPE OF WORK

The work under this scope consists of supplying, installation and commissioning of all material and services of the complete Conduits and Pipes 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 lines and equipment. The Conduit and Pipes with accessories shall also comply with the General Specifications for Electrical Works, Section - I and with other relevant provisions of the Tender document.

## 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, bushings, bends, inspection / pull boxes, round boxes, etc., necessary for the completion shall be similar to that of conduit or pipes. All the accessories shall be supplied by the Contractor without any extra cost and deemed to have been included in the price of conduits / pipes.

## STANDARDS

Pipes and Conduits shall comply with Section -1. Particular reference shall be made to BS EN 1452, BS EN 1329, BS EN 1401, and IEC 61386-21 for various applications, including water supply and electrical conduits.

- BS 31 Steel Conduit and accessories
- BS 1378 Galvanized Iron Pipes and accessories.
- BS 3595 EMT Pipes and accessories.
- BS 4607 EMT Conduit s and accessories.

Any other standard referred to in above standards or these specifications.

## MATERIAL

### 4.1.1 EMT Conduit s, Pipes and Accessories

The EMT Conduit s and accessories for lighting and power circuits shall be furnished by the Contractor as shown in the drawings or given in BOQ. The EMT 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. 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 sharp 90-degree bends and tees will not be allowed for concealed wiring. The round EMT 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 EMT pipe shall be rigid and shall be minimum B-Class (working pressure - 12 Kg / cm), unless otherwise stated on Drawings or Bill of Quantities. Where pipe changes direction, manufactured smooth bends shall be used. For jointing of pipe, all precautions and procedures recommended by manufacturer shall be followed.

### 4.1.2 Steel Conduit and Accessories

All conduits shall be of heavy gauge 16 SWG steel, manufactured and tested in accordance with latest relevant standards. The conduit shall be protected by two base coats of red oxide anti-rust 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-rust 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.

### 4.1.3 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.

### 4.1.4 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 EMT Conduitwith 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 a white plastic sheet of appropriate size fixed to the box by means of galvanized screws.

### 4.1.5 Adaptable Boxes

Adaptable 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.

### 4.1.6 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.

### 4.1.7 Cable Trunking

Where required, wiring shall be run in hot-dipped galvanized (after fabrication) sheet steel cable trunking of the specified gauge complete with all fittings and accessories, manufactured and installed in accordance with BS 4678/NEMA. The trunking shall be constructed with return flanges. Trunking covers shall be secured by anchored turn- buttons and locking bars and minimum length of individual sections shall be 2.44-m. The trunking shall be suspended/supported from the structure at maximum 2-m intervals with straps and hangers fabricated from minimum 6-mm dia HDGI bars, or supported by angle-iron brackets.

Conduit drips from the trunking shall also be supported with hangers. Factory made connectors shall be used at joints.

Junctions (tee and 4-way) in multi-compartment trunking shall be double depth to avoid reduction in cabling space.

Cable in vertical runs shall be supported by pin racks, prongs or bridging pieces. Fire barriers shall be provided at each floor level. Allowance for expansion shall be incorporated.

Bonding links shall be provided at each joint and secured by screws, nuts and shockproof washers. The bonding links shall make contact with the metal of the trunking of fitting, and continuity shall not depend on contact through the screws, nor on removal on site paint finish from ferrous metal.

## INSTALLATION

### 4.1.8 EMT Conduit s - Concealed

The conduit shall be installed concealed in roof, wall, column, etc.

At all joints and bends, EMT jointing solution as manufactured by Pakistan EMT Limited or approved equivalent 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. In the reinforced cement concrete (RCC) work, the conduit shall be laid before pouring of concrete.

Under no circumstances shall chases be made in the RCC structure for concealing conduit and accessories, after pouring of concrete. The concrete shall be supported on top of bottom reinforcement of slab and shall be firmly secured by tying to the reinforcing steel in order to avoid being disturbed during pouring of concrete.

All outlet boxes to be firmly supported and installed such that they finish flush with the soffit of slab of beam.

Where conduits have to be concealed in cement concrete (CC) work after concreting, or in block masonry, chases 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 32 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 chasing and cutting.

The termination of conduits at or near the Switchboard / Distribution Board is shown diagrammatically on the drawing. The exact final locations of the termination shall be coordinated with the Switchboard/Distribution Board to be installed. Any extension of conduit near the Switchboard / Distribution Board to suit the site condition shall be made without any extra cost. 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 LSZH Cables to be pulled through them.

The entire conduit system shall be installed and tested before wiring is carried out. Any obstruction found shall be cleared by use of cutting mandrel or other approved device and the conduit shall be cleaned out before the installation of cable.

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.

### 4.1.9 Fixing of Conduits and Fittings

Conduits in process units and on steel work with "U" bolt type fixings.

Conduits in buildings shall be fixed with galvanized distance saddles. Where a number of conduits follow a single route, they may be fixed to mild steel brackets. Conduits shall be supported on both vertical and horizontal runs as follows

- Conduits size 20 mm and 25 mm maximum spacing of fixing 1000 mm.
- Conduit sizes larger than 25 mm spacing of fixing 1500 mm.

All conduit boxes that support fittings shall be securely fixed. All conduits shall be fixed 150 mm before and after every right angle or off set. All conduit fittings and equipment shall be fixed true and line able. All conduit bends shall be made

with an approved conduit bending machine or hickory. The radius of curvature of the inner edge of any bend shall not be less than the following

| Conduit Size | | Radius |
|---|---|---|
| 25 mm | (1") | Not less than 150 mm. |
| 50 mm | (2") | Not less than 305 mm. |
| 82 mm | (3") | Not less than 460 mm. |
| 100 mm (4") | | Not less than 610 mm. |
| 150 mm (6") | | Not less than 750 mm. |

Underground conduit stud-up or kick pipe through concrete envelope shall be extended a minimum of 150 mm above grade and adequately braced to prevent shifting during concrete pouring work. The concrete envelope shall extend at least 76 mm above grade.

Under floor conduit installation shall be at a minimum depth of 120 mm from finished floor level. The G.I. pipes / conduits shall be installed at a minimum depth of 1000 mm measured from the top of size to the finished road level.

### 4.1.10 Location of Conduits and Fittings

Before conduits are installed, confirmation shall be obtained that the conduit may be installed in that position. Particular attention shall be given to the location of conduits to prevent the infringement of headroom and access ways. Conduits shall be located to avoid obstructions, furnaces, hot lines and other places of high temperature.

Conduit shall not be located than 150 mm (6") where it runs parallel to or crosses hot surfaces. Underground conduit runs shall be kept to minimum in both number and length. Conduits shall not be recessed in fair brick work. Draw boxes shall be so positioned to enable the LSZH Cables to be drawn in easily. The boxes shall not be located in the comers or other such locations and shall be positioned to avoid tight bends, bending and cable kinks.

Conduits shall not generally be installed having a greater length 12,000 mm (40 feet) between draw-in boxes. Conduit entries shall wherever possible be located in the bottom of boxes and equipment etc.

# 5 SECTION – 5 - WIRING ACCESSORIES

## SCOPE OF WORK

The work under this scope consists of supplying, installation and commissioning of all material and services of the complete switches, switch sockets, etc., and miscellaneous items 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 lines and equipment.

The wiring accessories shall also comply with the General Specifications for Electrical Works, Section -I and with other relevant provisions of the Tender document.

## 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.

## STANDARDS

Wiring accessories and miscellaneous items shall comply with Section -1.

Particular reference shall be made to amended to date following standards

- BS 67 Ceiling roses.
- BS 1363 13A Fused plugs and unswitched 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. Any other standard referred to in above standards or these specifications.
- IEC 60884 Plugs and socket-outlets for household and similar purposes.
- IEC 60309 Plugs, socket-outlets and couplers for industrial purposes.
- IEC 60320 Appliance couplers for household and similar general purposes.
- IEC 60906 IEC system of plugs and socket-outlets for household and similar purposes.
- BS 1362 Specification for general-purpose fuse links for domestic and similar purposes (primarily for use in plugs).
- BS 1363 13 A plugs, socket-outlets and adaptors.
- BS EN (IEC) 60309 Plugs, socket-outlets and couplers for industrial purposes.
- BS EN 60320 Appliance couplers for household and similar general purposes.
- BS 7671 Requirements for Electrical Installations.

## MATERIAL

### 5.1.1 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.

For locations where switches and fan speed regulators are installed together, single switches shall be grouped and fixed on 3 mm thick plastic sheet screwed to a sheet steel box of appropriate dimensions. 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.

### 5.1.2 Switch Socket Outlets

Switch socket units shall be of flat pin type and conform to BS 1363, 13A for fused plugs and socket outlets. 2 and 3 Pin rated for 15 Amps. or 2 Pin rated for 10 Amps. Supply as specified in the bill of quantities.

3 Pin 15 Amps. Sockets shall be molded 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.

### 5.1.3 Sheet Steel Boxes

The outlet boxes for installation of switches, fan speed regulators 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-rust 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 were installed in the vicinity of liquids.

### 5.1.4 Ceiling Rose

The ceiling rose shall be suitable for 5 Amps. 250V AC. It shall have white plastic moulded 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 multicore EMT insulated and EMT sheathed cable.

### 5.1.5 Fans

I. 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.

II. 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 Schedule 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.

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.

III. Ceiling Fan

The ceiling fans shall be consisting of three blade types with 56" and suitable for operation on 250 VAC with +10% tolerance. The Fan shall be mounted directly on ceiling; the lowest point of the fan blade is approximately 300mm (1 foot) below the ceiling. Make sure that the chosen location of the fan will not allow the rotating fan blades to come into contact with any object.

Ensure ceiling joists are sound and of adequate size to support a 35Kg (77lb) load. To reduce the risk of fire, electrical shock or personal injury, ensure that the fan mounting bracket is supported directly from the building structure. Do not mount to an outlet box. The mounting bracket must be firmly screwed to a load bearing structure e.g. a concrete ceiling, steel structure or timber frame. If a timber frame is to be added it must be securely nailed or screwed between two beams.

# 6 SECTION – 6 - LIGHTING FIXTURES

## SCOPE OF WORK

The work under this scope consists of supplying, installation and commissioning of all material and services of the complete 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 route, location and positions of light fixtures.

## GENERAL

The lightning protection for each system shall be in strict compliance with latest BS standards; if the risk assessment is negative contractor shall provide Level-II as minimum for each of buildings in each of depot sites.

The description of light fixtures in given Bill of Quantities, and stated on the drawings, and relevant material are described in this section. The determination of quality is based on certified photo-metric data covering the coefficient of utilization, light distribution curves, construction material, shape, finish, operation, etc.

The Contractor shall submit two samples of each and every light fixture specified and obtain approval of the Owner before purchasing. The quality and finishes of local make light fixtures (if mentioned in BOQ) shall be same as that of standard manufacturer. The accessories such as ballast, lamp / starter holders, starters, lamps, igniters, etc., for all type of light fixtures shall be of Philips make.

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.

The maintenance factor of 0.7 shall be used for outdoor lighting calculation

## STANDARDS

Lighting fixtures shall comply with Section -1. Particular reference shall be made to following amended to date standards

- IEC 60598 Luminaries.
- IEC 62384 DC or AC supplied electronic control gear for LED modules performance requirements.
- BSEN 1838 Lighting applications. Emergency lighting for buildings
- NFPA 101 Emergency Lighting
- IEC 62031: Specifies safety requirements for LED modules for general lighting.
- IEC 62560: Focuses on the safety requirements of self-ballasted LED lamps for general lighting with voltages exceeding 50V.
- IEC 62612: Deals with the performance requirements of self-ballasted LED lamps for general lighting with voltages exceeding 50V.
- IEC 62776: Covers safety specifications for double-capped LED lamps designed to replace linear fluorescent lamps.
- IEC 60598 series: This is a comprehensive series of standards for luminaires, with various parts addressing specific types and requirements. For example, IEC 60598-2-1 covers fixed general-purpose luminaires.
- IEC 62778: Deals with the application of IEC 62471 for assessing blue light hazard from light sources and luminaires.
- IEC 62471: Focuses on the photobiological safety of lamps and lamp systems, including LED lighting products.
- IEC 62722-2-1: Specifies particular requirements for LED luminaires.
- IEC 62717: Addresses performance requirements for LED modules for general lighting.
- IEC 62722-1: Covers general requirements for luminaire performance.

Any other standard referred to in above standards or these specifications.

## LED Light Fixtures

The light fixture shall be as stated on drawings and bill of quantities. The light fixture shall be finished in standard colors unless otherwise stated on drawings or directed by Engineer. All LED light fixtures shall be of international standard and quality. The type of fixtures with manufacturer catalogue reference is given on the fixture schedule and in Bill of Quantities.

Equivalent fixture may be acceptable provided that the Contractor submits for review all necessary data indicating photo-metric curves to show that the fixture proposed are of the same type, construction and quality. The lamps for light fixtures shall be Light Emitting Diodes with driver and shall be supplied and installed according to the wattage as indicated on drawings.

Weather proof light fixture shall comprise of cast aluminum body and gasketed clear glass cover secured to the body by means of galvanized nuts / screws to give a weather proof and water tight fit. The gasket shall be weather resistance type.

The LED light fixtures shall be supplied complete with driver and all accessories as per light fixture schedule and shall be installed in accordance with manufacturer's recommendations and sound engineering practice.

## INSTALLATION

### 6.1.1 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 terminal box and the fixture shall be carried out with 3 core I.5 sq. mm copper conductor, EMT / EMT cable respectively for circuits protected by 10 amps and 15 / 20 amps MCBs. The wiring inside light fixture body shall be done with heat resistant LSZH Cables or EMT 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.

### 6.1.2 LED Light Fixtures

The LED 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 accordance with manufacturer's recommendations and in coordination with ceiling installation.

## Outdoor Lighting

### 6.1.3 General

The work under this section consists of supply, storage, installation, testing & commissioning of Road lighting system read together with drawings & bill of quantity. The Contractor shall furnish all labour, materials, services, and skilled supervision necessary for the construction, erection, installation and connection of all equipment. The extent of work specified herein and/or shown on the drawings represents the minimum requirements. Electrical Work Generally is to be in accordance with the requirements of the Specification Road lighting including luminaries, columns, related power distribution and control, protective earthing and related works including column foundations and LSZH Cables etc.

The contractor shall be responsible and confirm in writing that his selection of equipment will ensure on the road surfaces luminance level and uniformities equal or better than those defined in the lighting design criteria as mentioned above. The contractor shall submit the technical details of the luminaries and other equipment and having obtained conditional approval thereof; submit in duplicate, full detail of the calculated results for the level and uniformity of luminance and illumination on all road surface. These details should be submitted after initial approval by the Engineer.

### 6.1.4 Technical Requirements:

Minor deviations from the Drawings may be considered for improvement in construction details, but no changes are to be made without the written approval of the client/Engineer.

### 6.1.5 Shop and Construction Drawings:

Contractor shall submit drawings for approval including, but not limited to, the following:

a) Layout of equipment in exact positions with mounting and construction details, concrete foundation dimensions and reinforcement, routing and sections of duct- banks and trenches, backfill and packing material, earthing rods etc.
b) Cabling and wiring diagrams, single line drawings, loads, phase distribution, protection and control, earthing.
c) Calculations of illumination levels and glare, based on CIE methods.

### 6.1.6 Led Street Lighting System

The Road light operates from Dusk to Dawn i.e., the lamp automatically switches ON after the sunset and switches OFF after sunrise. The LED light should have programmable driver. The light fixture shall be posted on single or double arm pole as shown in drawings. The luminaire shall be fixed on to the Pole and are interconnected through the LSZH Cables. The street light operates in the stand-alone mode. The Street Lighting system components consist of:

a) LED Luminaire
b) Pole
c) Interconnecting LSZH Cables
d) Terminal box & Circuit Breaker

### 6.1.7 Luminaires Description

The fixture shall have a full die cast aluminum housing providing adequate rigidity, strength and heat dissipation. The housing shall have integrated driver and LED lamp compartments for better heat dissipation and convenience in maintenance at the site, and shall feature highly reflective components and films to increase light output. The optical LED compartment shall have thermally hardened glass cover and high-quality silicon gaskets. The glass shall be extra-white for maximum light transmission. The glass cover shall be tightly secured with housing. The complete fixture shall be rated for ingress protection class IP 66.

The fixtures shall have flexible optical systems for various wattage range. The fixture shall use high efficiency LED and optics system. The Light output Ratio (LOR) shall not be less than 85%. The fixture shall offer a composite system efficiency of more than 120 lumen / watt. The lens system design and high efficiency LED shall facilitate maximum spacing between the road lighting poles and coverage of wider roads. The multilayer optics design shall ensure adequate luminance uniformity in the unlikely event of individual LED failure.

The fixture shall offer choice of narrow, medium and wide beam light distribution. The optics lens system shall have choice of narrow, medium and wide beam light reflectivity for maximum light output.

The lighting fixture shall have surge protection to protect the electronic driver and LED system. Minimum surge protection rating shall be 10 KV. SPD should comply to IEC 61347-2-11 and should be listed in Luminaries IEC 60598-2-3 amended to date. The complete fixture including lamp and gear compartments shall have ingress protection class IP66 for Road Lights and IP65 for Flood Lights long reliable performance and minimal maintenance requirement and an impact Resistance of IK08 or above. No chemical glue shall be used as that may cause breakdown of water-proof and dust-proof seal.

Both the driver and LED lamp compartments shall be designed to be easily accessible for maintenance. The mounting of the fixture shall be in axial orientation through suitable sized sidearm. The means for attaching the luminaire or external part to its support shall be appropriate to the weight of lumiaire or external part.

The connection shall be designed to withstand wind speeds of 160 Km/hr on the project surface of the assembly without undue deflection. The fixture shall be fully compatible with future LED upgrades when they become available.

It shall have a modular design to upgrade/replace with new LED modules or LED drivers at site conveniently with minimum effort. All electronic components/drivers shall be mounted on a separate tool-less gear-tray. Lamp compartment shall have easy access for opening the glass cover.

The LED driver shall be designed to operate large array of high-powered LEDs through current controlled output. The driver shall be suitable for 230V ±10%,- 15%, 50Hz, single phase mains AC supply. The LED driver shall have an efficiency of at least 85%. The LED driver shall be manufactured Harvard, Philips, Thorn and NVC.

The LEDs shall:

- Be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 35º C.
- Have a useful life of 50,000 burning hours.
- Have a minimum color rendering index (CRI) of 70 ± 10 % and a color temperature above 5000K.

### 6.1.8 Thermal Management

Managing thermal properties in LED fixtures is most critical to ensure optimum performance of LEDs and reliability of the system. The housing under the circuit board shall be specially designed to ensure perfect contact between the board and the fixture housing for efficient heat dissipation.

Only metal core PCBs shall be used to maximize heat transfer process PCB shall be mounted on the housing using a highly efficient thermal interface material. Use of silicon glue is not acceptable. The housing over the driver chamber shall have additional ribs to ensure direct contact with the drivers. The housing shall have adequate surface area to ensure fast heat dissipation.

### 6.1.9 Photometrics

Fixtures shall have illumination Engineering society (IES) Type II or III distribution pattern, with short or medium longitudinal distribution. LM-80 LED and photometric test reports and IES files from a third-party testing laboratory shall be available.

### 6.1.10 Warranties

The complete fixture including all accessories shall have at least three (3) year warranty (after one year of defect liability period) against defects and failures.

### 6.1.11 Applicable Standards and Codes

The fixtures shall conform to the following latest standards and codes

- IEC 60598-1
- IEC60598-2-2
- IEC60598-2-3 (Road & Tunnel Lights)
- IEC 60598-2-5 (Flood Lights)
- IEC6247-1 (Complete fixtures being offered as well as for the LED Chips)
- LM-79 (Luminaries being offered (Model/Wattage specific)
- LM-80 (LED chips being used)
- LM-82-12 (Approved method of measuring LPW @ 50°C (Model/Wattage specific)
- UL-1598 (For thermal management test, Model/ Wattage specific)
- EN 55015: 2006 and 2007 – Limits and method of measuring radio disturbance characteristics of electrical lighting)
- EN 61547: 1995 / +A1: 2000 – Equipment for general lighting purpose
- EMC immunity requirements
- EN 61000-3-2: 2006 – Limitation of harmonic current emission
- EN 61000-3-3: 2006 – Limitation of voltage fluctuation and flicker
- EN 62493 Assessment of lighting equipment related to human exposure to electromagnetic field (Environmental friendly)

The LED driver shall conform to following latest standards and codes:

- EN61347-1: General and Safety requirements
- EN61347-2-13: particular requirements for DC or AC supplied electronic control gear for LED modules
- EN61384: DC or AC supplied electronic control gear for LED modules performance requirements
- EN 61548: 1995 / +A1: 2000 – Equipment for general lighting purpose EMC immunity requirements
- EN 62384: AC or DC supplied electronic control gear for LED modules performance requirements

### 6.1.12 Technical and Descriptive Data and Drawings

Technical and descriptive data and drawing to be submitted shall include but not limited to the following:

Technical data of fixtures and driver

- IES Photometric file (absolute photometric data)
- LM-79 test report for each of the fixture type/ wattage being offered.
- LM-80 test report of LED used
- LM-82-12 approved method of measuring LPW @ 50°C (test report of the fixture type / wattage being offered.
- Thermal management test report (UL 1598) of the fixture type/wattage being offered.
- EN 62493 test report
- IK rating test report
- Lumen depreciation test report at 1000, 2000, 3000 and 6000 burning hrs.
- 3rd party IEC 60598 test reports
- Vibration test reports
- EMC test reports
- Salt spray test report
- Photo- biological safety test report
- Customers testimonials
- Factory ISO certificate
- Report of other type tests stipulated in the respective standards/codes.

Country of origin, Manufacturing works / factory details, premises & QA & QC procedure, in house testing procedure, routine testing procedures and test reports, testing equipment details are also being provided in order to ensure proper traceability and quality assurance on each piece of the product being delivered.

### 6.1.13 International Independent Laboratories

For the specified requirements of type tests and type test reports by an independent authority/independent laboratory, the following laboratories shall be considered as independent laboratories:

- KEMA Labs, Holland.
- CESI Labs Italy
- CRIEPI Labs, Japan.
- Any laboratory accredited by EA (European Co-Operation for Accreditation) or a member thereof.
- Any laboratory accredited by ILAC (International Laboratory Accreditation Cooperation) or member of thereof
- Any laboratory accredited by IAF (International Accreditation Forum) or a member thereof.
- Any laboratory accredited by STL (short-circuit Testing liaison) or a member thereof.

### 6.1.14 Installation Details

When LSZH Cables cross road, paved area or other services, they shall be laid in protective uEMT pipes of required size. The pipe end after installation of cable shall be plugged to make them water tight by means of bituminized hessian or equivalent material.

# 7 SECTION – 7 - EARTHING SYSTEM

## SCOPE OF WORK

The work under this scope consists of supplying, 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.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact route, location and positions of the electrical lines and equipment. The Earthing system with accessories shall also comply with the General Specifications for Electrical Works, Section - I and with other relevant provisions of the Tender document.

## GENERAL

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.

## STANDARDS

The latest editions of the following amended to date standards / codes shall be applicable for the materials covered within the scope of this specification

- 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 EMT Insulated LSZH Cables.
- CP 1013 Earthing
- IEC 60364: Low-voltage electrical installations and includes detailed requirements for earthing arrangements and protective conductors.
- IEC 60364-5-54: Earthing arrangements and protective conductors.
- IEC 61000-5-2: Earthing and cabling for electromagnetic compatibility (EMC).
- BS 7430: Earthing and bonding in electrical installations.
- BS EN/IEC 62305: lightning protection, which includes earthing considerations.
- NFPA 70

Complete earthing design, testing and installation shall be in strict compliance with IEEE 80 and Contractor shall ensure that main earthing grounding grid, all branch connections and main ground bars are procured as per issued tender drawings.

Contractor must ensure that earthing resistance at any point in earth continuity system to main earth electrode shall not exceed 01 ohm, unless otherwise specified. Contractor to ensure that resistance at any point in lightning protection earth continuity system to main earth electrode shall not exceed 10 ohms. Contractor to ensure that Earthing and lightning protection are two independent systems; and there is a horizontal separation of seven meters between earthing and lightning protection earth pits.

# 8 LIST OF APPROVED MANUFACTURERS (LOAM)

| Sr. No. | Equipment | Manufacturer | Origin |
|---|---|---|---|
| 1. | Oil Filled Transformer / PMU | Pak Elektron Limited (PEL) | Pakistan |
| | | Siemens | Pakistan |
| | | Sky Electric | Pakistan |
| 2. | MV/LV LSZH Cables | Pakistan LSZH Cables | Pakistan |
| | | Fast LSZH Cables | Pakistan |
| | | Newage LSZH Cables | Pakistan |
| 3. | MV LSZH Cables Accessories (Jointing | ABB | EU |

| | | | |
|---|---|---|---|
| | & Termination Kits) | Raychem | USA |
| 4. | HT – CT / PT | Revalco | Italy |
| | | Schneider Electric | France |
| | | ABB | Italy |
| | | Mitsubishi | Japan |
| 5. | MV Switchgear | Siemens | Germany |
| | | Pak Elektron Limited (PEL) | Pakistan |
| | | Bilal Switchgear | Pakistan |
| | | Tariq Electric | Pakistan |
| 6. | LV Switchgear, PFI Panels | Pak Elektron Limited (PEL) | Pakistan |
| | | Schneider Electric | Pakistan |
| | | Green T&D | Pakistan |
| | | Bilal Switchgear | Pakistan |
| | | Tariq Electric | Pakistan |
| 7. | Power Factor Plant, Capacitor, Relay, controller | Nokian | Finland |
| | | Mitsubishi | Japan |
| | | Lovato | Italy |
| 8. | LV Circuit Breakers | Mitsubishi | Japan |
| | | Schneider Electric | EU |
| | | Siemens | Germany |
| | | ABB | Italy |
| 9. | C.T, Relays & instruments | Schneider Electric. | France |
| | | Mitsubishi | Japan |
| | | Revalco | Italy |
| | | ABB | Italy |
| 10. | LV LSZH Cables and Wires/ Earthing Cable | Pakistan LSZH Cables | Pakistan |
| | | Newage LSZH Cables | Pakistan |
| | | Fast LSZH Cables | Pakistan |
| 11. | Load Break Switches, Isolator, Change Over Switches | ABB | Italy |
| | | Mitsubishi | Japan |
| | | Legrand | Italy |
| | | Schneider Electric | EU |
| | | ABB | EU |
| 12. | ıEMT Conduit s / Pipes and Accessories | Dadex | Pakistan |
| | | Beta | Pakistan |
| 13. | Back Box / Pull Boxes / Junction Boxes | Hussain & Co. | Pakistan |
| | | Hensel | Germany |
| | | ABB | EU |
| 14. | Switch & Socket Outlets / Floor Boxes | Clipsal (Schneider Electric) | Australia |
| | | Legrand | France |
| | | ABB | Italy |
| 15. | Cable Glands, Lugs, Terminals and Accessories | Cembre | UK |
| | | Hubbell / Hawke | UK |
| | | Hensel | Germany |
| 16. | Cable Tray / Trunking | Tariq Electric | Pakistan |
| | | Bilal Switchgear | Pakistan |

| | | | |
|---|---|---|---|
| | | | |
| 17. | Contactors | Telemechanique | France |
| | | Schneider Electric | EU |
| | | Mitsubishi | Japan |
| | | ABB | Italy |
| 18. | Fans and Accessories | Pak Fan | Pakistan |
| | | GFC Fan | Pakistan |
| | | Millat Fan | Pakistan |
| | | Royal Fan | Pakistan |
| 19. | Light Fixture, Exit & Emergency | Signify | USA |

| | | | |
|---|---|---|---|
| | Lighting Fixtures | Slyvania | UK |
| | | Avento | Belgium |
| | | NVC | China |
| | | Thorn | UK |
| 20. | Diesel Generator, Fully Imported (Assembled in USA, Europe or Japan) Alternator | Caterpillar | USA |
| | | Hyundai Corp | Japan |
| | | Perkins | UK |
| | | John Deere | USA |
| | | Mitsubishi | Japan |
| | | Mecc Alte | Italy |
| | | Stamford | UK |
| | | Leroy Somer | France |
| 21. | Lightning Protection & Earthing | Indelec | France |
| | | LPI | Australia |
| | | Erico | UK/USA |
| | | ABB Furse | EU |
| | | Dehn | Germany |
| | | Wallis | UK |
| 22. | UPS | APC | USA |
| | | Schneider | France |
| | | Eaton | EU |
| 23. | Telephone Cable | Clipsal (Schneider Electric) | Australia |
| | | 3M/Corning | USA |
| | | Panduit | Singapore |
| 24. | Fire Alarm System | Polon Alfa | Poland |
| | | Eaton | EU |
| | | Bosch | Germany |
| 25. | Closed Circuit Television (CCTV) System | Hikvision | China |
| | | Pelco | USA |
| | | IDIS | Korea |
| 27. | Communication Racks & PDU | Digitus | Germany |
| | | Toten | China |
| | | APC | USA |
| 28. | Fire Resistance Cable | Prysmian | UK |
| | | Draka | UK |
| | | Honeywell | UK |
| | | Virdi | Korea |
| 29. | RMU | ABB | EU |
| | | Siemens | EU |
| | | Schneider | EU |

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# DRAWINGS

Refer Volume 3 of Bidding Documents for Drawings

# Volume 2 (Bill of Quantities)

| NEW ECSP HEAD OFFICE, LAHORE | | |
|---|---|---|
| (RENOVATION OF NEW ECSP HEAD OFFICE) | | |
| ELECTRICAL & IT WORKS ENGINEERING BOQ | | |
| MRS, 2nd BI-ANNUAL-2025 (01.07.2025 to 31.12.2025) DISTRICT LAHORE | | |
| **Sr. No.** | **Description** | **Amount** |
| 1 | SCHEDULE ITEMS TOTAL COST | |
| 2 | NON-SCHEDULE ITEMS TOTAL COST | |
| 3 | SUBTOTAL COST | |
| 4 | PRA 5% ON SUBTOTAL COST | |
| | | |
| 5 | TOTAL PROJECT COST | |

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| Sr. No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| | | **ELECTRCAL WORKS** | | | | |
| 1 | | **Single core (Non-armored)** | | | | |
| | CH-24-12 | Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only):- | | | | |
| | a-x | 120 mm sq (37/0.083") | Meter | 80 | | |
| | a-xii | 185 mm sq (37/0.103") | Meter | 80 | | |
| 2 | | **Cable Tray** | | | | |
| a | CH-24-98-a-ii | Providing and fixing 4" deep cable tray with straight flange fabricated with perforated G.I. Sheet of specified guage,size and depth duly wall supported/ceiling hung,supported on painted brackets of MS angle iron of 1-1/2"x1-1/2"x3/16" and MS patti of 1-1/2"x3/16" size @ 5 ft C/C, hangers i/c the cost of hardwares as approved and directed by the Engineer Incharge<br>**16SWG**<br>**9"x4"** | Meter | 200 | | |
| a | CH-24-99-I | Providing and fixing 4" deep cable tray with straight flange fabricated with perforated G.I. Sheet of specified Guage, size and depth duly supported on painted brackets of MS angle iron of 1-1/2"x1-1/2"x3/16" and MS Patti of 1-1/2"x3/16" size @ 3 ft C/C, hangers i/c the cost of hardwares as approved and directed by the Engineer Incharge.<br>**14SWG**<br>**12" x 4"** | Meter | 800 | | |
| 3 | | **Cable Tray Cover** | | | | |
| a | CH-24-100-vi | Providing and fixing screwless cable tray cover fabricated with 18 SWG G.I. Sheet of required size i/c the cost of hardware as approved and directed by the Engineer In charge<br>**12" wide** | Meter | 800 | | |
| 4 | | **CABLE LADDER** | | | | |
| a | CH-24-101-b-iv | Providing and fixing hot dipped Galvanized Cable Ladder fabricated with side channels of specified size and guage duly fixed with rungs of 35x15mm run @10"C/Ci/c the cost of coupler plates(1-1/4"x8") and hard wares as approved and directed by the Engineer Incharge.<br>**12"x2" 14SWG** | Meter | 100 | | |
| 5 | | **Switch Board** | | | | |
| | CH-24-105 | P/F PVC double layer Switch kit Face plate with specified switch holes i/c the cost of switches / sockets / dimmer made of Hi-Life/ Bush / Schneider or approved equivalent manufacturer, screws complete as approved and directed by the Engineer In charge | | | | |
| | b-I | 4 GANG 1 WAY SWITCH (Large) | Each | 80 | | |
| 6 | | **Switch Sockets** | | | | |
| | CH-24-105 | P/F PVC double layer Switch kit Face plate with specified switch holes i/c the cost of switches / sockets / dimmer made of Hi-Life/ Bush / Schneider or approved equivalent manufacturer, screws complete as approved and directed by the Engineer In charge | | | | |
| | a-iv | Three pin Light Plug 10/13 Amp | Each | 30 | | |
| | a-viii | Three Pin Power Plug 15-32 Amp | Each | 30 | | |
| | | **Distribution Boards Description** | | | | |
| 7 | CH-24-91 | Supply, installation, testing, and commissioning of P/F **floor mounted Electric Panel board** of required depth and size, fabricated with 14SWG M.S sheet (Indoor/Outdoor Type),dedusting, zinc Phosphate, finish with electro static powder coating in approved color i/c the cost of capacitor trip unit over current, Lock, Indication lights, Brass glands, Natural & Earth bar, Digital volt meter/ Amp meter, Selector switches, Current Transformers, Controls, Channels, Copper bus bars of specified capacity, Door Earthing, complete in all respects as approved and directed by the Engineer In charge (Breakers will be Paid Separately).<br>**1.LT Switchboards**<br>**a) 2.50 ft deep**<br>**I) 250-600A** | | | | |

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| Sr. No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| | | **MCCB Breakers (Description)** | | | | |
| 8 | CH-24-87 | Supply, installation, testing, and commissioning of **MCCB** (Molded Case Circuit Breaker) of specified rating made of LEGRAND FRANCE/ GE U.S.A / SCHNEIDER GERMANY / TERASAKI JAPAN/SIEMEN/ABB SWITZERLAND or approved equivalent manufacturer (with fixed Thermal Magnetic Trip) in prelaid DBs and Panels i/c the cost of screws, necessary wire complete in all respect as approved and directed by the Engineer In charge.<br>**b) Four Pole With Adjustable Thermal-Magnetic Trip/Electronic Trip (40-100%)** | | | | |
| | | **MCB Breakers (Description)** | | | | |
| 9 | CH-24-85 | Supply, installation, testing, and commissioning of **MCB** (Miniature Circuit Breaker) of specified rating made of LEGRAND FRANCE/ GE U.S.A /SCHNEIDER GERMANY /SIEMEN GERMAN/TERASAKI JAPAN/ ABB SWITZERLAND or approved equivalent manufacturer in prelaid DBs and Panels i/c the cost of screws, necessary wires complete in all respect as approved and directed by the Engineer In charge | | | | |
| a | CH-24-91-a-i | **MDB (7TH floor)**<br>Size: 1800 x 1500 x 600 mm<br>Qty: 01 No | Cft | 21.90 | | |
| | CH-24-87-b-v | 450 Amp FP MCCB 36KA **(Incoming)** | Each | 1 | | |
| | CH-24-85-a-iii | 6-63 Amp (10 KA) 40 Amp SP MCB **(Outgoing)**<br>(Spare Breakers are included) | Each | 35 | | |
| | CH-24-85-a-iii | 6-63 Amp (10 KA) 10 Amp SP MCB **(Outgoing)** | Each | 28 | | |
| | CH-24-85-a-iii | 6-63 Amp (10 KA) 16 Amp SP MCB **(Outgoing)**<br>(Spare Breakers are included) | Each | 20 | | |
| b | CH-24-91-a-i | **MDB (14TH floor)**<br>Size: 1800 x 1500 x 600 mm<br>Qty: 01 No | Cft | 21.90 | | |
| | CH-24-87-b-v | 300 Amp FP MCCB 36KA **(Incoming)** | Each | 1 | | |
| | CH-24-85-a-iii | 6-63 Amp (10 KA) 40 Amp SP MCB **(Outgoing)**<br>(Spare Breakers are included) | Each | 19 | | |
| | CH-24-85-a-iii | 6-63 Amp (10 KA) 10 Amp SP MCB **(Outgoing)** | Each | 30 | | |
| | CH-24-85-a-iii | 6-63 Amp (10 KA) 16 Amp SP MCB **(Outgoing)**<br>(Spare Breakers are included) | Each | 20 | | |
| 10 | | **ELV system** | | | | |
| e | | **CAT-6 Cable** | | | | |
| | CH-24-116-a-i | Supply, installation, testing, and commissioning of wiring with 4-pair data cable ,23 AWGUL/EN listed cable* Conforming to following standards: TIA/EIA568 /ISO/IEC11801, in prelaid conduit /cable tray from including all accessories, Manufacturer/OEM Authorization, Make: Schneider / i-connect UK/3M Corning USA/ D-Link/ Pollo Australian or equivalent approved manufacturer, complete in all respect as approved and directed by Engineer In charge<br>**a) UTP (Unshielded Twisted pair)**<br>**(ii) CAT-6A (Min.1G/ 10G @ 500MHz or higher)** | Meter | 8,800 | | - |
| f | | **Optical Fiber Cable** | | | | |
| | CH-24-144-a-ii | Supply, installation, testing, and commissioning of Armored Fiber Optic Cable of specified core and mode, Fiber Optic Connection, UL listed , in prelaid/pipe, cable tray , including all accessories, made of Norden / Schneider / Panduit/Pollo Australia or equivalent Complete in all respect as approved and directed by Engineer In charge.<br>**a) Multimode OM3**<br>**6 Core** | Meter | 100 | | |
| g | | **Patch Cord** | | | | |
| | CH-24-119-I | Supply, Installation and commissioning of Cat-6, UTP Machine Made Patch Cord of Specified Length, Support 10 Giga, UL listed cable, with anti snag boots, Gold Over Nickel Plated, Manufacturer/OEM Authorization, confirming to manufacturer warranty, Made of Schneider / i-Connect UK /Panduit USA/D-Link/3M, Corning ,Pollo Australian or equivalent Approved and Directed by Engineer In charge. | | | | |
| | | 1-meter patch cord | Each | 300 | | |

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| Sr. No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| h | | **12 PORT ODF** | | | | |
| | CH-24-130-II | Supply, Installation and commissioning of Fully loaded 12 Port LC-Duplex patch panel, OM3 1U Metal housing 480 x 243 x 44 mm, grey RAL 7035 Slide-out tray with changeable front plate 2 sets 12 color pigtails OM3 with LC connector Including fiber adapters, pigtails and splice tray With 2 pcs. PG13.5 cable clamp, 6 pcs. cable tie Including 4 sets of M6 screws and nuts , including all accessories, in all respect as approved and directed by Engineer Incharge. | Each | 2 | | |
| k | | **PATCH PANEL** | | | | |
| | CH-125-II | Supply, Installation and commissioning of 19" Rack Mounted of specified, UTP Patch Panel with specified toolless support & Rear Cable Management, ULlisted, Loaded with UTP of specified Keystone Jack Toolless Support, Made of Schneider / Norden / 3MCorning/D-Link, Pollo Australia or equivalent approved manufacturer and Directed by Engineer Incharge.<br>**CAT-6A (24 Port Patch Panel with Toolless Support 10-Gigabit)** | Each | 10 | | |
| 11 | | **Access Control System** | | | | |
| | CH-24-158-iii | Supply, installation, testing, and commissioning of following RFID based Access Control Machines with display i/c the cost of mounting accessories, complete in all respect. Make: Norden / Bosch / Honey Well, complete in all respect as approved and directed by Engineer Incharge.<br>**Keypad Finger/Thumb, Retina** | Each | 1 | | |
| 12 | | **Power Supply** | | | | |
| | CH-24-153 | Supply, installation, testing, and commissioning of Power Supply with stabilized voltage of 12 volt DC (+/- 15%). The PSU supplies voltage U= 13.8 V DC with current efficiency =4.5 A +0.5A battery charging for access control machines, in case of power failure, instantaneous switching to battery operation complete in all respects. Make: Norden / Bosch / Honey Well, Complete in all Respect as approved and directed by Engineer Incharge. | Each | 1 | | |
| 13 | | **Access Controller** | | | | |
| | CH-24-159-II | Supply, installation, testing, and commissioning of Access Controller suitable for standard controller with TCP/RS-485.commuinication ports, for specified doors, complete in all respect. make: KADE Europe/Norden / Bosch /Honey Well, complete in all respect as approved and directed by Engineer Incharge.<br>**4-doors** | Each | 1 | | |
| I | | **SCHEDULE ITEMS TOTAL COST** | | | | |

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| Sr. No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 14 | | **Light Fitting Fixtures** | | | | |
| | | Supply, installation, connecting and testing of imported lighting fixtures surface/ceiling mounted or to be fixed in the false ceiling, complete with ceiling rose, lamp holders, Light drivers, control units, 3 way lever connectors and earthing terminals and internal wiring, connector, including hangers, brackets & necessary hardware such as screws, anchors, etc. complete in all respect approved type and to entire satisfaction of Consultants/Client. Manufactured by Phillips, NVC or equivalent. | | | | |
| a | | LED Down light, 15 watts, 220/240 volts, Temperature 3000k warm or above, 100 Lm/W or above, 1500 Lumens or above, Color Rendering > 80, Power factor 0.9. Complete in all respect. | Each | 85 | | |
| b | NS | Vanity/Mirror light with light 9 watt, 1250 lumens or above, Color Rendering > 90, Power factor >0.5. Complete in all respects. | Each | 15 | | |
| c | | LED Down light, 12 watts, 220/240 volts, 100 Lm/W or above, 1200 Lumens or above, Temperature 3000k warm or above, Color Rendering Index > 80, Power factor 0.9. Complete in all respect. | Each | 60 | | |
| d | | Recessed/Surface mounted linear light 36W, 220-240V / 50 - 60Hz, Temperature cool 6000k or above, 4680 lumens or above, 130lm/w or above, CRI>90, P.f: 0.9, IP20, protection safety class-I, Dimension (HxWxL): 75x90x1220mm. Complete in all respect. | Each | 540 | | |
| e | | Supply, installation, testing and comiisioning of Custom Profile Light as per design including LED Strip light 20w/m, 24 vdc, CCT: 6000k/cool, IP-20, complete in all respect including lever connectors as per satisfaction of the client. | RFT | 1,200 | | |
| 15 | | **Junction Box** | | | | |
| a | | Supply, installation, testing, and commissioning of Junction box IP-56 with wall mounted bracket, 3 cu terminals strips LNE, one incoming cable gland 2c+1c 16mm2 cu/pvc/pvc and 3 outgoing cable glands 2c+1c 4mm2 cu/pvc/pvc for 190x140x70mm ip56 gw 650°c, halogen free grey engineering plastic. Make Approved and Directed by Engineer In charge. Make Scame italy, ABB germany, Mitsubishi japan, EU or USA Manufactured only. | Each | 45 | | |
| 16 | | **POWER AND DATA OUTLET POP-UP Box** | | | | |
| a | NS | Supply, installation, testing, and commissioning of Table/Wall Matt Black 8 Module Pop-Up box containing two universal 13A power sockets and 2 Data RJ45 IP Outlets. Including 3 way lever connectors and thimbles. Complete in all respect as per satisfaction of the engineer in charge. Make: Legrand France, Point Pod Australia, Mockett USA or equivalent. Manufacturing shall be of EU/USA based. | Each | 25 | | |
| b | NS | Supply, installation, testing, and commissioning of Table/Wall Aluminium 8 Module Pop Up box containing two universal 13A power sockets and 2 Data RJ45 IP Outlets. Including 3 way lever connectors and thimbles. Complete in all respect as per satisfaction of the engineer in charge. Make: Legrand France, Point Pod Australia, Mockett USA or equivalent. Manufacturing shall be of EU/USA based. | Each | 200 | | |
| 17 | | **CABLE MANAGER** | | | | |
| | NS | Supply, installation, testing, and commissioning of Cable Manager Made: APC USA, Attom or equivalent of EU OR USA Brands | Each | 10 | | |
| 18 | | **PDU** | | | | |
| | NS | Supply, installation, testing, and commissioning of PDU, Basic, 1U, 1 Phase, 3.7kW, 230V, 16A, 8 x C13 outlets, IEC60320 C20 inlet: APC USA, Attom or equivalent of EU OR USA Brands | Each | 4 | | |
| 19 | | **Fiber Patch Cord** | | | | |
| | NS | Supply, Installation and commissioning of Cat-6a, UTP Machine Made Patch Cord of Specified Length, Support 10Giga, UL listed cable, with anti snag boots, Gold Over Nickel Plated, Manufacturer/OEM Authorization, confirming to manufacturer warranty, directed by Engineer Incharge.<br>i)Cat6a Patch Cored 3 meter 24 AWG Make Digitus UK, Corning Germany or equalent | | | | |
| | | 1-meter patch cord | Each | 10 | | |
| 20 | NS | **SPD 100 KA TYPE 1+2/ CLASS I+II For 3p with separate NNPE Make phoenix, ABB Germany Or EU/USA Manufactured Equivalent.** | Each | 2 | | |

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ELECTRICAL & IT WORKS ENGINEERING BOQ
MRS, 2nd BI-ANNUAL-2025 (01.07.2025 to 31.12.2025) DISTRICT LAHORE

**NOTE: Submittal of all equipment shall be approved before delivery at site. Third-party testing of all equipment will be provided and conducted from government approved labs, in accordance with the client's or consultant's requirements and final approval shall be accorded after lab testing and FAT inspection results. Additionally, the manufacturer will provide original OEM authorization certificates and type test reports of imported items and shall be provided in the submittal. Consultant can also conduct site sample testing as per their requirement.**

| Sr. No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 21 | | **Single core cable 250/440** | | | | |
| | | Supply, installation and testing of single core LSZH insulated, LSZH | MDPE sheathed copper conductor, 250/440 volts grade cable Standard: BS: 6346, IEC 60502-1, 60228, 60332-1, in prelaid EMT Aluminum conduits/cable trays, manufactured by LPCB approved manufacturer, (rate for cable only) | | | | |
| | | **Note: Following cables are for LNPE** | | | | |
| | NS | 3/0.74mm" (1.5mm²) LP-P,SB-FLP, FP-P, SB-FFP | Meter | 6,500 | | |
| | NS | 7/0.74 mm (7/0.029") (2.5mm²) | Meter | 1,000 | | |
| | NS | 7/0.91 mm (7/0.036")(4mm²) | Meter | 1,000 | | |
| | NS | 7/1.63 mm (7/0.064") (16mm²) DB-JB | Meter | 1,200 | | |
| | | **Two core cable 250/440** | | | | - |
| 22 | | Supply, installation and testing of Two core LSZH insulated, LSZH | MDPE sheathed copper conductor, 250/440 volts grade cable Standard: BS: 6346, IEC 60502-1, 60228, 60332-1, in prelaid EMT Aluminum conduits/cable trays, manufactured by LPCB approved manufacturer, (rate for cable only) | | | | |
| | NS | 7/0.74 mm (7/0.029") (2.5mm²) DB-SB | Meter | 3,000 | | |
| | NS | 7/0.91 mm (7/0.036") (4mm²) J.B-P.P | Meter | 1,500 | | |
| | NS | 7/1.63 mm (7/0.064") (16mm²) DB-JB | Meter | 1,200 | | |
| 23 | | **EMT Aluminium Pipe** | | | | |
| | | Supply and erection of EMT Aluminium conduit pipe/Ducts for wiring, 6000-series aluminum alloy,EMT-to-FMC adapters, Seismic Bracing Kits, Standards: UL 797, ANSI C80.5, Federal Specification WW-C-54-c, including inspection boxes, bends, pull boxes, saddles, bends, saddles, hooks, and repairing surface, etc., complete with all specials.<br>a) Recessed in walls i/c making jharries<br>b) On Surface i/c clamps | | | | |
| | NS | 25 mm Dia | Meter | 4,000 | | |
| | NS | 3" x 1" Wall Thickness 2.5mm | Meter | 500 | | |
| II | | **NON-SCHEDULE ITEMS TOTAL COST** | | | | - |
| | | **TOTAL COST (I + II)** | | | | - |

Engineering Consultancy Services Pakistan (Pvt.) Ltd. ECSP

# Volume 3 (Drawings)

# INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE

## ELECTRICAL TENDER DRAWINGS

## 7th FLOOR


**CONSULTANTS:**

**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
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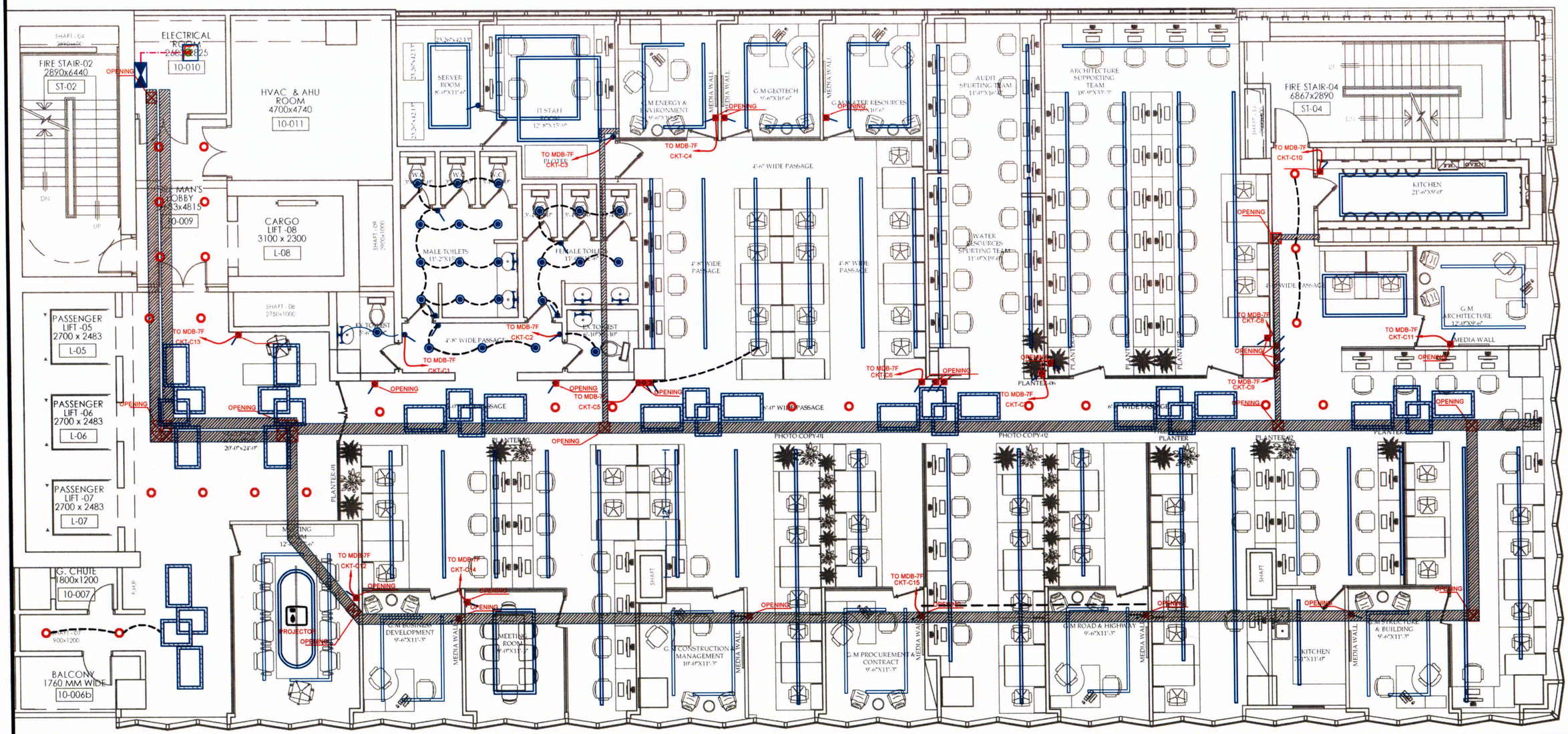
info@ecsp.com.pk www.ecsp.com.pk


Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

OPTION-04

TOTAL PERSON 140




# FINAL 7TH FLOOR LAYOUT PLAN

NOTE:
1-CABLE SIZE FOR LIGHT POINT TO POINT SHOULD BE 2 x1.5mm² LSZH CU.
2-CABLE SIZE FOR SWITCH BOARD TO FIRST POINT SHOULD BE 2 x 1.5mm² LSZH CU .
3-FROM MDB TO SWITCH BOARD SHOULD BE 2 x 2.5mm² LSZH CU .
4-ALL LIGHT AND POWER CIRCUITS SHALL RUN VIA CABLE TRAYS TO RESPECTIVE DROP POINTS OF SWITCH BOARDS AND POWER JUNCTION BOXES VIA EMT ALUMINUM CONDUITS RESPECTIVELY.

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT | S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|---|---|---|---|
| 1 | RECESSED/ SURFACE EMT ALUMINUM CONDUIT SIZE 1" DIA | | RECESSED IN SLAB | 7 | LED DOWN LIGHT 15W | | RECESSED MOUNTED |
| 2 | MAIN DISTRIBUTION BOX (MDB) | | ON WALL AT 4' F.F.L | 8 | LED DOWN LIGHT 12W | | RECESSED MOUNTED |
| 3 | 10A, 220V, ONE WAY, MULTI GANG SWITCH "(4)" INDICATES NUMBER OF SWITCHES | | H=4'-0"/AFFL | 9 | LINEAR LIGHT | | RECESSED MOUNTED |
| 4 | VANITY LED LIGHT 9W | | 8" ABOVE MIRROR | 10 | CABLE TRAY 12"x4" | | BELOW DUCT |
| 5 | PROFILE LIGHT CEILING (CHANDELIER) | | | 11 | CEILING ACCESS PANEL (OPENING) | | |
| 6 | PROFILE LIGHT CEILING | | | | | | |

Consultancy Services Punjab (Pvt) Ltd. ECSP Engineering

**CLIENT:**

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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**

**INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE**

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**LIGHTING LAYOUT 7TH FLOOR PLAN**

**DRAWING NO:** ELE-01

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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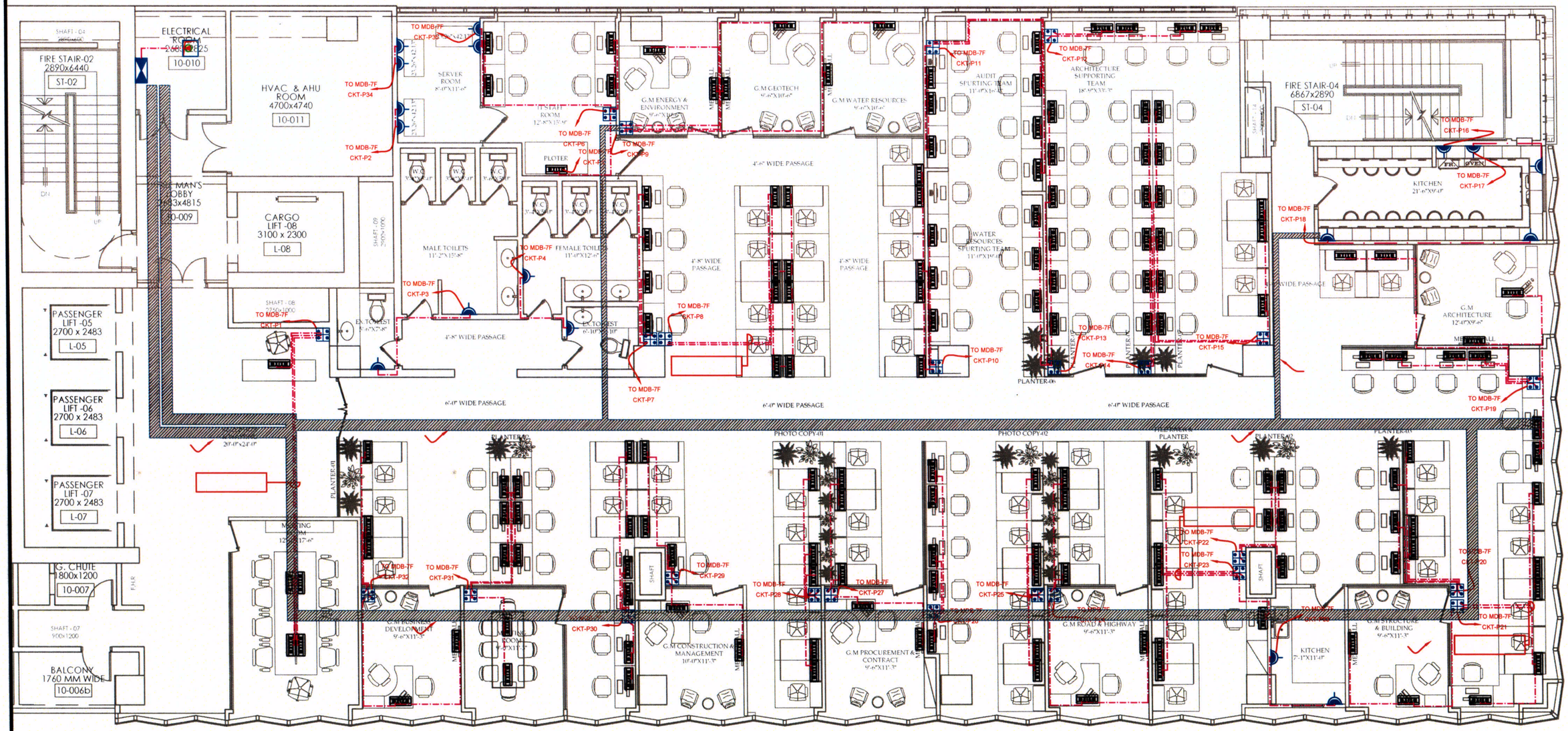
| | | | |

OPTION-04

TOTAL PERSON 140




# FINAL 7TH FLOOR LAYOUT PLAN

NOTE:
1-FROM MDB TO JUNCTION BOX SHOULD BE 2C+1C x 16mm² LSZH CU.
2-FROM JUNCTION BOX TO POWER OUTLET SHOULD BE 2C+1C x 4mm² LSZH CU.
3-ALL LIGHT AND POWER CIRCUITS SHALL RUN VIA CABLE TRAYS TO RESPECTIVE DROP POINTS OF SWITCH BOARDS AND POWER JUNCTION BOXES VIA EMT ALUMINUM CONDUITS RESPECTIVELY.

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT | S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|---|---|---|---|
| 1 | RECESSED/ SURFACE EMT ALUMINUM CONDUIT SIZE 1" DIA | | | 7 | DISCONNECT LINK | | |
| 2 | MAIN DISTRIBUTION BOX (MDB) | | ON WALL AT 4' F.F.L | 8 | CEILING ACCESS PANEL (OPENING) | | |
| 3 | MULTI STANDARD UNIVERSAL SOCKET 13 AMPS | | ON WALL AT 2' F.F.L | | | | |
| 4 | MULTI STANDARD UNIVERSAL SOCKET 16 AMPS | | ON WALL AT 2' F.F.L | | | | |
| 5 | TABLE POPUP POWER & DATA BOX OUTLET | | ON TABLE | | | | |
| 6 | JUNCTION BOX | | ON WALL 2' F.F.L | | | | |

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**PROJECT:**

**INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE**

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**POWER LAYOUT 7TH FLOOR PLAN**

**DRAWING NO:** ELE-02

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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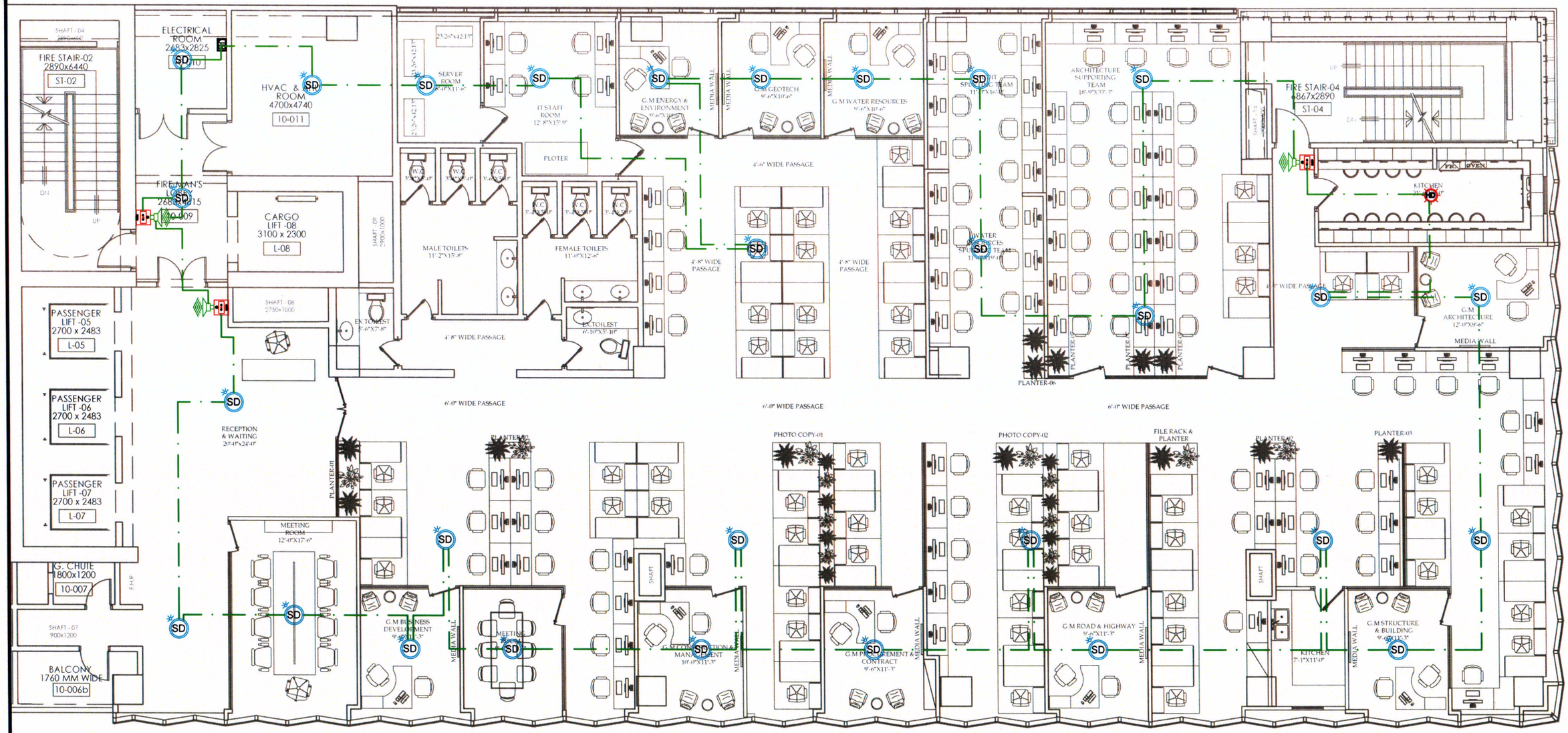
OPTION-04

TOTAL PERSON 140




# FINAL 7TH FLOOR LAYOUT PLAN

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|
| 1 | SMOKE DETECTOR | SD | CEILING |
| 2 | HEAT DETECTOR | | CEILING |
| 3 | MANUAL CALL POINT | MCP | H=4'-0"/AFFL |
| 4 | SOUNDER BEACON | | ON WALL AT 8' F.F.L |
| 5 | 1" PVC CONDUIT FOR FIRE ALARM CABLE | | |

**CLIENT:**

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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**

**INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE**

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**FIRE ALARM SYSTEM LAYOUT 7TH FLOOR PLAN**

**DRAWING NO:** ELE-03

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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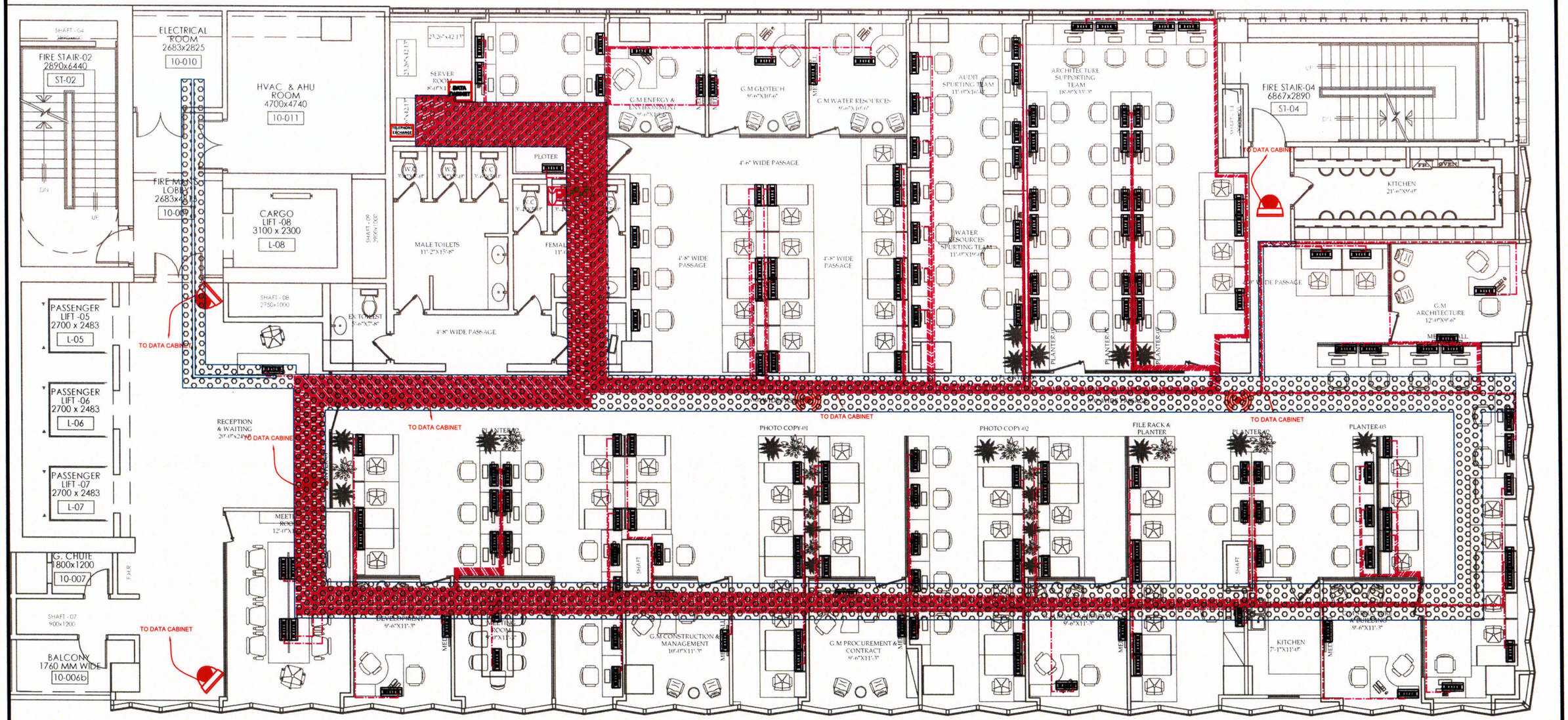
OPTION-04

TOTAL PERSON 140




FINAL 7TH FLOOR LAYOUT PLAN

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|
| 1 | DOME CAMERA | | CEILING |
| 2 | DATA CABINET | | |
| 3 | WIFI ROUTER | | |
| 4 | CCTV CABLE CAT-6 | | |
| 5 | TABLE POPUP POWER & DATA BOX OUTLET | | |

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**PROJECT:**

**INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE**

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**CCTV AND TELEPHONE SYSTEM LAYOUT 7TH FLOOR PLAN**

**DRAWING NO:** ELE-04

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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| | | | |
| | | | |

# INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE

## ELECTRICAL TENDER DRAWINGS

## 14th FLOOR


**CONSULTANTS:**

**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
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+92-42-99333976, +92-42-5717681-4
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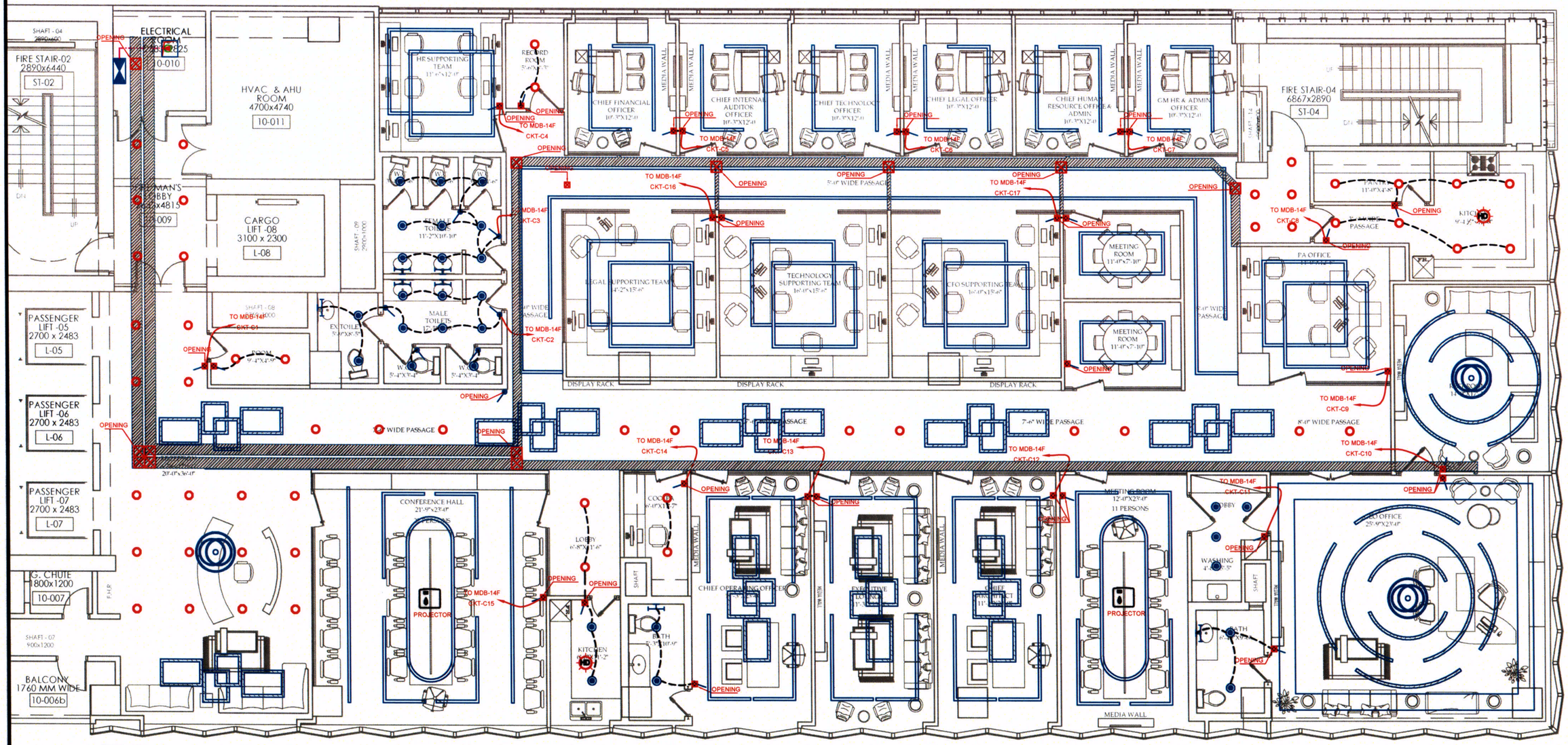
01 CEO 08 CHIEF 28 WORKING STAFF TOTAL=37




FINAL 14TH FLOOR LAYOUT PLAN

NOTE:
1-CABLE SIZE FOR LIGHT POINT TO POINT SHOULD BE x 1.5mm² LSZH CU.
2-CABLE SIZE FOR SWITCH BOARD TO FIRST POINT SHOULD BE 1.5mm² LSZH CU .
3-FROM MDB TO SWITCH BOARD SHOULD BE 2 x 2.5mm² LSZH CU .
4-ALL LIGHT AND POWER CIRCUITS SHALL RUN VIA CABLE TRAYS TO RESPECTIVE DROP POINTS OF SWITCH BOARDS AND POWER JUNCTION BOXES VIA EMT ALUMINUM CONDUITS RESPECTIVELY.

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT | S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|---|---|---|---|
| 1 | RECESSED/ SURFACE EMT ALUMINUM CONDUIT SIZE 1" DIA | | RECESSED IN SLAB | 7 | LED DOWN LIGHT 15W | | RECESSED MOUNTED |
| 2 | MAIN DISTRIBUTION BOX (MDB) | | ON WALL AT 4' F.F.L | 8 | LED DOWN LIGHT 12W | | RECESSED MOUNTED |
| 3 | 10A, 220V, ONE WAY, MULTI GANG SWITCH "(4)" INDICATES NUMBER OF SWITCHES | | H=4'-0"/AFFL | 9 | LINEAR LIGHT | | RECESSED MOUNTED |
| 4 | VANITY LED LIGHT 9W | | 8" ABOVE MIRROR | 10 | CABLE TRAY 12"x4" | | BELOW DUCT |
| 5 | PROFILE LIGHT CEILING (CHANDELIER) | | | 11 | CEILING ACCESS PANEL (OPENING) | | |
| 6 | PROFILE LIGHT CEILING | | | | | | |

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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**

**INTERIOR FIT-OUT WORKS OF ECSP'S NEW HEAD OFFICE**

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**LIGHTING LAYOUT 14TH FLOOR PLAN**

**DRAWING NO:** ELE-01

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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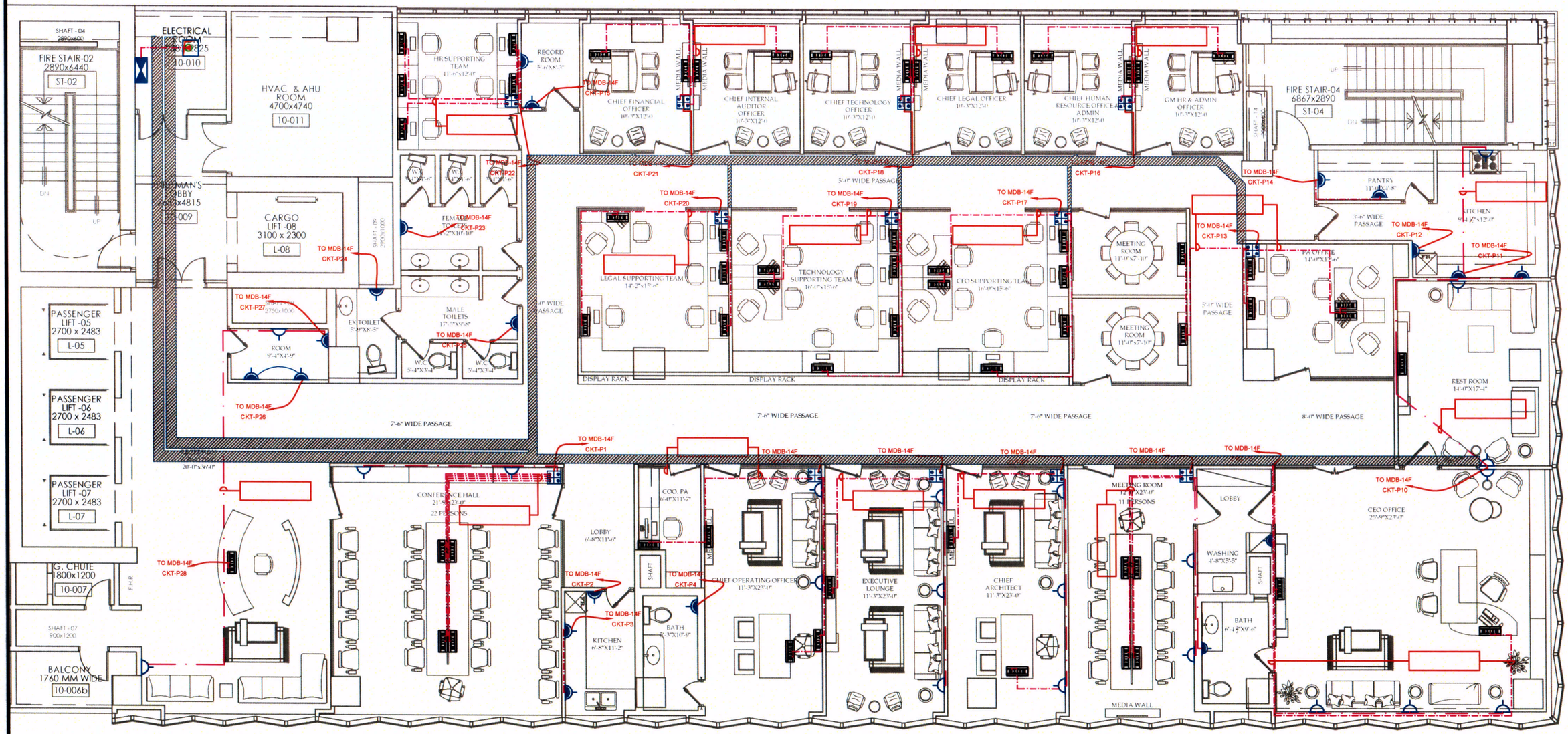
# 01 CEO 08 CHIEF 28 WORKING STAFF TOTAL=37




FINAL 14TH FLOOR LAYOUT PLAN

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

NOTE:
1-FROM MDB TO JUNCTION BOX SHOULD BE 2C+1C x 16mm² LSZH CU.
2-FROM JUNCTION BOX TO POWER OUTLET SHOULD BE 2C+1C x 4mm² LSZH CU.
3-ALL LIGHT AND POWER CIRCUITS SHALL RUN VIA CABLE TRAYS TO RESPECTIVE DROP POINTS OF SWITCH BOARDS AND POWER JUNCTION BOXES VIA EMT ALUMINUM CONDUITS RESPECTIVELY.

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT | S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|---|---|---|---|
| 1 | RECESSED/ SURFACE EMT ALUMINUM CONDUIT SIZE 1" DIA | | | 7 | DISCONNECT LINK | | |
| 2 | MAIN DISTRIBUTION BOX (MDB) | | ON WALL AT 4' F.F.L | 8 | CEILING ACCESS PANEL (OPENING) | | |
| 3 | MULTI STANDARD UNIVERSAL SOCKET 13 AMPS | | ON WALL AT 2' F.F.L | | | | |
| 4 | MULTI STANDARD UNIVERSAL SOCKET 16 AMPS | | ON WALL AT 2' F.F.L | | | | |
| 5 | TABLE POPUP POWER & DATA BOX OUTLET | | ON TABLE | | | | |
| 6 | JUNCTION BOX | | ON WALL 2' F.F.L | | | | |

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**PROJECT:**
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| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**
**POWER LAYOUT 14TH FLOOR PLAN**

**DRAWING NO:** ELE-02

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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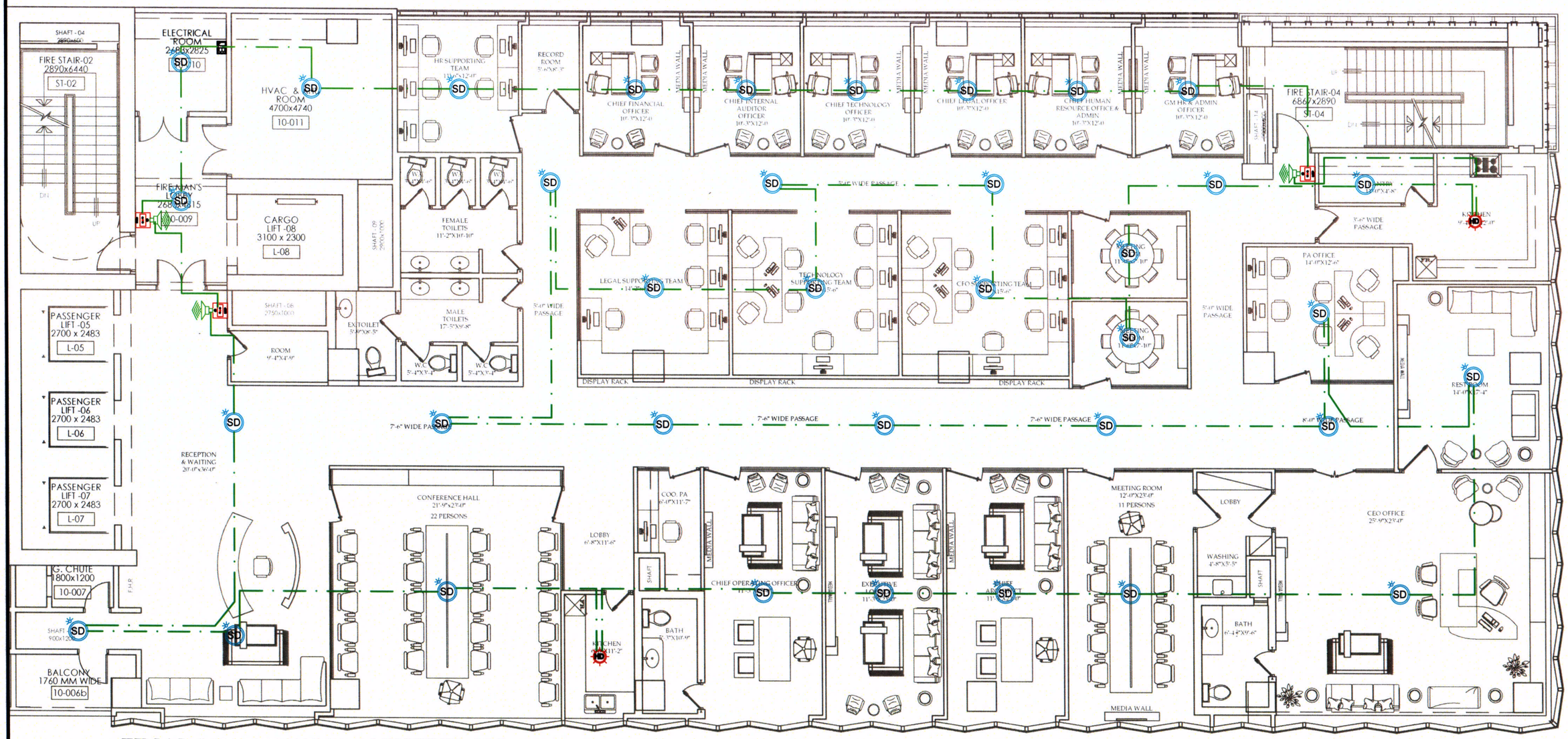
01 CEO 08 CHIEF 28 WORKING STAFF TOTAL=37




# FINAL 14TH FLOOR LAYOUT PLAN

Consultancy Services Punjab (PVT) Ltd. ECSP Engineering

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|
| 1 | SMOKE DETECTOR | SD | CEILING |
| 2 | HEAT DETECTOR | HD | CEILING |
| 3 | MANUAL CALL POINT | MCP | H=4'-0"/AFFL |
| 4 | SOUNDER BEACON | | ON WALL AT 8' F.F.L |
| 5 | 1" PVC CONDUIT FOR FIRE ALARM CABLE | | |

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| DESIGNED BY: | Engr.RAJA ABDULLAH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**FIRE ALARM SYSTEM LAYOUT 14TH FLOOR PLAN**

**DRAWING NO:** ELE-03

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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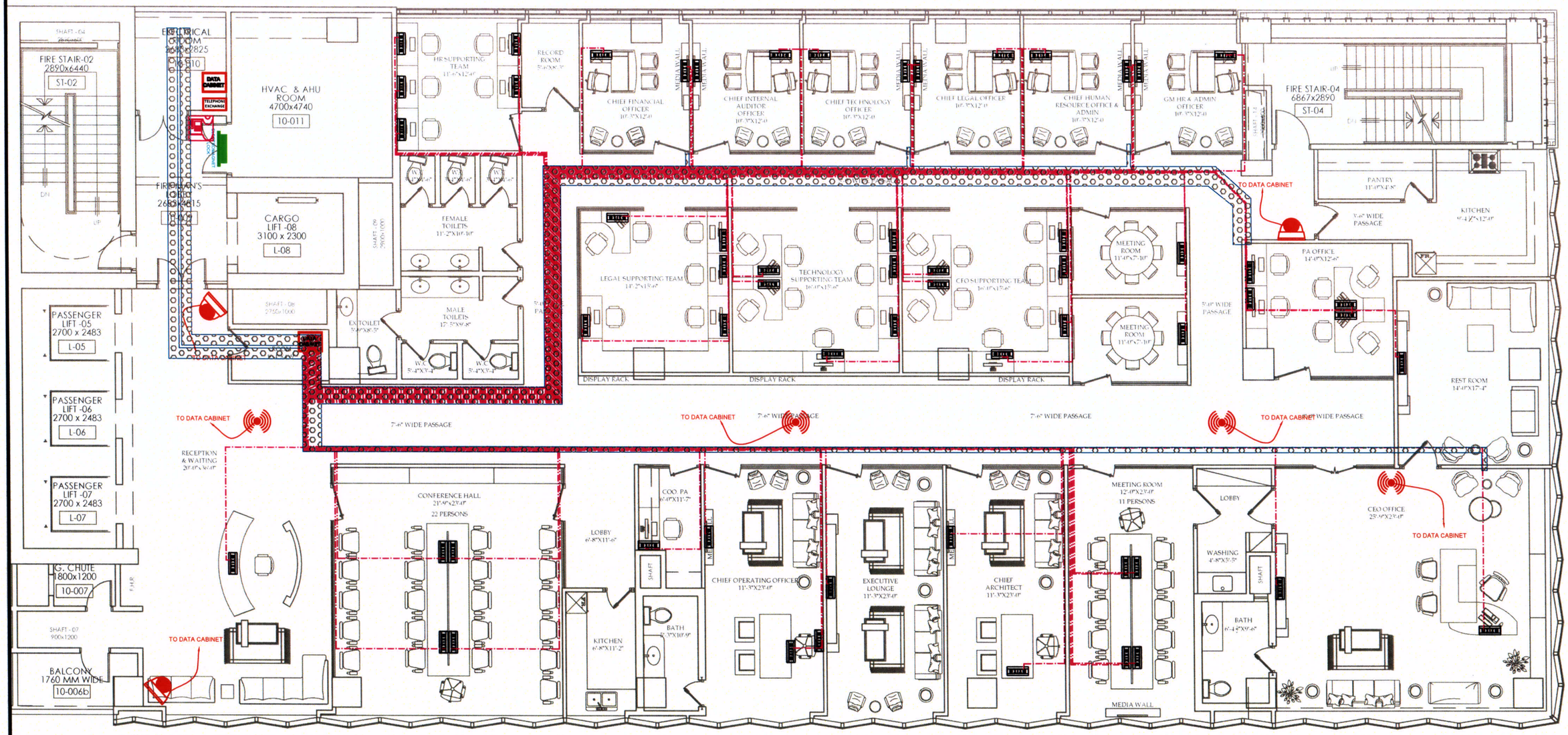
01 CEO 08 CHIEF 28 WORKING STAFF TOTAL=37




# FINAL 14TH FLOOR LAYOUT PLAN

## LEGEND

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|
| 1 | DOME CAMERA | | CEILING |
| 2 | DATA CABINET | | |
| 3 | WIFI ROUTER | | |
| 4 | CCTV CABLE CAT-6 | | |
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| APPROVED BY: | | |
| DATE: | NOVEMBER, 2025 | |

**DRAWING TITLE:**

**CCTV AND TELEPHONE SYSTEM LAYOUT 14TH FLOOR PLAN**

**DRAWING NO:** ELE-04

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
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